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KONE MONOSPACE® 500, KONE MONOSPACE® 700, KONE ECOSPACE™, KONE TRANSYS™ LCE (EN 81–20)

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1 ABOUT THIS INFORMATION

This information provides general guidance on the maintenance and usage of your elevator. By following this information you ensure safe, comfortable and reliable service for the elevator users in your building. You also increase the service life of your elevator, better retaining the value of your investment.

This information is compiled according to the guideline of the EEA for new elevator deliveries by providing the following information:

- Normal use of the elevator
- General maintenance
- Preventive maintenance
- Maintenance program
- Safety component maintenance
- Periodical inspection tests
- Rescuing trapped passengers

NOTE: Store this information so that it is accessible to authorized persons if needed.

NOTE: The pictures in these instructions are for illustrative purposes only, intended to provide general information. Some minor details in the illustrations can be different than the actual equipment.

We trust that you will be completely satisfied with your new equipment.

Safety and reliability are KONE's primary concerns and have been strongly emphasized in the design, manufacture, installation and maintenance processes of this elevator. The revolutionary elevator technology, together with KONE's quality, guarantees you a modern, ecologically-friendly elevator which will maintain its functionality in the years to come.

Planned preventive maintenance helps you take care of your elevator. You can ensure the future value of your investment by implementing a carefully-planned preventive maintenance program, carried out by a competent maintenance company. KONE has the experience and knowledge needed to plan and carry out a program that will meet all the maintenance needs of your elevator.

KONE offers you a wide range of top quality maintenance and training services with the help of our global organization and the latest elevator technology. For more information on these services, please contact your local KONE office.

1.1 Audience

This information is intended for the elevator owner, competent maintenance company and authorities performing periodical inspections.

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1.2 Signs

	Danger of falling
	General warning: caution, danger, risk
	Risk of electric shock
	Risk of tripping
	Risk of crushing
	Risk of crushing on car roof
	Risk of crushing in pit
	Falling objects
	Do not lubricate
	General mandatory action
	Wear safety shoes
	Wear safety gloves

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	Turn main power OFF
	Lock and tag equipment
	Activate stop button or switch
	Verify de-energization
	Use fall prevention measures
	Use safety fences
	Wear eye protection
	Wear harness
	Wear helmet
	Incorrect
	Correct
 *X0000086743*	Use work stool

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1.3 Related information

- Local safety and maintenance information
- EN 81-20 Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts
- EN 81-50 Safety rules for the construction and installation of lifts. Examinations and tests. Design rules, calculations, examinations and tests of lift components
- EN 12015: Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Emission
- EN 12016: Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Immunity
- EN 13015 Maintenance for lifts and escalators. Rules for maintenance instructions
- EN 81-21: Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 21: New passenger and goods passenger lifts in existing building
- EN 81-58: Safety rules for the construction and installation of lifts - Examination and tests - Part 58: Landing doors fire resistance test
- EN 81-70: Safety rules for the construction and installations of lifts - Particular applications for passenger and good passenger lifts - Part 70: Accessibility to lifts for persons including persons with disability
- EN 81-71: Safety rules for the construction and installation of lifts - Particular applications to passenger lifts and goods passenger lifts - Part 71: Vandal resistant lifts
- EN 81-72: Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts - Part 72: Firefighters lifts
- EN 81-73: Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts - Part 73: Behaviour of lifts in the event of fire
- EN 81-77: Safety rules for the construction and installations of lifts - Particular applications for passenger and goods passenger lifts - Part 77: Lifts subject to seismic conditions
- Lifts Directive 2014/33/EU
- OM-01.01.006 KONE Cleaning Instructions - Elevator Decorative Materials and Accessories
- OM-01.01.007 Firefighting Elevator (EN 81-72)
- OM-01.01.008 Earthquake Devices (EN 81-77)
- OM-13.25.001 KRM Emergency Phone, Owner's manual

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1.4 National statutory requirements

In addition to Lifts Directive 2014/33/EU, you may need to follow national statutory requirements that are not discussed in this document. Typical requirements include the following:

- Fire regulations
- Working safety rules
- Elevator maintenance regulations

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– Electromagnetic compatibility

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2 SAFETY

Safety is KONE's primary concern. Constant attention is given to safety aspects in the design, manufacture and maintenance of elevators. In addition, KONE maintains a constant research effort in the field of new safety elements in order to provide you with the safest products possible.

Safety features, for example, the overspeed governor, locks, brakes, pit safety devices and safety gear make your elevator safe. There are, however, some remaining safety risks that cannot be fully eliminated. The following sections describe how to further increase the safety of your elevator.

2.1 Prior to putting the elevator into service

Prior to putting your elevator into service, you must ensure the following:

– A planned maintenance service program, to be carried out by a maintenance company, is established. The maintenance company should be the same for all elevators on the same site
– A 24-hour call out service for the elevator is available for the entire time that the elevator is in operation
– The name and telephone number of the maintenance company is visible inside the elevator

2.2 Safety considerations

Elevators, like all transportation equipment, require maintenance to operate reliably. An operational elevator is an important safety element of your building. It avoids the risks involved in the use of stairs and is essential for the transport of elderly and disabled persons.

As the owner of the building you must make sure that your building is safe for persons that need to use it, by observing the following considerations:

– If the availability of rescue personnel is changed so that a trapped person cannot be freed without undue delay, the elevator must be taken out of service
– If maintenance work is to be carried out in the elevator shaft, a competent maintenance person must be available while service personnel are on site
– The access ways to the elevator and working places must be kept safe and clean. The maintenance company must be informed of any changes or hazards in these access ways
– The keys to the MAP (machine-room-less elevators), machine room and control cabinet (elevators with machine room) and landing doors must be kept in a secure place inaccessible to unauthorized persons. The keys may be given only to competent maintenance persons

Preventive maintenance is crucial to maintain the safety of the elevator. Regular checks of your elevator's safety equipment help to locate defective components before they cause hazards.

Proper maintenance provides the following benefits:

– Better safety for elevator users
– Retention of value of your investment
– Increased service life of your elevator

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– More comfortable ride for elevator users
– Reduced number of elevator stoppages due to breakdown

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3 RESPONSIBILITIES AND QUALIFICATIONS

Elevator work is intended for elevator professionals only. Elevator maintenance work involves many risks that unskilled people are unaware of.

The following sections describe the roles involved in the maintenance of your elevator, and the responsibilities and qualifications of each role.

Table 1: Role definitions

Role	Definition
Owner	The owner is responsible for ensuring that a competent elevator maintenance company or organisation maintains the elevator in accordance with a predefined maintenance program.
Maintenance company	The maintenance company is a company or part of a company where competent maintenance persons carry out maintenance operations on behalf of the owner of the elevator.[1)]
Competent maintenance person	The competent maintenance person is a designated person, suitably trained, qualified by knowledge and practical experience, provided with necessary instructions and supported within their maintenance company to enable the required maintenance operations to be safely carried out. For more information on training, see the ISO 9000 series.

3.1 Owner's responsibilities

The following table describes the specific responsibilities of the owner as defined by EN 13015.

Table 2: Owner's responsibilities

	In particular the owner must be aware of the following:
1	Keep the elevator in safe operating condition. To fulfil this, the owner must use a maintenance company complying with the requirements of standard EN 13015 4.3.2.1.
2	Remove the elevator from service when the two-way means of communication is out of order (EN 13015 4.3.2.6).
3	Remove the elevator from service in case of dangerous situations (EN 13015 4.3.2.7).

The maintenance company must be informed of the following details:

– The access way to be used
– The location of any keys required for full access to all parts of the elevator
– The identities of persons accompanying the maintenance persons to the elevator, if necessary

1) EN 13015 Maintenance instructions for lifts and escalators - Rules for maintenance instructions

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– The specifics of personal protective equipment needed in the access ways, and where the equipment is located, if necessary
– The necessity of any modification work of equipment, or modification to the conditions related to the elevator

3.2 Maintenance company's responsibilities

The following table describes the specific responsibilities of the maintenance company.

Table 3: Maintenance company's responsibilities

	In particular the owner must be aware of the following:
1	The maintenance company must promptly inform you about progressive upgrading, in accordance with any relevant "essential health and safety requirements" as defined in new European directives and standards.
2	The maintenance company is responsible for keeping a record of the results of each intervention due to a failure of the appliance (in particular, the type of failure) and making this record available for you on request. This requirement is in addition to any national legal requirements obligating you to retain records.
3	The maintenance company is responsible for putting the elevator out of service in case of dangerous situations, and informing you of the situation.
4	The maintenance company is responsible for providing a competent person to operate the elevator for inspection by an authorized body, and for special works.
5	The maintenance company is responsible for providing the necessary spare parts for any repair.
6	The maintenance company is responsible for carrying out a risk assessment for any maintenance location and for any maintenance operation to be undertaken.
7	The maintenance company is responsible for carrying out a maintenance program such that preventive maintenance is suited to the specific installation and that corrective maintenance time, including logistics and technical delays, is as short as reasonably practicable.
8	The maintenance company is responsible for deciding the frequency of preventive maintenance operations so that several operations can be performed at the same time to facilitate maximum utilization of the appliance.
9	The maintenance company is responsible for recording all maintenance operations in the maintenance logbook.

NOTE: The maintenance company must carry out a risk assessment of any maintenance area and of any maintenance operation to be undertaken.

3.3 Qualified maintenance company

The following table describes the required qualifications of the company responsible for your elevator's maintenance.

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Table 4: Maintenance company's qualifications

	A qualified maintenance company is defined in this information as a company able to ensure that:
1	A risk assessment is carried out for every maintenance operation of an elevator, including cleaning, and taking into account the installer's maintenance instructions for every task to be undertaken.
2	The maintenance work is carried out in conformity with the relevant regulations and instructions and in line with the safety policy of the maintenance company.
3	Any call out is taken care of as soon as possible; most maintenance companies provide a 24-hour call out service. The call out response time, from the call to the arrival on site, must be in accordance with the nature of the call, giving priority to the rescue of persons. A remote monitoring system can provide information for response to the rescue.
4	To ensure transport of the infirm, elderly or disabled persons, any call out to the elevator must be performed as soon as possible; the maintenance company must provide a 24-hour call out service.
5	The competence of the maintenance personnel is continuously updated.
6	The maintenance company should carry adequate and proper insurance cover provided by a recognized insurance company.

3.4 Competent maintenance person

The following table describes the required qualifications of the person responsible for your elevator's maintenance.

Table 5: Maintenance person's qualifications

	A competent maintenance person is defined in this information as a person who:
1	Is a competent maintenance engineer as defined in EN 13015.
2	Has been trained in the maintenance procedures of this elevator to enable a true assessment of its condition for continued safe operation.
3	Is supported within his or her company.

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4 ENVIRONMENT

Elevators have an impact on the environment during their lifetime in the course of material and energy use, as well as wastes and emissions in manufacturing, installation and service. At KONE, our policy is to develop and supply environmentally-sound products.

4.1 KONE's environmental policy

We at KONE are conscious of the problems facing our environment and as a global organization feel that it is our duty to take care of and protect it. We do this through our operating practices and by developing environmentally-sound products and services. We feel that it is everyone's responsibility to ensure, and continually improve, efficient and economical use of all available natural resources.

4.2 Building efficiency

Your KONE elevator is an example of our environmental policy in practice and it shows how product innovations can minimize environmental degradation in building construction. Eliminating the need for a machine room, this elevator can be fitted into the building with minimum space requirements, saving costs compared with traditional elevator solutions. This is our contribution to the customer wish to make buildings more efficient and more environmentally friendly.

4.3 Energy savings

In accordance with regulations concerning the emissions of "greenhouse gases" and requirements for energy savings, the machine combined with the new control unit uses significantly less energy than a traditional traction machine with the same lifting power. Energy savings have characterized the design of the entire life cycle of this product. The light and compact hoisting machine saves much of the considerable energy consumed in the production of materials for a traditional traction elevator. The elevator also has an optional feature that switches off the elevator car lights when it has been idle for a few minutes.

The energy consumed by an elevator depends on the load, speed, travel height, average travel, traffic density, elevator technology and moving masses, for example, elevator car. This document consequently does not include energy consumption figures.

For more information on the power supply requirements, for example, voltage, frequency, maximum current and power, see the order bound document Basic Characteristics of the Lift in the owner's documentation binder.

4.4 Long lasting product

The construction of the machine is simple, assuring a long and reliable life span, a quality required of environmentally friendly products. KONE elevators are predominantly manufactured from recyclable materials.

4.5 Packaging materials

Elevator components are packed in wooden boxes. Cardboard, plastic films and polystyrene are used to protect small parts from damage during transportation and handling. KONE has

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taken care of the disposal of packages at the installation of on elevator. Packaging materials are sorted and recycled when local circumstances permit.

4.6 Final disposal

Entrust the dismantling and disposal of an elevator to a company specialized to disposal. Note the following instructions:

- Remove lead battery and fluorescent tubes, if present. Dispose of these materials according to local hazardous waste management procedures.
- Separate metals and other recyclable materials from non-recyclable materials
- Arrange recycling and disposal of materials with a professional waste management company
- If the elevator needs to be replaced with a new elevator, contact KONE sales for the installation of a new elevator and recycling and disposal of old elevator components

4.7 Materials used in your elevator

Elevators are composed mainly of different metals, for example, steel and cast iron. Some aluminium, bronze and copper are used in specific components. Decorative materials are the same as can be found in building interiors, for example, coated steel sheets, laminated panels, glass and rubber. There are a number of different electronic components as well as plastics.

The following table lists common hazardous materials and their frequency of use in elevators.

Table 6: Hazardous materials

Material	**Used**
Oil	Occasionally
Lead battery	Yes
Fluorescent tubes containing mercury	Occasionally
Asbestos	No

NOTE: Make sure that the elevator maintenance company has proper waste management procedures. Elevator ropes and other metal components are recyclable. Lead batteries and fluorescent tubes are hazardous waste.

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5 KONE MACHINE-ROOM-LESS ELEVATOR

Your KONE elevator is a machine-room-less rope suspension elevator that maximizes both vertical and horizontal space efficiency.

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A machine-room-less elevator eliminates the need for a separate machine room. In traditional elevator systems the machinery of the elevator has been mounted in a machine room. This has taken up valuable rental space and sometimes dominated building design. Since the machine is located in the elevator shaft, these problems no longer exist.

5.1 Operating principle

Passengers control the movement of the elevator car with the push buttons located in the elevator car and at the landings. The push buttons are connected to the elevator control system which is the "intelligence" of the elevator.

When the control system registers a call given by a passenger, the car moves to the required direction.

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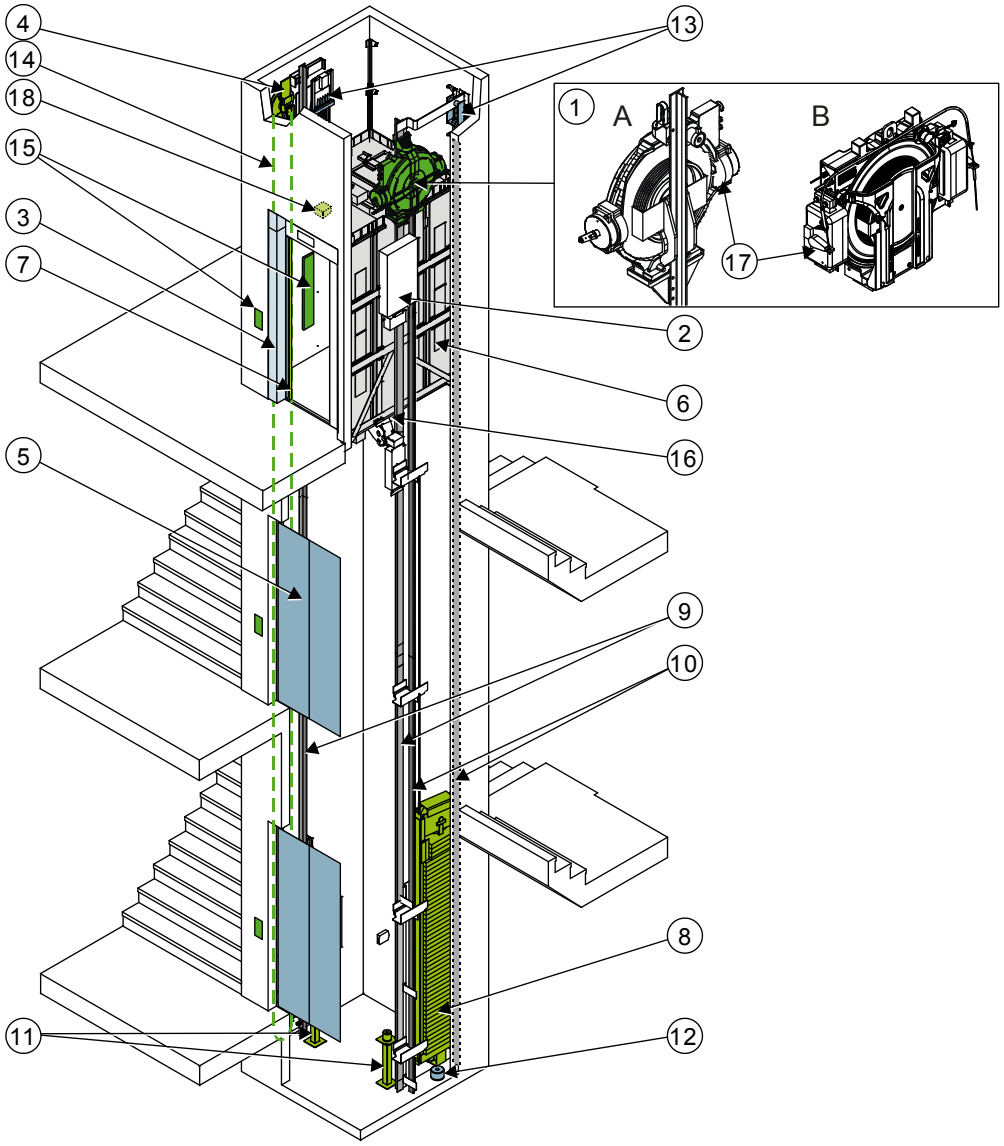
5.2 Components



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1	Hoisting machine – A = MX hoisting machine – B = NMX hoisting machine
2	Drive
3	Maintenance access panel
4	Overspeed governor
5	Landing doors
6	Elevator car
7	Car door
8	Counterweight
9	Car guide rails

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10	Counterweight guide rails
11	Car buffer
12	Counterweight buffer
13	Rope suspension points
14	Overspeed governor rope
15	Signalization
16	Safety gear
17	Brakes
18	EBD

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5.2.1 Hoisting machine

The machine is a gearless synchronous machine driven by a variable frequency drive.

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5.2.2 Brakes

The brakes are electromechanical devices that prevent the elevator car from moving when the car is at rest or power is cut OFF to the machine.

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5.2.3 Maintenance access panel

MAP is typically located beside the landing door and contains the elevator main switch, service user interface, emergency drive buttons and the car light supply switch. Due to its placement, it is extremely important that the MAP door is closed and locked at all times. There should not be any flammable materials near MAP.

NOTE: Do not block the working space in front of the MAP. The MAP is needed in rescue and maintenance operations.

WARNING: Never leave the MAP door unlocked or open while it is unattended. This provides unauthorized persons access to the elevator controls and may cause danger.

WARNING: Never remove the shields from the electrical system while the system is energized. The elevator's electrical systems are behind the shield and there is a risk of an electric shock if the shield is removed.

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5.2.4 Suspension ropes

The ropes provide the suspension connecting the elevator car to the machine traction sheave, pulleys and counterweight. The ropes are capable of supporting the elevator with a safety factor according to the elevator standards (typically > 10).

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5.2.5 Overspeed governor

The overspeed governor's function is to stop the elevator using the safety gear, and assisted by the machine brakes. The overspeed governor switch activates if the elevator car exceeds its rated speed and cuts the safety circuit thus closing the machine brakes. If the car continues to move downwards, the overspeed governor brakes the governor rope, which is attached to the safety gear. The safety gear engages and the elevator car stops. The overspeed governor is a mechanical device that is fully functional even during power failures.

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5.2.6 Safety gear

The safety gear is a mechanical safety device attached to the frame of the elevator car. When the elevator car exceeds its rated speed downward and the overspeed governor pulls the governor rope, the safety gear firmly grips the guide rails and stops the elevator car.

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5.2.7 Elevator car

The elevator car is an enclosure for passengers so that they can be transported safely from floor to floor.

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5.2.8 Counterweight

The counterweight ensures traction between the shaft top diverting pulleys and the suspension ropes, and comprise a set of weights to balance the weight of the car and a proportion of the car load.

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5.2.9 Landing and car doors

Doors are fixed to each landing and on the elevator car to protect users from injury during operation of the elevator. Electrical contacts in the door prevent the elevator from moving if the doors are not fully closed. Landing doors are fitted with a special lock that keeps the doors closed and locked if the elevator car is not level at that landing floor.

Preventing the landing door opening by accident is necessary to prevent people from falling into the elevator shaft.

All automatic doors have a closing force limiter, which prevents people being crushed.

If the construction of the door panels is to be changed, check with KONE that the changes are allowed and do not harm the functioning of doors.

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5.2.10 Signalization

The KONE Signalization System is the elevator's user interface. With operating panels and displays it informs the passengers of the elevator's position, allows them to call the elevator and set the destination floor. The KONE Signalization System transfers these messages through the elevator network to the control unit, which drives the elevator according to user commands. If KONE Remote Monitoring Services™ is used, the signalization system also operates as a voice connection between the elevator and the service company, allowing trapped passengers to talk to the service company.

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5.2.11 Guide rails

The guide rails are steel rails that guide the elevator car through the elevator shaft. Guide rails are attached vertically to the shaft structure.

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5.2.12 Buffers

The buffers stop the elevator car if it descends beyond its normal limit of travel. Because of the buffers, the car does not hit the pit floor or shaft ceiling under any circumstances.

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5.2.13 Emergency battery drive (EBD A or EBD M)

The elevator can be equipped with an optional emergency battery drive (EBD), which drives the car to the next landing if there is elevator power brake between landings. Normal operation is restored automatically when the power supply returns.

EBD A option automatically moves the elevator to the nearest floor in the lighter direction (car weight is greater or less than counterweight weight).

EBD M option requires maintenance personnel to start up the emergency battery drive.

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6 USING YOUR ELEVATOR

6.1 Dos and don'ts

The following table describes the best practices in the care and use of your elevator.

Table 7: Dos and don'ts

Dos	Don'ts
Comply with the stated number of persons/ weight for the elevator.	Do not press any of the elevator car buttons other than the level you require.
Give priority to disabled and elderly passengers.	Do not hold the elevator doors open, as doing so delays elevator service.
Remember the elevator etiquette "last in, first out."	Do not try to enter the elevator if the elevator doors are closing.
Instruct children thoroughly on the use of elevators. Children playing with elevators can cause dangerous situations.	Do not sweep rubbish or water into the elevator shaft.
Beware of closing doors. The force of closing doors is controlled but may in some cases be hazardous, especially for children and elderly people.	
Make sure that domestic animals are kept on a sufficiently short leash. Dangerous situations may occur should animals run out of the elevator as the elevator doors are closing.	

WARNING: Do not stand too close to the elevator doors. Clothing or fingers may get caught between moving door panels or between landing door panel and frame.

6.2 Transporting heavy loads

NOTE: Vehicles with small wheels may get stuck between the car and landing sills. Heavy loads on small wheels can exert enough pressure to damage the sills. Do not transport heavy loads over the elevator doorstep with wheeled vehicles. Use vehicles with large wheels.

WARNING: If you are temporarily transporting freight in the elevator, observe the following considerations:

- The weight is evenly distributed over the elevator floor
- The freight is fixed and will not move freely
- The elevator is not overloaded, as this may cause damage to the elevator equipment and danger to the passengers and persons near the elevator

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6.3 Events requiring the intervention of a competent person

The intervention of a competent person is required in the following situations:

– If the elevator does not move
– If the car lighting has failed
– If abnormal noise is heard from the elevator shaft
– If the doors do not close
– If the elevator has stopped and the doors do not open
– If an alarm has been notified and there is somebody in the elevator

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WARNING: Danger of severe accident. You must not start any rescue operation yourself unless you are trained for this task.

6.4 Elevator stops between floors

If the elevator stops between floors due to, for example, a power failure, remain calm and follow the instructions below. By following the instructions you will ensure that you will not unintentionally cause a hazardous situation.

If the elevator stops between floors
Try to start the elevator using the car call button. If the elevator still fails to respond, perform the following actions: 1. Press the alarm button. An internal alarm bell sounds. 2. Stay calm and relax. There is no danger and there is adequate ventilation. 3. The elevator is equipped with KONE Remote Monitoring (KRM) communications. You have a direct voice connection to a service center. Follow the instructions given to you from the service center.

WARNING: Do not try to exit the elevator without the assistance of a trained person. It is very dangerous to attempt to exit the elevator by yourself. Wait for an authorized person to arrive on the scene and follow their instructions.

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Related information

– OM-13.25.001 KRM Emergency Phone, Owner's Manual (11)

6.5 Door panel clearance

In a new elevator, clearance between the door panel and the wall must be 6 mm. With use, the clearance is allowed to expand to 8 mm. If the clearance is greater than 8 mm, door panels must be readjusted.

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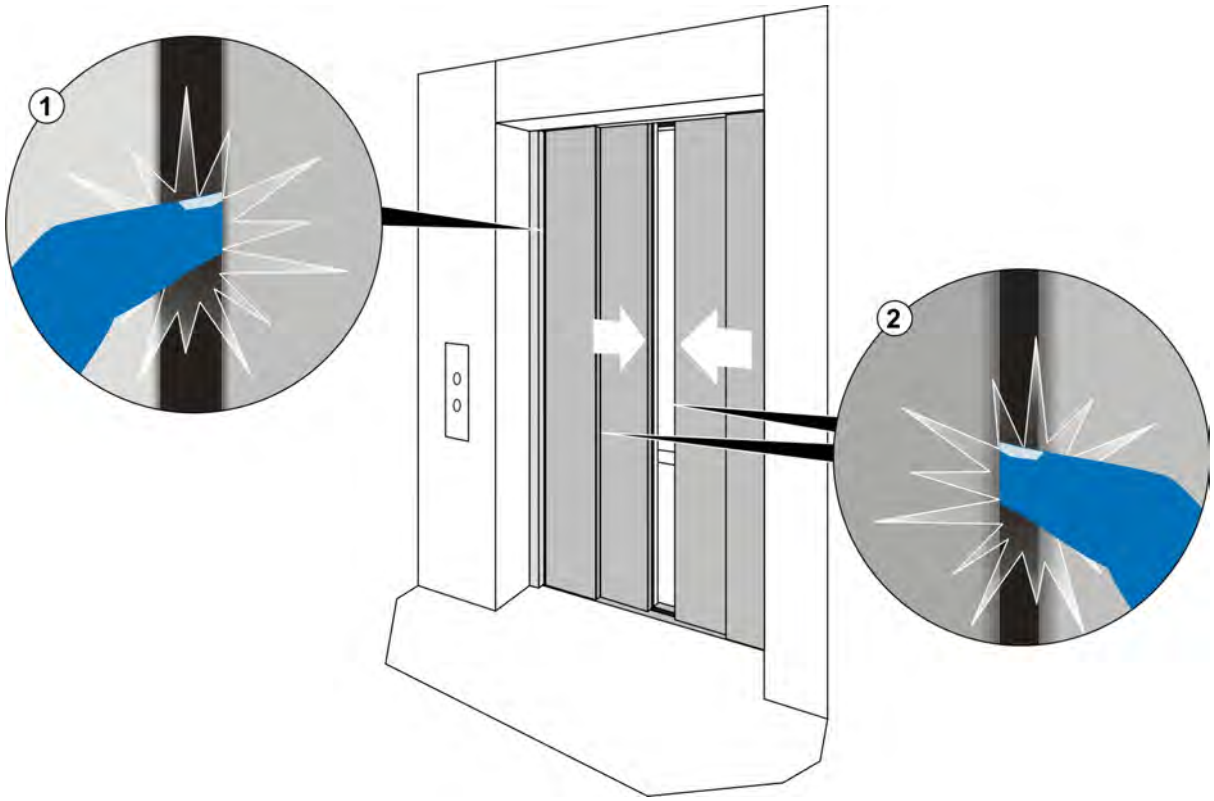

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1	Fingers or clothing may get caught between the door and the wall
2	Fingers or clothing may get caught between the doors

Figure 1: Door panel risk areas

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6.6 Optional features and components

Your elevator can be equipped with optional features or components.

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6.6.1 Elevators for persons with disabilities (EN 81-70)

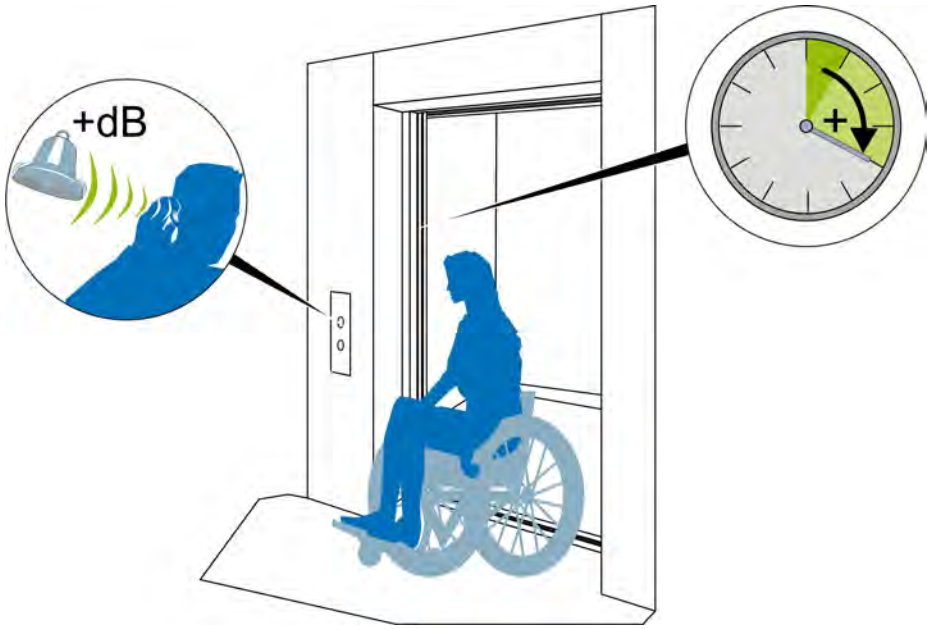

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Figure 2: Elevator features for the disabled

Accessibility features are an investment in building value. KONE provides elevators to comply with EN 81-70 when specified in the order. The owner must ensure that:

- There is safe and unobstructed access to the elevator and its control devices on landing. This is especially important for people using, for example, wheelchairs or roller frames.
- The door dwell time is sufficient for persons with disabilities. The initial setting with KONE elevator doors is 5 seconds, but this is adjustable to between 2 and 20 seconds. If the dwell time setting is not suitable or the passengers' needs change, for example, due to people getting older, the elevator owner must ask the elevator maintenance company to readjust the setting.
- The noise level of audible signals for call buttons in the car and at the landing is sufficient for people with impaired hearing. If the audible signal level is not sufficient, the elevator maintenance company can readjust them on request. Audible signals are adjustable between 35 and 65 dB(A). The background noise in the building may require an increase in the noise level of audible signals.
- Instructions for passengers on how to use specific control devices of the elevator, for example, accessibility button or destination control are available.
- Authorized persons to rescue trapped passengers are instructed to react immediately on signals from the emergency alarm device even when no response is given by the person in the car, as the person may have impaired hearing or speech. Rescue operations are otherwise performed as instructed in this document.

X0000090471 B.2

6.6.2 Elevator behavior in the event of fire according to EN 81-73

The EN 81-73 option, behaviour of an elevator in the event of fire, is targeted at elevators which are not intended for fire fighting or evacuation. If this option is provided, a "No entry" indication light is installed above the landing call buttons.

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A specific pictogram, "Do not use elevator in event of fire", is installed near the landing call station.

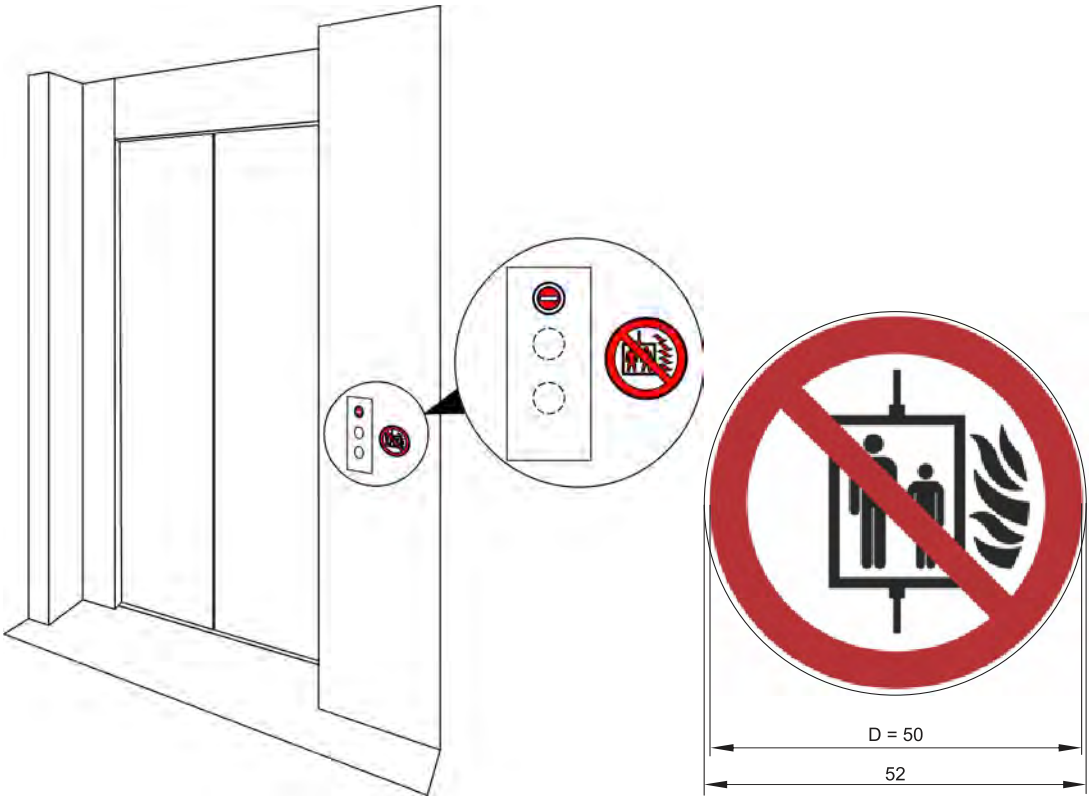

Figure 3: Elevator "No entry" indicators

The "No entry" indication light[2)] works in combination with the fire detection device. When the sensor detects a fire, the elevator returns to the evacuation floor to let passengers out. The elevator cannot be used after this. At the landing, there is a lighting message that the elevator is out of service due to fire.

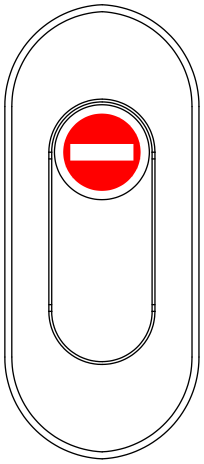

Figure 4: "No entry" indication light (EN 81-73:2005)

If there is no fire detection sensor, a manual switch at the evacuation floor will allow the fire fighters to ensure that no persons are trapped in the elevator.

2) The "No entry" indication light is only valid with EN 81-73:2005. With EN 81-73:2016, the indication light is not mandatory.

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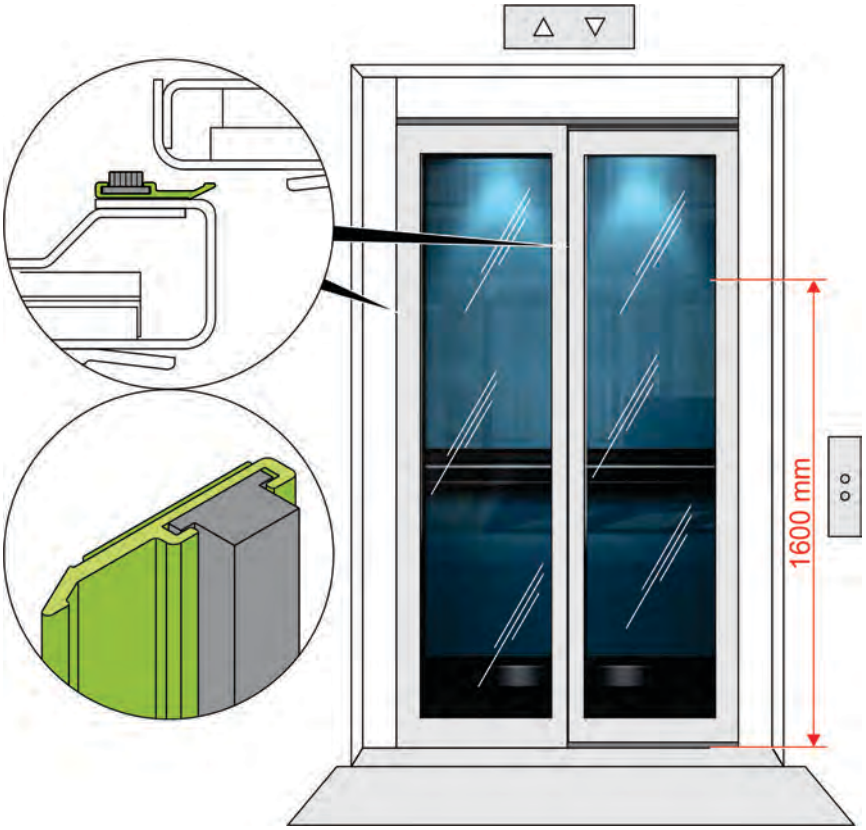
It is the responsibility of the owner to test this function periodically.

X0000090524 D.3

6.6.3 Glass door panels

If the lower edge of the glass section on the door panel is situated lower than 1600 mm from finished floor level, a protection trim must be placed between the panel and the wall. Protection trim must not be removed, and must be replaced if broken.



X000030144

Figure 5: Critical protection area

X0000090473 B.2

X0000087672 C.2

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7 MAINTENANCE

The elevator must be maintained by a competent maintenance company. The safety components must be maintained with special care, so all safety equipment is operational always.

NOTE: If you detect any abnormal behavior in any of the components of your elevator, contact your maintenance company immediately. Place out-of-order signs to landings to prevent using the elevator.

Related information

– Responsibilities and qualifications (15)
– Maintenance program checklist (35)

7.1 Before you contact KONE - maintenance by owner

Although most of the maintenance performed on elevator equipment must be left to your maintenance company, there are a few tasks you can carry out yourself. By carrying out these tasks, you retain the value of your elevator, and ensure a more comfortable and safe ride for elevator users.

Consult your local KONE representative concerning what is and what is not covered under the maintenance agreement. It is important that you understand what maintenance you must perform between service calls.

To prevent unnecessary service calls, check the following items before contacting KONE:

– Check that your building has power from the external power grid.
– Check for broken light bulbs or LEDs inside the elevator car, and replace accordingly if possible.
– Check that all key operated switches are in normal operating or RUN position.
– Check for blown fuses or tripped circuit breakers of the building power supply.
– Check that elevator car is cleaned regularly.
– Check that there is no debris in landing door sills and elevator car door sills, both are recommended to be cleaned regularly, as debris can prevent the doors from operating properly.

When you contact KONE for maintenance, provide the following information:

– Building address
– Elevator number
– Description of the problem

  Be as accurate and detailed as possible.

7.1.1 Changing tenant directory information sheet

Your elevator can be equipped with a tenant directory that contains the house tenant information. You can change the ordinary paper used as the information sheet yourself.

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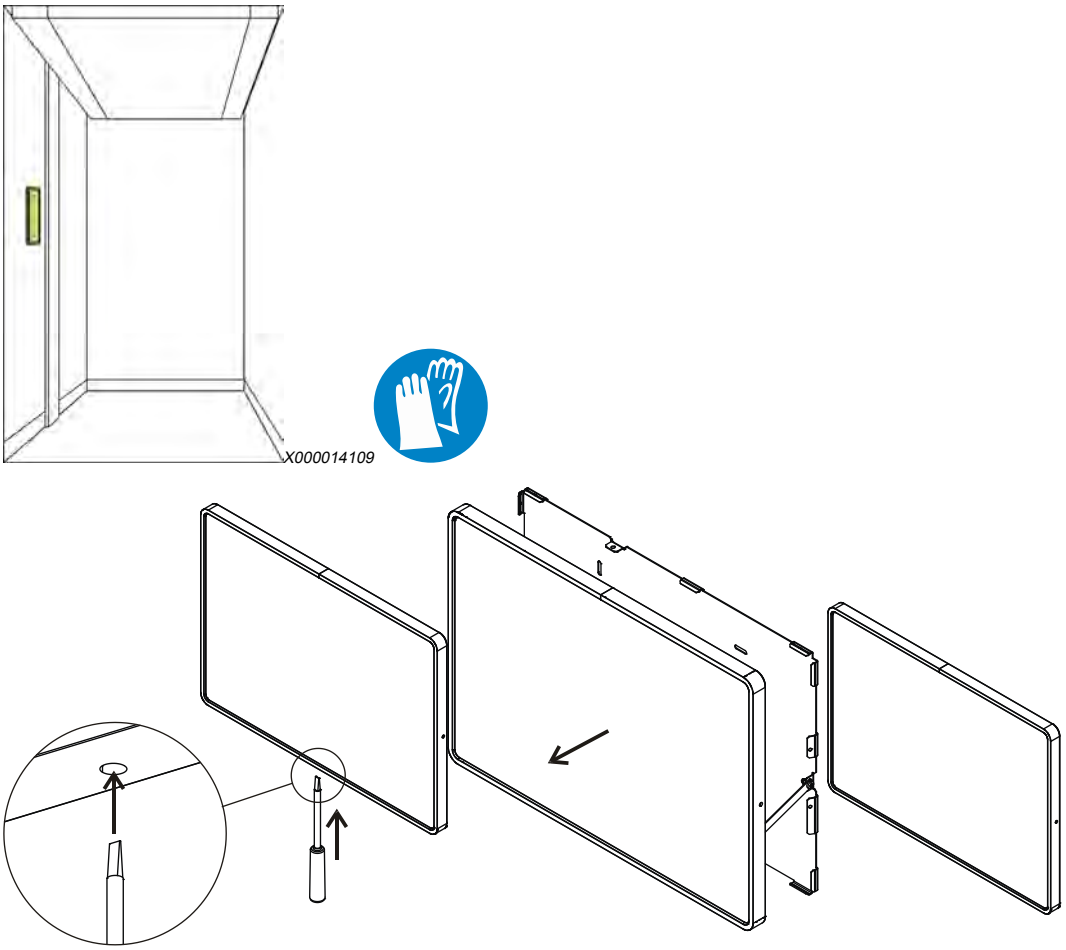

Figure 6: Tenant directory (TD1 and TD2)

1. Release the frame fixing with a screwdriver.
2. Pull the frame to access the information sheet.
3. Replace the information sheet.
4. Push the frame to lock it back in place.

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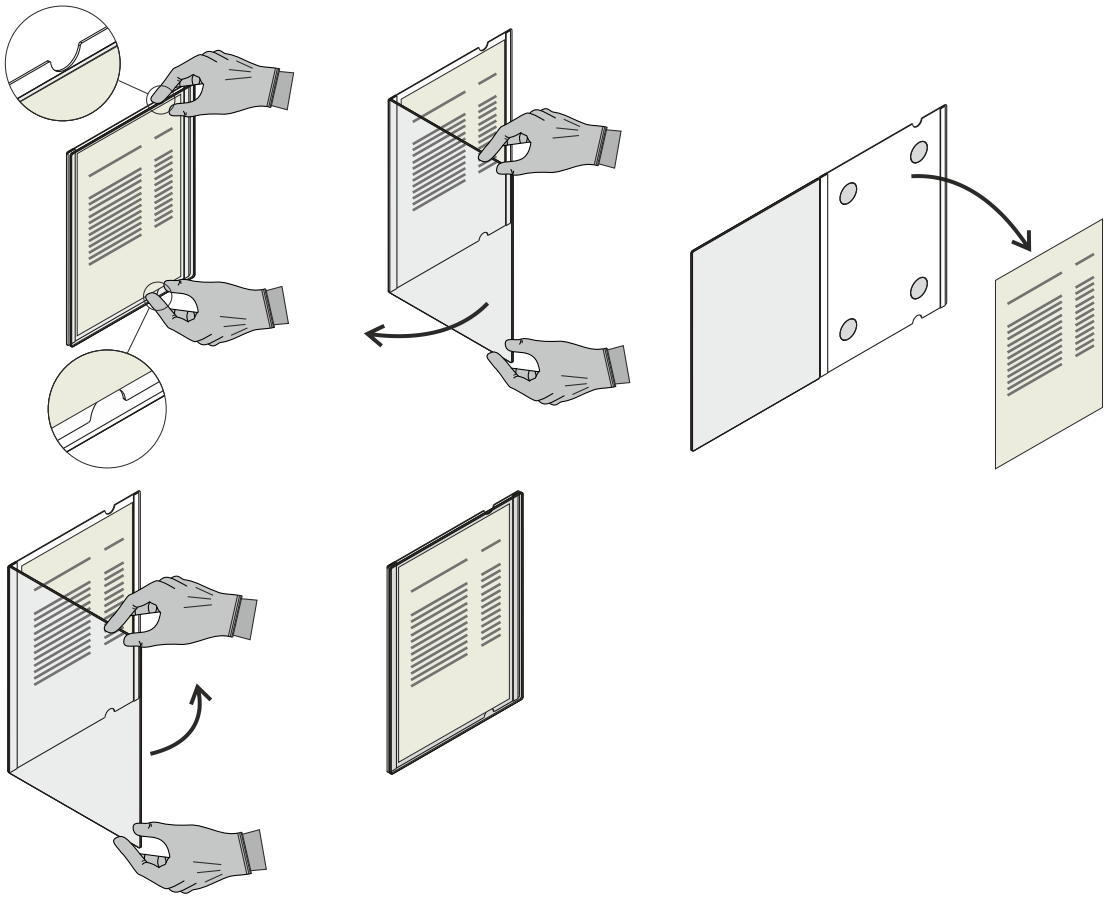

Figure 7: Tenant directory information sheet (TD3 and TD4)

7.1.2 Changing elevator lighting elements

You can change the elevator lighting elements with the help of your building maintenance personnel. For more information, contact your KONE service office.

7.1.3 Interfaces

Certain interfaces between the elevator and the building are crucial to the safe and correct functioning of the elevator. Interfaces include ventilation, electricity supplies and telephone lines. If any interfaces appear to be functioning incorrectly or not at all, they must be repaired immediately. If they cannot be repaired without undue delay, the elevator must be taken out of service or the safety of passengers cannot be guaranteed.

7.1.4 Ventilation

The purpose of the ventilation system is to keep the temperature and humidity within the originally specified values both in the elevator shaft and the elevator car. If the ventilation does not operate, temperature and humidity can exceed the allowed maximum values, harming the elevator and making the elevator ride an unpleasant experience. Humidity and temperature must be kept at the levels specified in original delivery documents.

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7.1.5 Telephone lines

Telephone lines may have been connected to your elevator to enable a 24-hour connection between the elevator and the service office or, for example, building caretaker. To ensure the safety of your elevator users, the building owner must make sure that this line is always functional, including for at least one hour during a power failure in the building.

7.1.6 Electricity

The elevator requires electricity to function. The voltage must be kept within tolerances specified in the original delivery documents. To keep the elevator functional, it is imperative that you ensure a constant supply of electricity and that the supplied voltage complies with the original delivery documents.

X0000087702 C.4

7.2 Preventive maintenance

Preventive maintenance is crucial to maintain the safety of the elevator. Regular checks of your elevator's safety equipment help to locate defective components before they cause hazards. As the owner of the building you should make sure that your building is safe for persons that need to use it.

A preventive maintenance plan ensures the following:

– Equipment performance and availability
– Consistent high levels of safety for elevator users
– Minimal costs associated with breakdowns
– Value retention of your investment

X0000087737 A.2

X0000087652 E.2

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8 MAINTENANCE BY COMPETENT MAINTENANCE PERSON

WARNING: All tasks described in this information are allowed for competent maintenance persons only, unless marked with the words "Maintenance by owner".

Related information

– Responsibilities and qualifications (15)

8.1 Maintenance program

The manufacturer provides a maintenance program that must be followed. Do not exceed the recommended intervals given in the maintenance program. Local conditions and application rates may require more frequent maintenance intervals.

NOTE: The frequency of the maintenance program inspections is decided by the manufacturer. The checks are not at fixed intervals.

X0000087736 C.2

8.2 Maintenance program checklist

Table 8: Maintenance items and intervals (in months)

ITEM	INSPECTION	ACTIONS TO BE MADE IF NECESSARY		
		LUBRICATION	ADJUSTING	CLEANING
HOISTING MACHINE				
Rope guards	24			
Wear of traction sheave grooves and suspension ropes	12	x	x (ropes)	x
Machine: Function of brake and brake release device, air gap	12			
Machine: Bearings and seals	12			
Machine: Fan	12			
Documentation	12			
Control system: Condition and operation of devices	12		x	x
Control system: Cables and mountings	12			

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Table 8 Maintenance items and intervals (in months) (continued)

ITEM	INSPECTION	ACTIONS TO BE MADE IF NECESSARY		
		LUBRICATION	ADJUSTING	CLEANING
Control system: Stopping accuracy and relevelling	12		x	
PIT AND SHAFT EQUIPMENT				
Guide rails and fixings	24	x (guide rails)	x (fixings)	x
Counterweight: guide shoes and guide lubricators, if used	12	x	x	x
Counterweight: rope suspension, diverting pulley, diverting pulley bearing	12	(no lubrication)	x	x
Overspeed governor and rope	12			x
Shaft protection, well flush panels if used	12			x (inside)
Electrical installations and travelling cables	12			
Floor positioning devices	12		x	x
Limit switches	12	(no lubrication)	x	
Lighting, ventilation and drainage	12			x
Buffers	12		x	
Shaft pit: check that the pit bottom is clean and dry	12			x
Tension weights: fixings, operation	12	(no lubrication)	x	x
SLING AND CAR EQUIPMENT				
Pulleys and bearings	12			
Fixing of car sling, insulators	12		x	
Guide shoe fixings and condition	12	x	x	
Guide lubricators, if used	12	x (re-filling)		

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Table 8 Maintenance items and intervals (in months) (continued)

ITEM	INSPECTION	ACTIONS TO BE MADE IF NECESSARY		
		LUBRICATION	ADJUSTING	CLEANING
Roller guides fixings and conditions, car and CWT	12		x	x
Mounting of suspension ropes	12	x	x	
Function of safety gear, CWT safety gear if provided	12	x	x	x
Service drive operations	12			
Car roof (outside)	12			x
Electrical installations	12			
Car interior	12			
Car lighting and ventilation and fans	12			x
Safety circuit: mechanical devices	12			x
Safety circuit: electrical devices	12			x
Push buttons and displays	12			
Emergency situation test: alarm devices and roof emergency hatch if used	12			
Car doors: locking and operator	12	x	x[3)]	x
Door way safety devices: safety edges, light rays	12			
FLOOR LEVEL EQUIPMENT				
Push buttons, displays and alarm bell (if applicable)	12			x
Door locks, guide shoes, sills, panels and fixings	12	x	x[3)]	x

3) The lock is not adjustable with KES 201 doors.

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Table 8 Maintenance items and intervals (in months) (continued)

ITEM	INSPECTION	ACTIONS TO BE MADE IF NECESSARY		
		LUBRICATION	ADJUSTING	CLEANING
Door operation and equipment	12	x	x	x
TEST DRIVE				
Operation, noise, ride comfort, stopping accuracy	12	x	x	x

X000094284 A.7

8.3 Safety

Table 9: Elevator safety precautions for competent maintenance persons

Safety precautions	Note
Develop and follow procedures that have assimilated the requirements of national elevator safety codes and other safety-related regulations.	If there is conflict between the code and these instructions, carry out a full risk assessment and define an appropriate course of action with the local regulator and company management.
Local safety codes and rules must be followed if they exceed KONE standards. Otherwise use the safe working methods defined in this information.	Refer to your local procedures to take the elevator out of use.
Follow the safe working methods defined in this information. If you are uncertain of the method's safety, seek expert advice.	
Follow this instruction. Any deviation creates potentially dangerous situations which you have not considered.	Warning signs highlight possible hazards.  Be sure that you only use maintenance instructions that apply to your elevator configuration. If you are unsure, contact KONE.
ENSURE THAT ELECTRICAL EQUIPMENT AND CONDUCTORS ARE SAFELY DE-ENERGISED BEFORE WORKING ON THEM. A locking off system for the main electric supply isolator or, for example, fuse removal or locking and tagging system when applicable, must be agreed with the person responsible for the building's electrics.	Do not connect or disconnect any connectors when the power is on. 
Personal protection equipment must be available and used as required.	
If there is a risk of injury from a fall, adequate fall prevention system must be in place.	

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Table 9 Elevator safety precautions for competent maintenance persons (continued)

Safety precautions	Note
Handle and dispose of waste materials in accordance with company procedures that have assimilated the local regulations.	
Use safety fences to segregate your work area so that your work does not cause a hazard to others. Keep access ways and fire exits clear.	
To prevent anyone from falling into the elevator pit, always open any landing door as slightly as possible. This prevents anyone accidentally trying to enter the elevator car or open elevator shaft. Use safety fences.	
The keys to the machine room / maintenance access panel and landing doors must be kept in a secure place inaccessible to unauthorized persons. The keys can be given only to competent maintenance persons.	
To avoid unexpected movement of the elevator car, always activate the emergency stop on the elevator car roof, on the machine, and in the elevator pit as applicable. Always secure the elevator car with a car blocking device when working with the brakes. Check and adjust only one brake at a time.	

X0000087701 C.4

8.3.1 Refuge space

Refuge space is a space above or below the car when the car or counterweight rests on its fully compressed buffer(s). It ensures a safe working area for installation and maintenance.

There is a refuge space label in the shaft pit and in the car top (balustrade). The label shows the person laying on his/her side (height 500 mm), crouching (height 700 or 1000 mm) or standing (height 2000 mm). The label also indicates the maximum number of people refuge space accommodates.

WARNING: There are no other refuge spaces available in the shaft pit or on the car top than what the site-specific refuge labels indicate. The layout of the elevator dictates the available refuge spaces. The refuge spaces are not optional or interchangeable.

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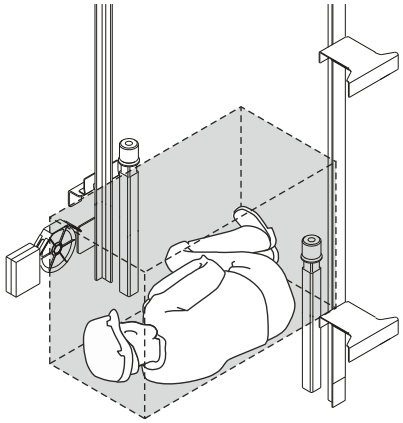

Figure 8: Refuge space in the pit (height 500 mm)

Figure 9: 0.5 m refuge space label in the pit

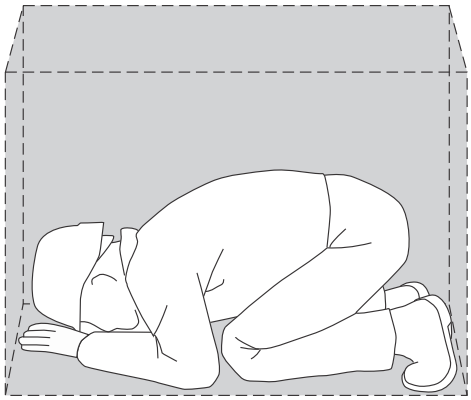

Figure 10: Refuge space in the pit (height 700 mm)

Figure 11: 0.7 m refuge space label in the pit

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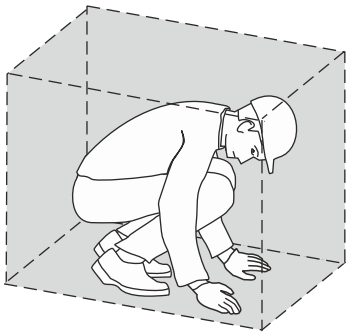

X0000090918

Figure 12: Refuge space in the pit or headroom (height 1000 mm)

Figure 13: 1 m refuge space label in the pit or headroom

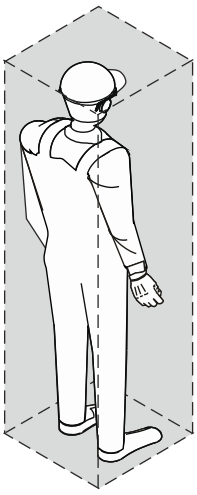

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Figure 14: Refuge space in the headroom (height 2000 mm)

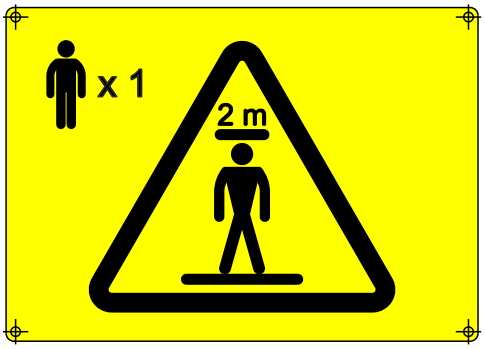

Figure 15: 2 m refuge space label in the headroom

If more persons than what is mentioned in the label are necessary on the car roof or in the pit for carrying out inspection and maintenance work, an additional refuge space shall be provided for each additional person by mechanically preventing the unexpected movement of the elevator car (for example, by parking chains attached to car sling and guide rail brackets).

X0000054133 E.3

8.3.2 Stand-by mode and maintenance

Some KONE elevators are equipped with stand-by mode, which enables the elevator to reach significant energy savings.

If the elevator has XL1 plugs in the MAP, they must be connected to de-activate the stand-by mode before starting the maintenance work.

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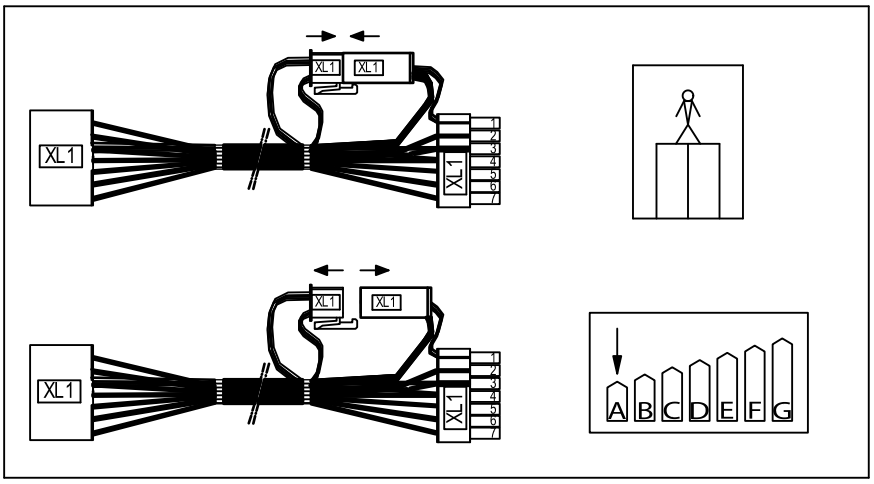

X000094289

NOTE: The following features can be used even when the elevator is in stand-by mode:

– Inspection drive unit on the car roof
– RDF
– Rescue operation: door zone LED and speed LEDs

When the maintenance work is finished, disconnect the plugs before returning the elevator to normal use. Otherwise, energy saving mode is not possible.

X000094290 A.3

8.3.3 Reset inspection control station

Prerequisites for the inspection control station reset:

– Inspection control station is in the holder, normal mode is switched on and the stop switch is released
– Pit stop switch is released, if applicable

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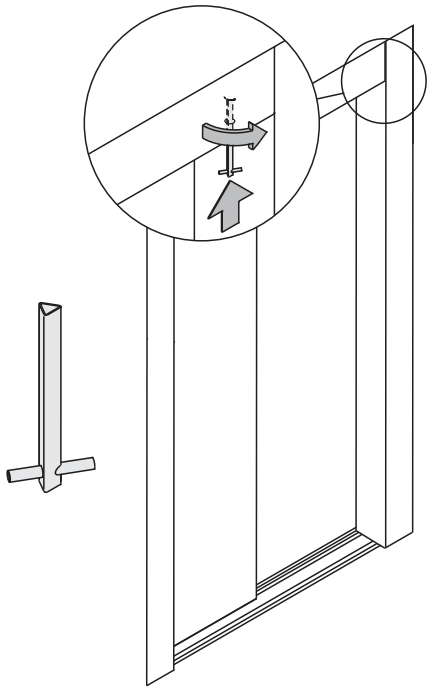
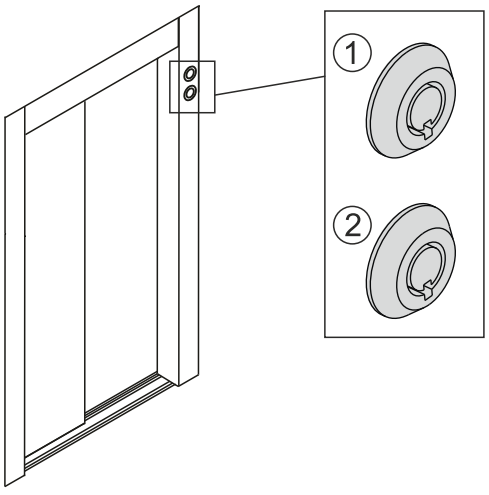
1. Turn the bottom landing door emergency opening device as if you were opening the lock.



X0000056767

NOTE: In case of Safety Space Arrangement (SSA), SSA reset is located in the door frame. It is operated with a maintenance access panel (MAP) lock key.



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2. Ensure that the landing doors are mechanically locked.

X0000002113

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8.4 Lubrication of guide rails

Table 10: Viscosity guide for lubrication at various temperatures

Viscosity	Operating temperature (°C)
ISO VG 68	+5 — +20
ISO VG 100	+10 — +30
ISO VG 320	+20 — +40

NOTE: Lubricate guide rails with oil that does not include extreme pressure (EP) additives, for example, molybdenum disulphide or sulphur phosphorus. Lubrication oil must not contain any viscosity index improvers, for example, polyisobutylene. Extreme pressure additives and viscosity index improvers reduce the braking force of the safety gear.

KONE recommends using Super Lube® synthetic grease (KM51141750) for counterweight (CWT) guide rails when CWT does not have safety gears.

X000094294 D.3

8.5 Lubrication of steel suspension ropes

WARNING: Do not lubricate KONE UltraRope®. KONE UltraRope® is an optional component in some KONE elevators.

Rope lubrication depends on the operating conditions, the usage of the elevator, and the amount of original lubricant on the ropes. Over-dry ropes allow rapid traction sheave and rope wear. Excess oil on the ropes makes nearby surfaces dirty and slippery, creating risk of hazardous situations.

NOTE: Do not renew the lubrication if enough lubricant exists after previous lubrication and the lubricant is still fluid.

The need for the relubrication can be assessed, for example, by observing the following:

– The ropes are dry.
– There is red dust, rust residue, on the ropes or on the floor.
– There is metal dust under traction sheave or pulley.
– The grooves of the pulleys are dry and not tacky, no oil film on fingertip when wiping.

If you relubricate, use the lubricants recommended by elevator rope manufacturers. Do not let lubricant get on the brake drum.

X000094295 B.2

X0000228854 B.2

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9 SAFETY COMPONENT MAINTENANCE

WARNING: If any of the safety components fails, the elevator must not be put into normal use before it has been repaired and it has passed all the tests.

If you replace a safety component, perform the commissioning tests according to EN 81-1, Annex E or EN 81-20, Annex C (examinations and tests after important modification or accident), depending on the elevator's compliance.

The EC-type examination certificate is valid only if the correct type of components and procedures are used in safety component manufacturing and repair. In order to ensure safety and conformity, it is essential to use original KONE spare parts only.

NOTE: KONE disclaims any liability resulting from possible safety risks or injuries caused by the use of other than KONE original spare parts.

Do not exceed the recommended maintenance intervals, unless otherwise instructed by the manufacturer. Local conditions and application rates may require more frequent maintenance intervals.

CAUTION: After each overspeed governor tripping, check that both safety gear and overspeed governor are operational before putting the elevator in normal service.

9.1 Safety components

The elevator is provided with safety equipment that must be maintained by a qualified maintenance company.

The following components are safety components:

- Machine brakes
- Overspeed governor
- Safety gear
- Doors
- Elevator car and landing door lock
- Buffers
- UCM protection
- Ascending car overspeed protection

X0000103548 A.3

9.2 Traceability of safety components

KONE as an economic operator (installer, manufacturer, distributor and importer) keeps a record of suppliers and customers for each installed and replaced safety component. If

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needed, this enables finding and organizing an immediate replacement of a faulty safety component in any elevator.

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9.3 Identification of safety components

KONE safety components can be identified as follows:

– KONE safety components are marked with a CE marking label and orange labels (or similar).

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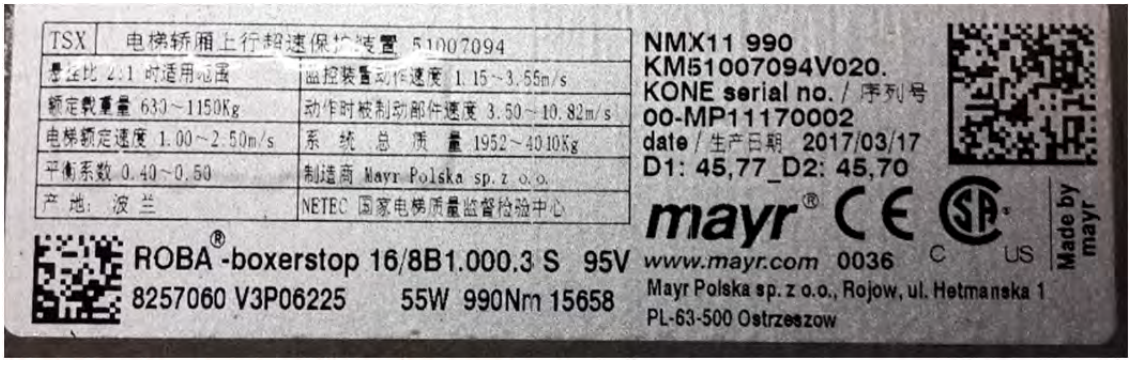

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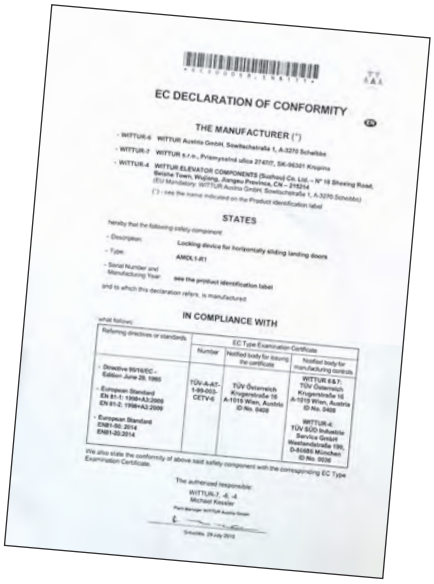
– Safety components have a declaration of conformity document (available in electronic format and sometimes delivered with the safety component).


EC DECLARATION OF CONFORMITY

THE MANUFACTURER (*)

STATES

IN COMPLIANCE WITH

X0000063517
X0000062626 F.1

9.4 Replacement of safety components

If you replace a safety component, ensure that you follow the local legislation. For example, regulations for the declaration of conformity and CE marking.

X0000062538 A.8

9.5 Prepare equipment and safety

1. Implement all safety measures for elevator maintenance and assimilate local safety regulations into local instructions with due regard to risk.
2. Switch OFF the elevator main switch (unless the check requires to have the main power on).
3. Activate the emergency stop on car roof, and on the machine, if applicable, to avoid unexpected movement of the car (unless the check requires to move the car).
4. When working on the elevator car roof above the topmost landing floor level, never move the elevator car so high up that you cannot return safely to the topmost landing.
5. Secure the car using a car blocking device, fixed to the car sling above the car, and a blocking plate, fixed to car guide rails in the headroom, when working with the brakes.

WARNING: Check and adjust only one brake at a time.

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NOTE:

– Do not lubricate the overspeed governor, as lubrication reduces the braking force.
– Do not adjust or replace any parts of the overspeed governor.
– After every operation of overspeed governor and safety gear, check that the overspeed governor and safety gear are operational.

X0000113159 B.2

9.6 UCM protection with doors open

The elevator control system detects any unintended car movement (UCM), and stops the car with the machine brakes. The UCM detection is saved in the fault log and resetting can only be performed by a competent person.

To maintain UCM protection, perform the UCM periodical inspection.

X0000090514 B.2

Related information

– Perform UCM test 2/2 (with 0% load) (88)

9.7 Ascending car overspeed protection

Ascending car overspeed protection stops the elevator car in the event of an overspeed in the up direction. In cooperation with an overspeed governor and automatic one-sided brake test, the ascending car overspeed protection is kept in safe operating condition.

X0000106095 A.2

Related information

9.8 Hoisting machine brakes

All hoisting machines are equipped with two direct acting drum brakes. The brakes operate independently and must therefore be adjusted separately. The brakes operate only after the machine has stopped, except in an emergency braking situation.

X0000093763 A.3

9.8.1 Checking intervals

Table 11: Maintenance checking intervals

Check	Interval
Check the air gap between the brake lining and the drum. An excessive "clonking" sound when the brake engages indicates that the air gap is too large.	Once a year
Check the overall cleanness of the machine. Check that the machine is clean of dust.	Once a year
Check the operation of the brake opening device.	Once a year

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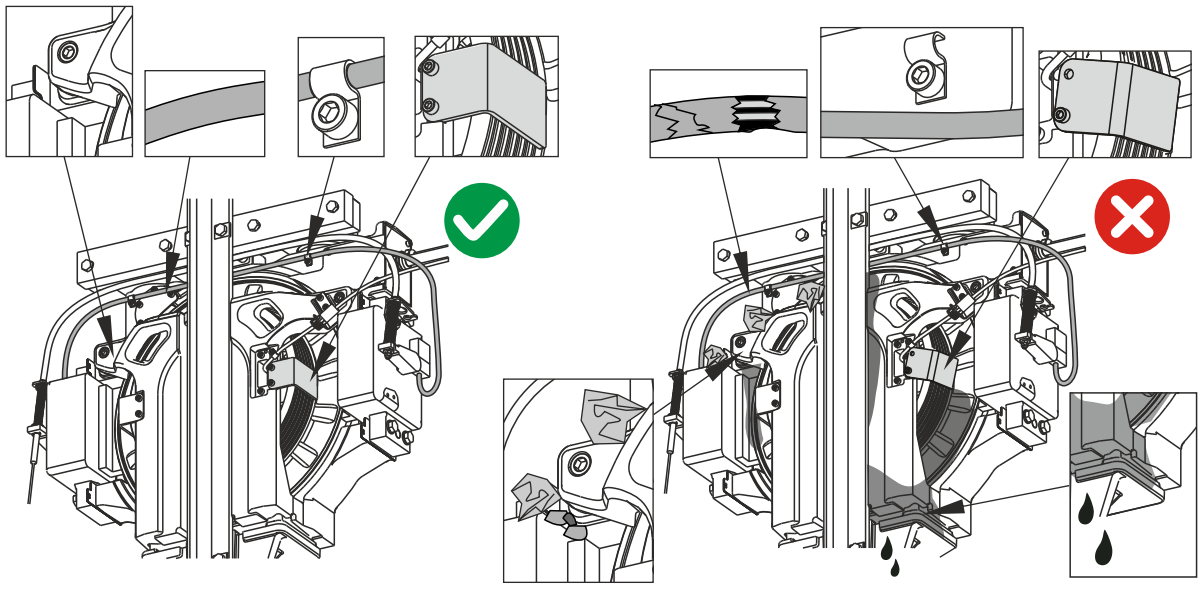
Related information

– *Test electrical brake release device during periodical inspections (66)*

9.8.2 Hoisting machine (condition check)



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X0000067054 A.3

9.8.3 Check brake air gap

WARNING: Do not open the brakes with the center nut or by any other means.

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1. Ensure that the elevator car is not at the topmost floor.
2. Go to the topmost floor.
3. Call the elevator to the topmost floor.
4. Listen to the sound of the closing brakes.

   Excessive noise indicates that the air gap is too large and you must replace the brakes. Adjustment of the air gap is not possible.

X0000099583 A.3

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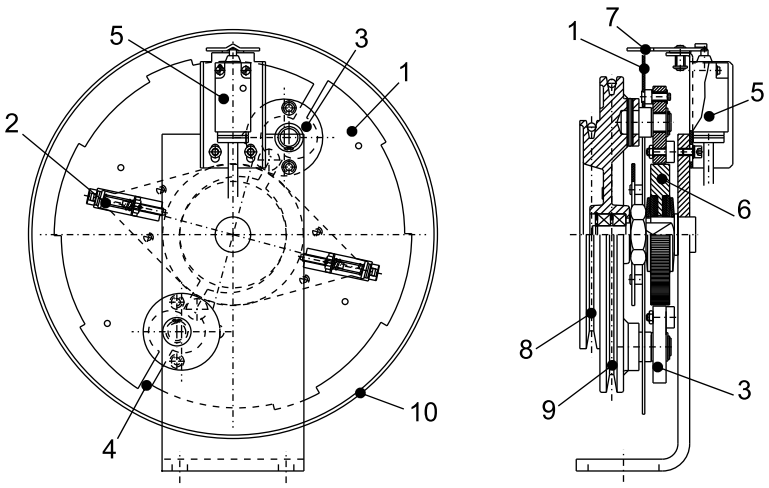
9.9 Overspeed governor OL35 / OL35E



X0000090605

1 Flyweight
2 Spring
3 Eccentric wheel
4 Flyweight catch
5 Overspeed contact
6 Trip wheel
7 Contact plate
8 Test groove
9 Groove for normal use
10 Safety cover[4)]

X0000090629 C.3

9.9.1 Checking intervals

Table 12: Maintenance checking intervals

Check	Interval
Cleaning	Once a year or when needed
Condition of the flyweights and the springs	Once a year
Operation of the overspeed contact	Once a year
Operation of the tension weight contact	Once a year
Wear of the rope groove	Once a year

4) With EN 81–20 compliant elevators

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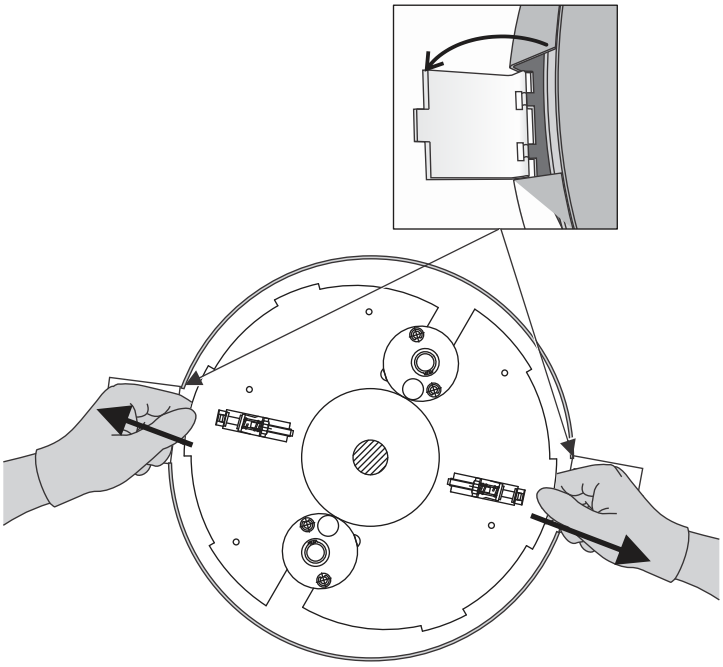
NOTE: If the recommended intervals or checks differ from the ones defined by local codes or regulations, follow the local codes or regulations.

X0000090630 B.2

9.9.2 Check overspeed governor mechanism

1. Open the hatches[5)].
2. Check manually the operation and vertical movement of the flyweights.



X0000056765

The flyweights must close by themselves, and they MUST return easily without extra friction when you stop pulling them.

3. Close the hatches[5)].

5) With EN 81–20 compliant elevators

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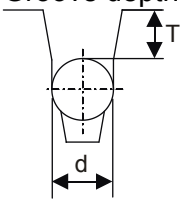
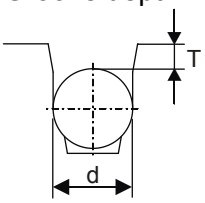
4. Check visually the condition of the OSG pulley groove.

   The OSG rope should not lay too deep inside the OSG pulley groove.

Groove type	Rope diameter (d)	Maximum rope groove wear (Tmax)
Groove depth 15 mm  *X000021065*	6 mm	8.5 mm
	6.5 mm	8 mm
	7 mm	7.5 mm
	8 mm	7 mm
Groove depth 11 mm  *X000021066*	7 mm	3.5 mm
	8 mm	2.5 mm

5. Check that the protective covers of the overspeed governor are intact and fixed into place.

NOTE: If you find anything abnormal, investigate the root cause and repair it. If the rope groove of the overspeed governor (OSG) has worn too deep, replace the OSG.

X0000001998

9.9.3 Check rope groove wear

1. Check that the pulley rope grooves are in good condition.

   If you find any abnormalities, replace the overspeed governor.

WARNING: If the overspeed governor does not operate correctly, take the elevator out of use and repair the component.

X0000095554 A.2

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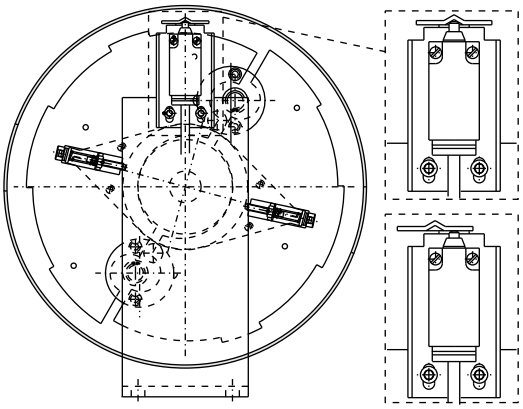
9.9.4 Check overspeed contact operation

1. Turn the contact plate so that the knob of the overspeed contact is not in the notch of the contact plate.



X0000090608

2. Check that overspeed contact cuts the safety chain.

   Elevator must not drive in normal or inspection drive mode.

   NOTE: RDF bypasses the overspeed contact.

WARNING: If the overspeed governor does not operate correctly, take the elevator out of use and repair the component.

X0000095555 A.2

9.10 Safety gears

X0000093978 A.2

9.10.1 Checking intervals

Table 13: Maintenance checking intervals

Check	Interval
Operating condition of the safety gear	Once a year
Operation of safety gear contact	Once a year
System functioning (overspeed governor - safety gear) with empty car at reduced speed	Every other year unless for example dirty or humid circumstances require more frequent testing

X0000090640 A.3

9.10.2 Check safety gear linkage

WARNING: If the component does not operate correctly and cannot be repaired during the same maintenance visit, take the elevator out of use. Inform the customer and supervisor, and arrange the repair immediately.

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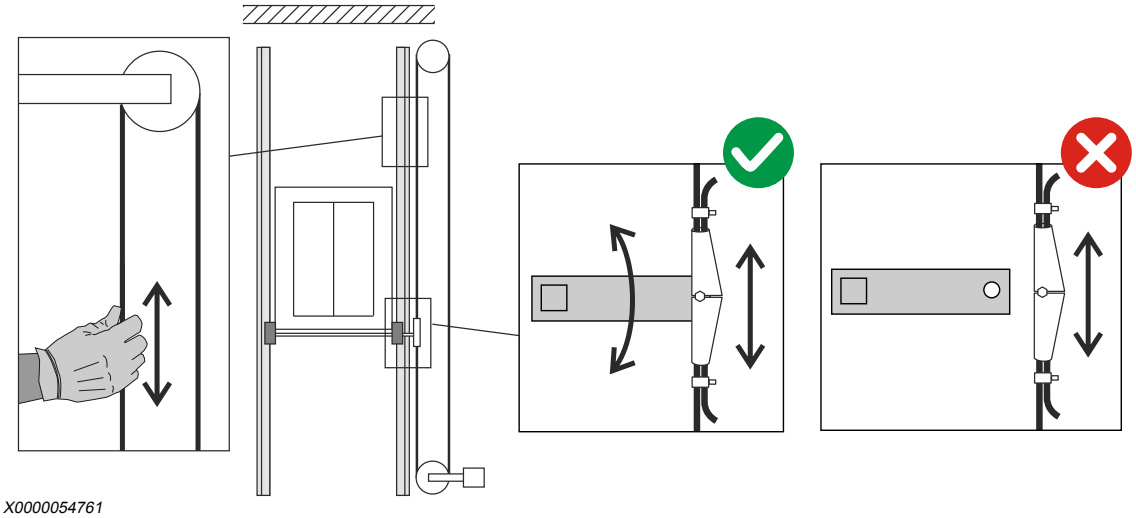
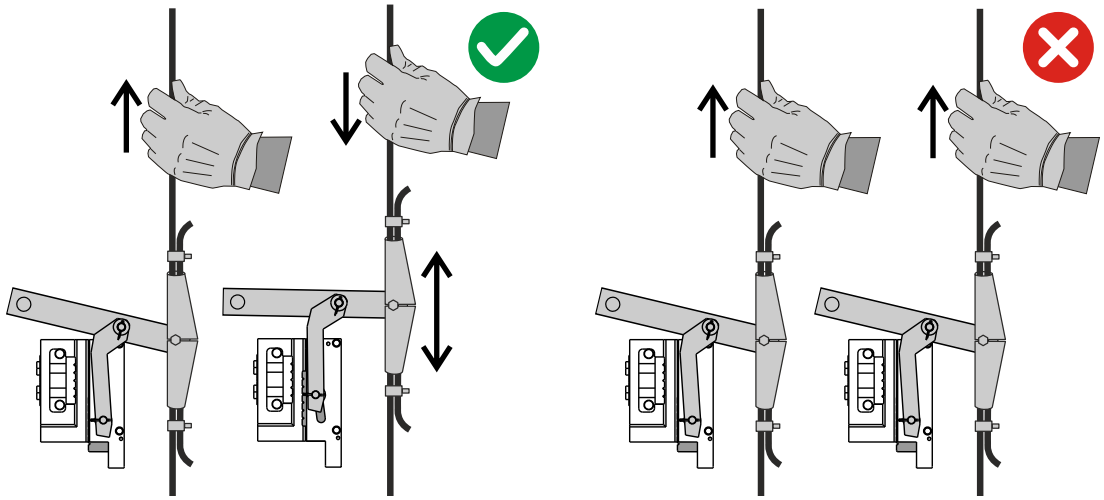
1. Pull overspeed governor rope slightly.



X0000054761

2. Move the rope up and down.



X0000055013

3. Verify the function of the safety gear linkage.

X0000054729 B.2

9.11 Polyurethane buffers

9.11.1 Checking intervals

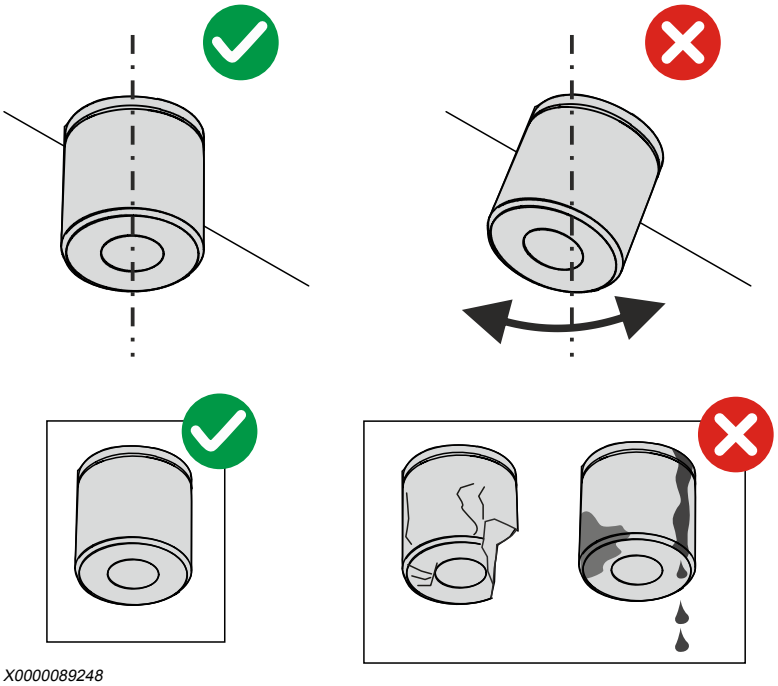
Table 14: Maintenance checking intervals

Check	Interval
Overall condition of the buffer structure	Once a year

X0000087809 A.2

9.11.2 Polyurethane buffers under car (condition check)

WARNING: If the buffer is not in full working order (it does not last until the next scheduled maintenance visit), arrange the replacement of the buffer immediately. If the buffer has failed already, take the elevator out of use until the buffer has been replaced.



X0000089248
X0000003000

9.11.3 Polyurethane buffers in pit (condition check)

WARNING: If the buffer is not in full working order (it does not last until the next scheduled maintenance visit), arrange the replacement of the buffer immediately. If the buffer has failed already, take the elevator out of use until the buffer has been replaced.

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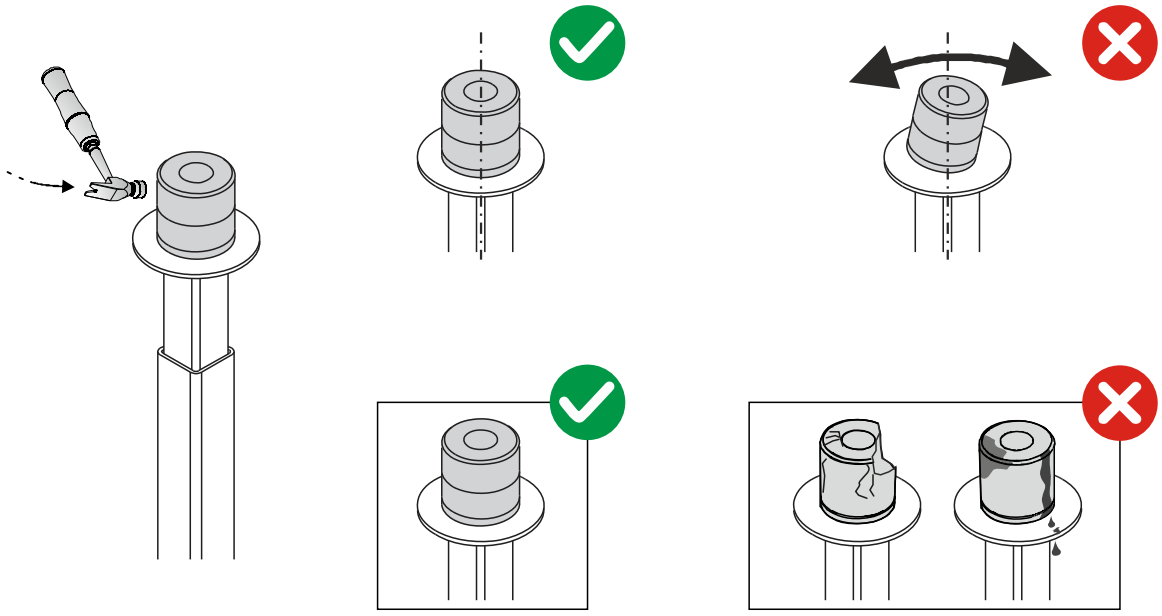
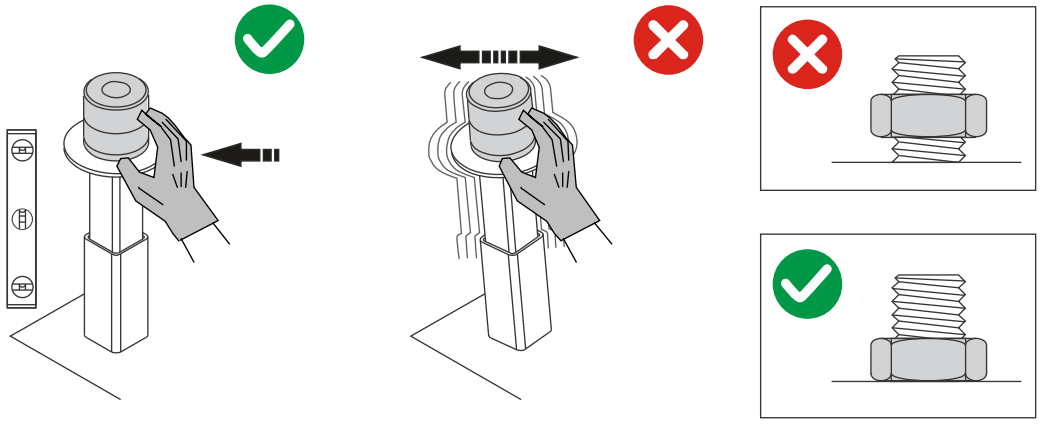


X0000104873



X0000104875
X0000103179 A.5

9.12 Oil buffers

9.12.1 Checking intervals

Table 15: Maintenance checking intervals

Check	Interval
Check condition	Once a year
Check oil level	Once a year

X0000094471 A.3

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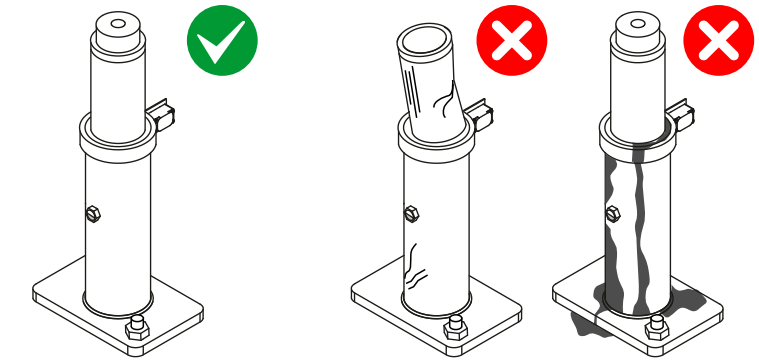
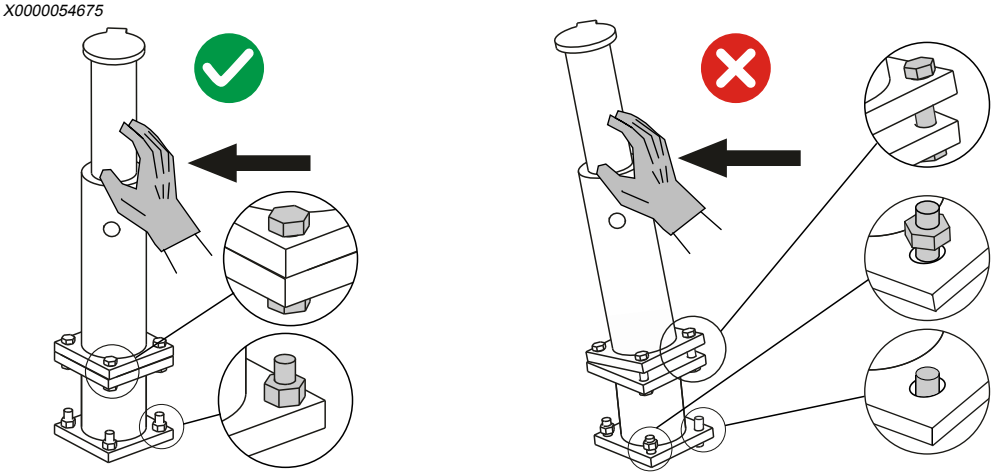
9.12.2 Oil buffers (condition check)

WARNING: If the buffer is not in full working order (it does not last until the next scheduled maintenance visit), arrange the replacement of the buffer immediately. If the buffer has failed already, take the elevator out of use until the buffer has been replaced.



X0000054675



X0000054694
X0000003001

9.13 Landing door lock

9.13.1 Checking intervals

Table 16: Maintenance checking intervals

Check	Interval
Check the lock function	Once a year

X0000090808 A.2

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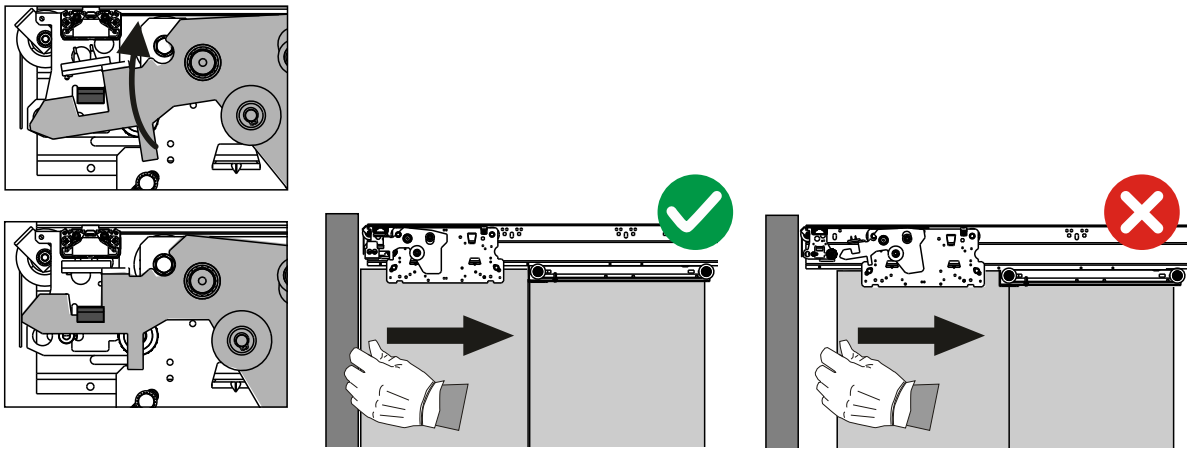
9.13.2 Landing door lock (condition check)

WARNING: If the elevator does not pass the test, take the elevator out of use. Do not return the elevator into normal use until the problem is solved.



X0000055450
X0000054780 A.7

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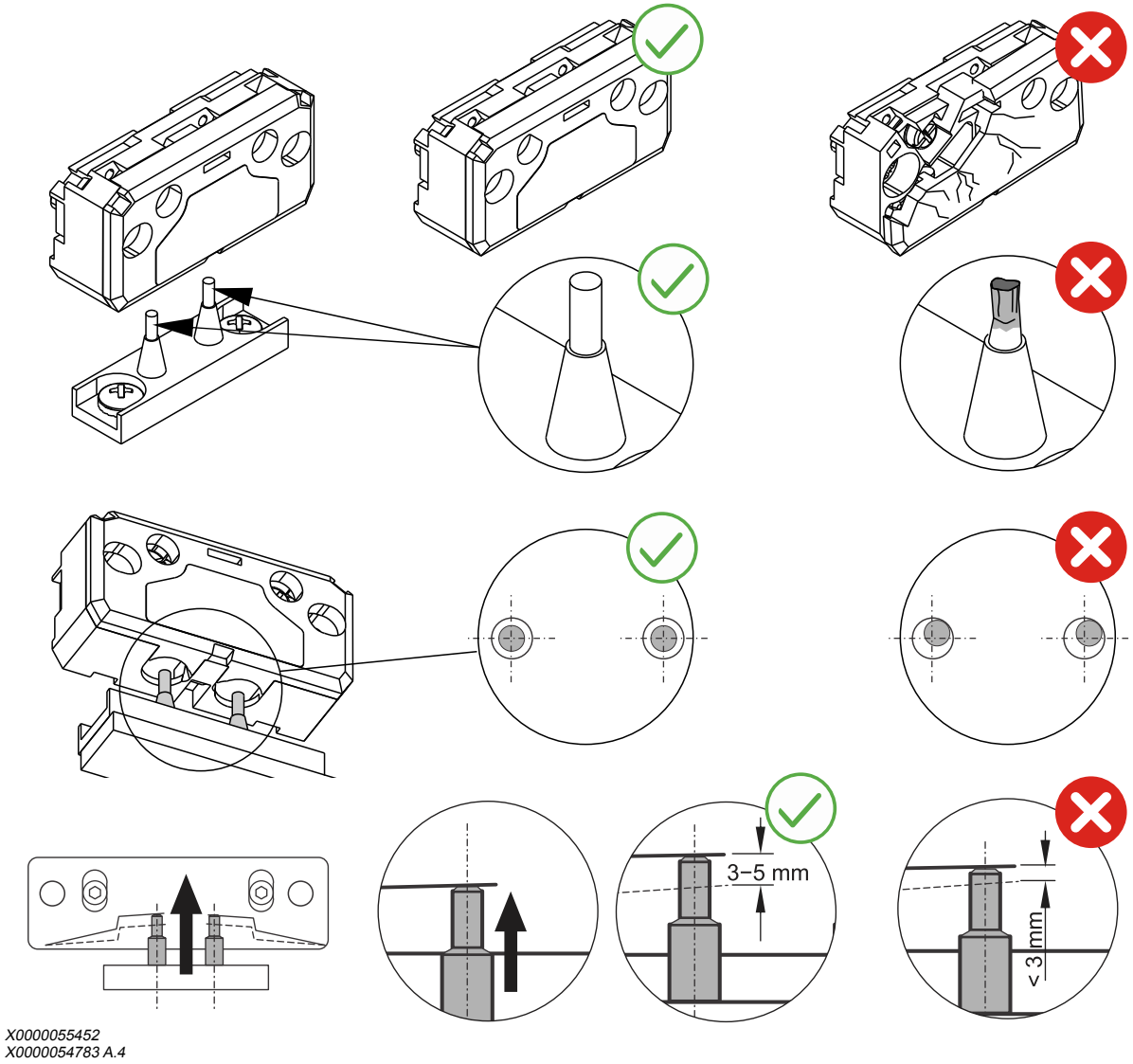
9.13.3 Landing door contact and lock contact (condition check)



X0000055452
X0000054783 A.4

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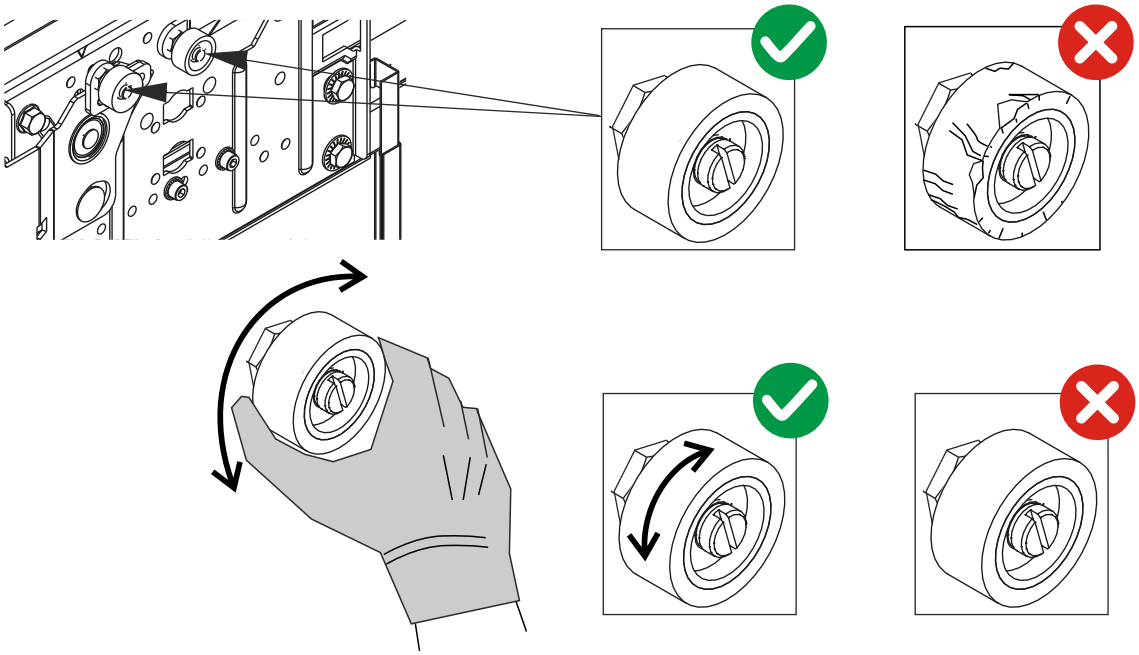
9.13.4 Landing door lock rollers (condition check)



X0000055474
X0000054784 A.4

9.14 Car door lock

9.14.1 Checking intervals

Table 17: Maintenance checking intervals

Check	Interval
Check the lock function	Once a year

X0000090808 A.2

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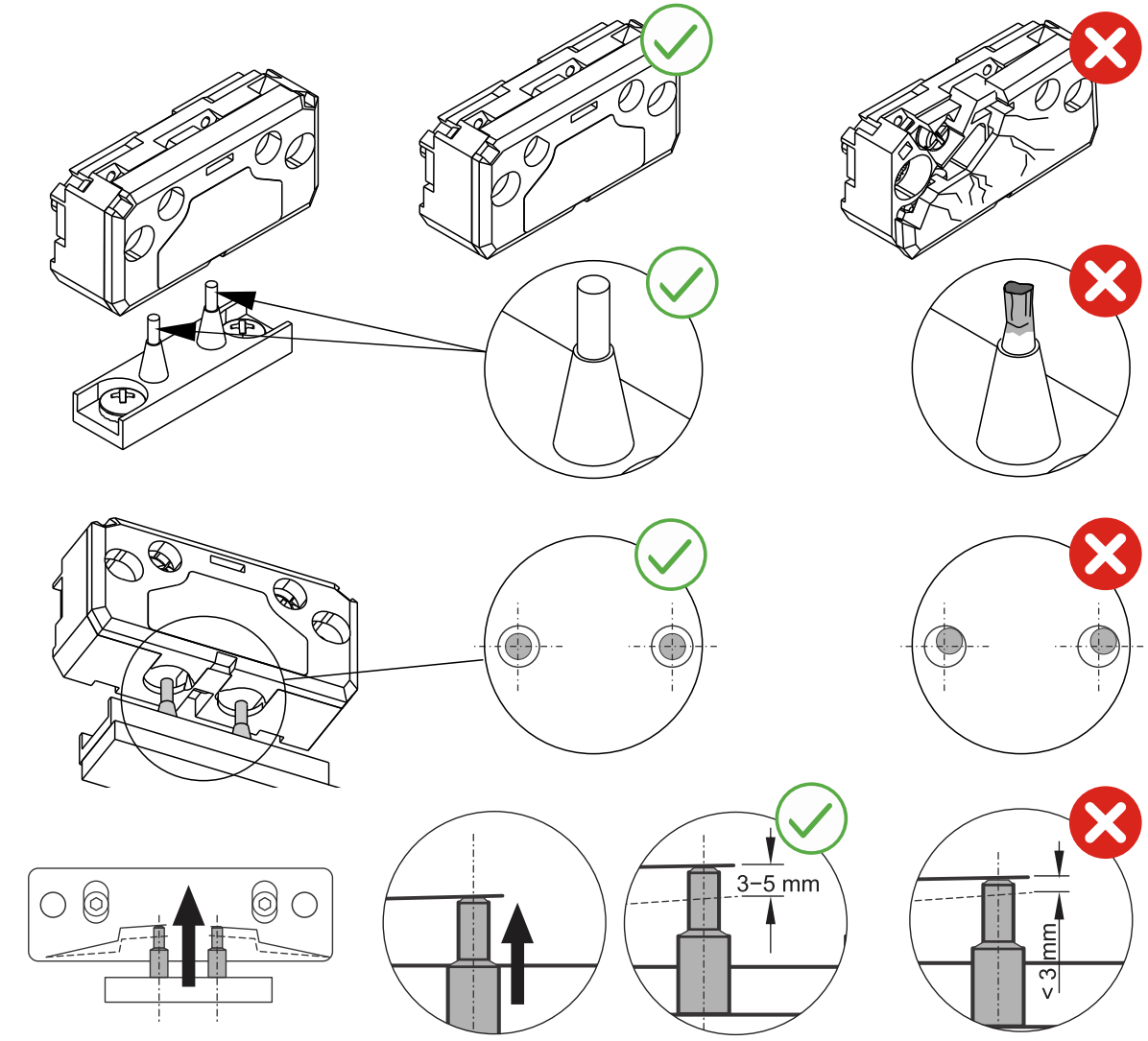
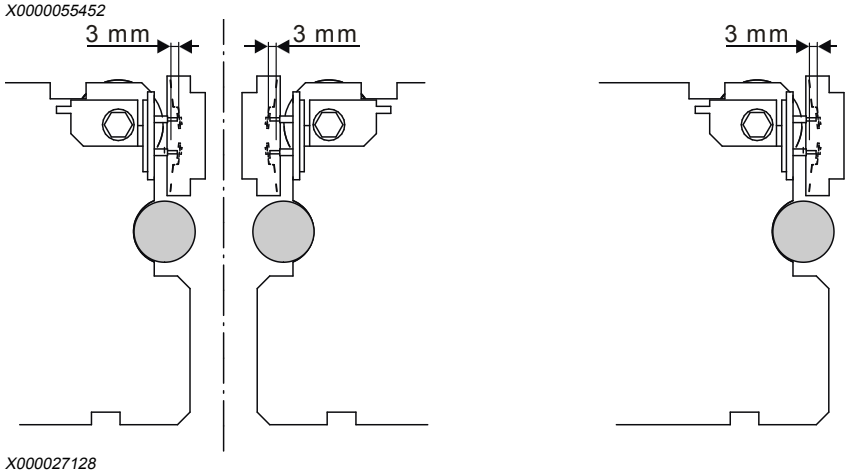
9.14.2 Car door contact and lock contact (condition check)



X0000055452



X000027128
X0000054441 B.2

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9.15 Suspension ropes

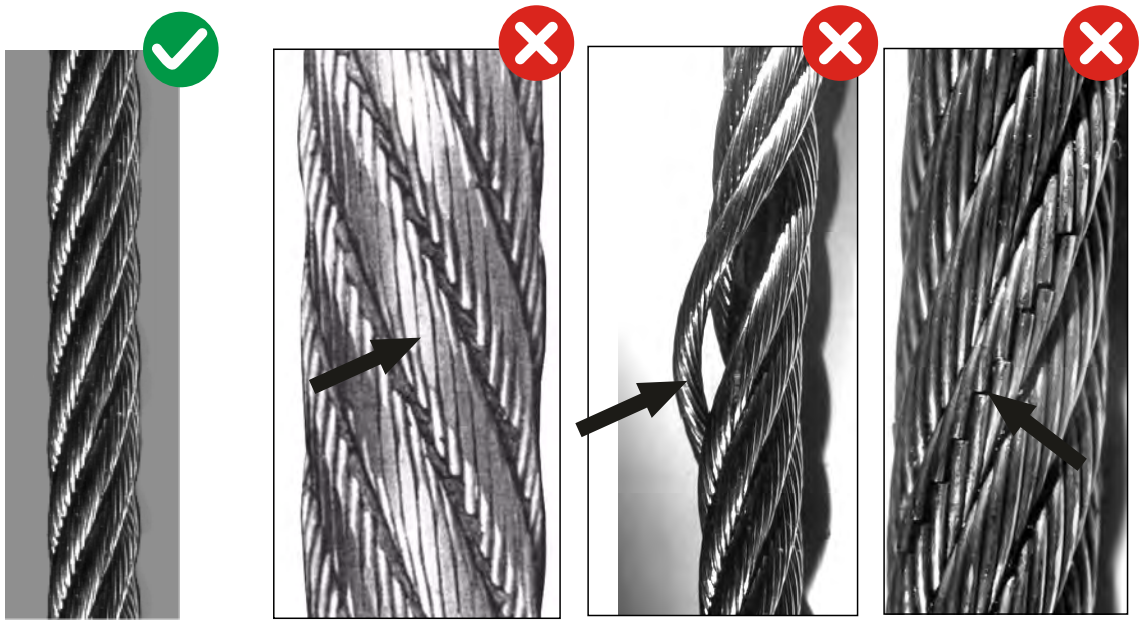
9.15.1 Checking intervals

Table 18: Maintenance checking intervals

Check	Interval
Wear and adjustment Check the whole shaft length (check at least 4 locations divided equally throughout the shaft length)	Once a year

X0000088160 B.2

9.15.2 Steel suspension ropes (condition check)



X0000055039

WARNING: If the elevator does not pass the test, take the elevator out of use. Do not return the elevator into normal use until the problem is solved.

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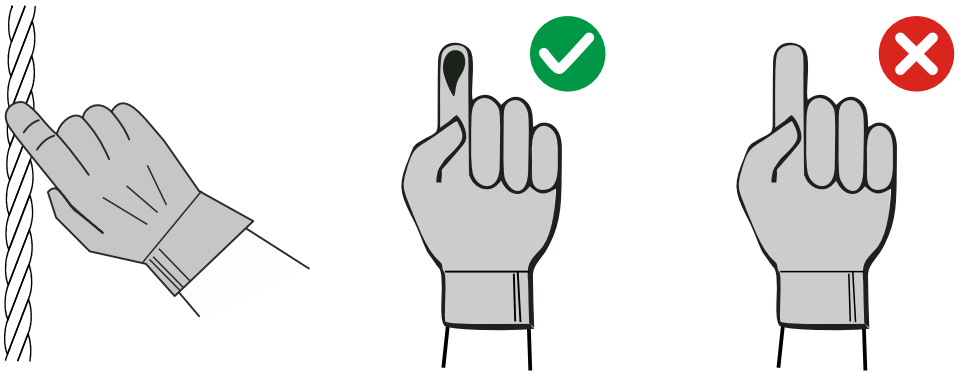

X0000055214
X0000003017

9.16 Overspeed governor rope

9.16.1 Checking intervals

Table 19: Maintenance checking intervals

Check	Interval
Wear and adjustment Check the whole shaft length (check at least 4 locations divided equally throughout the shaft length)	Once a year

X0000088160 B.2

9.16.2 Overspeed governor rope (condition check)

WARNING: Do not lubricate the overspeed governor rope.

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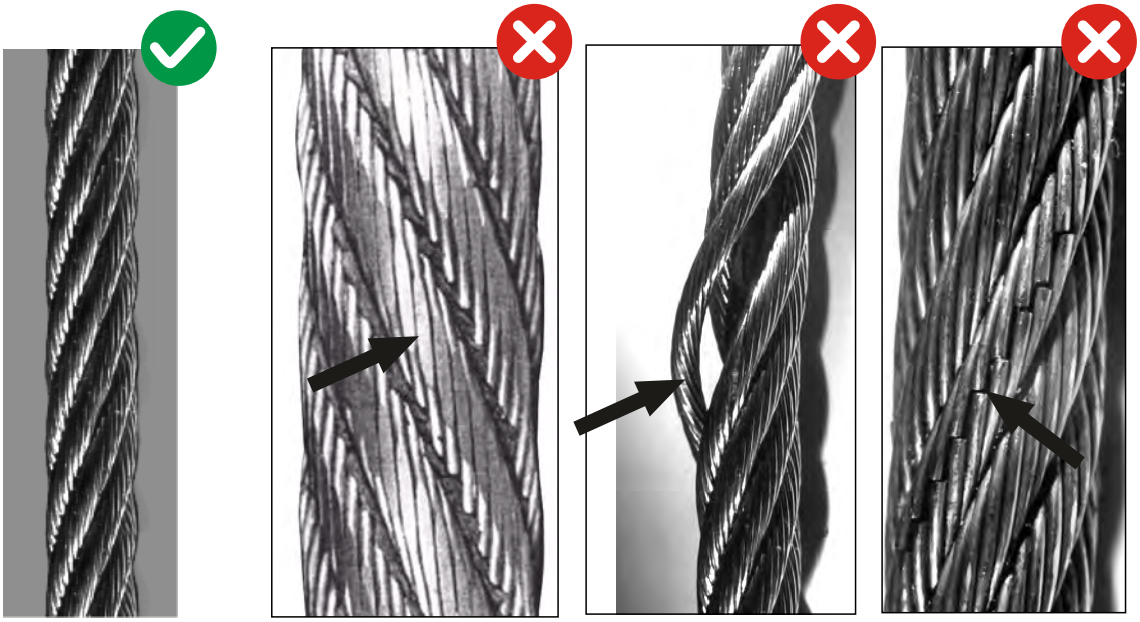

X0000055039
X0000003021

X0000087738 D.2

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10 EXAMINATIONS AND TESTS AFTER IMPORTANT MODIFICATION OR ACCIDENT ACCORDING TO EN 81-20 ANNEX C

You must ascertain that your elevator continues to conform to standard after important modifications or after an accident. To determine the conformity to standard, a competent maintenance person must carry out examinations and tests in accordance with EN 81-20 Annex C.

NOTE: Record the important modifications and accidents in the elevator logbook and in technical documentation as applicable. For tests after an important modification or after an accident, documents and necessary information are submitted to the responsible person or organization. For more information, see EN 81-20 Annex C.

X0000087830 B.2

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11 PERIODICAL INSPECTIONS ACCORDING TO EN 81-20 ANNEX C

According to EN 81-20 Annex C, the elevator owner ensures that the elevator gets periodically inspected to verify that it is in good condition. The inspection interval and contents should be according to local regulations. KONE recommends to test once every two years. In addition to the local authorized inspector, it is recommended that a representative of the qualified maintenance company is available during inspection.

If any of the tests in this information are part of the local periodical inspection procedure, follow the instructions described in this information. If local regulations require more tests, perform those tests according to local regulations. All periodical examinations and tests must be carried out in accordance with EN 81-20 Annex C.

Periodical examinations and tests are not more stringent than those required before the elevator was put into service for the first time.

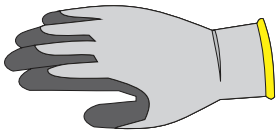
Make all tests in the defined order and mark the test date and results to the elevator's log book.

A separate test report sheet must be filled during the periodical inspection. A copy of it must be placed to the elevator's log book.

WARNING: Take the elevator out of use if it fails any of the tests. Keep the elevator out of use until you have identified and repaired the root cause of the failure.

NOTE: The periodical tests should not, through their repetition, cause excessive wear or impose stresses likely to reduce the safety of the elevator. Make all tests with an empty elevator car, unless stated otherwise. This is the case in particular of the test on components such as the safety gear and the buffers. If tests on these components are made, they must be carried out with empty car and at a reduced speed. The person appointed to make the periodical test must assure that these components, which do not operate in normal service, are still in an operating condition.

11.1 Tools

Maintenance sign Temporarily out of service  *X0000219828*	Cut-resistant gloves  *X0000085580*
Standard maintenance tools	Door blocking tool

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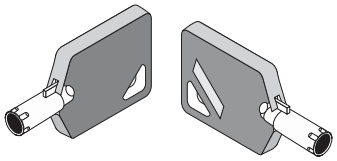
MAP lock keys
KM278355

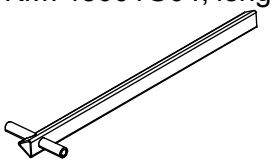


X0000209966

Locking set for main switch

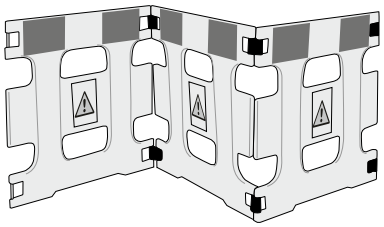
X000010443

Emergency opening key
KM748001G01, length 200 mm
KM748001G02, length 400 mm
KM748001G03, length 700 mm
KM748001G04, length 1100 mm



X0000210601

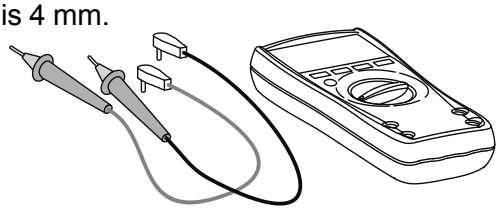
Safety fence



X0000228703

Digital multimeter
Protected against high voltage. Fluke 179 or equivalent, CAT III (IEC/ EN 61010-031) compliant multimeter.

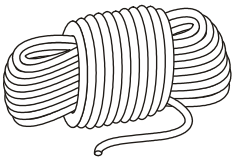
- Insulated test probes, minimum length 100 mm
- Leads, minimum length 700 mm
- Specified to 1000 V voltage
- To prevent short circuits and arcing, the maximum length of bare metal probe tips is 4 mm.



X000102903

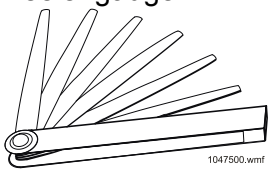
Stopping accuracy tool

Lifting rope



X000028668

Feeler gauge



X000010448

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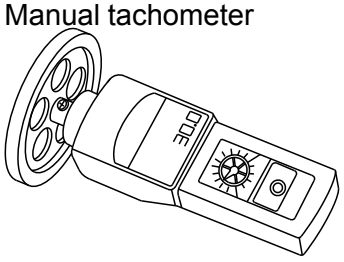
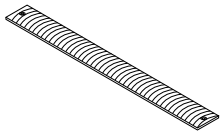
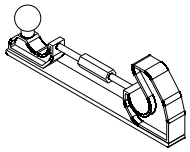
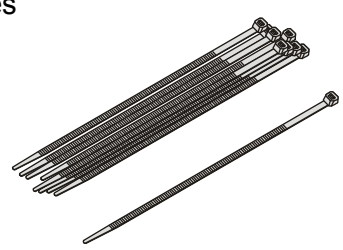
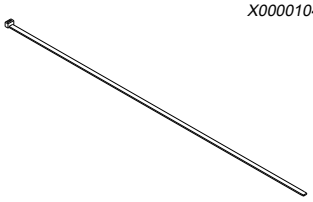
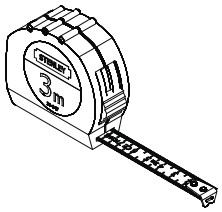
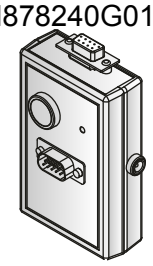
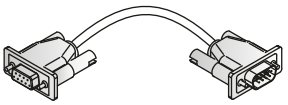
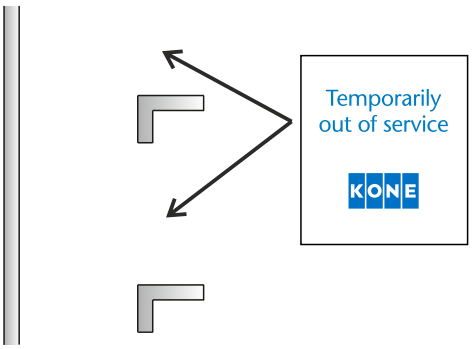
Manual tachometer  X000015355	Milled file  X0000228754
Frame for milled file  X0000228809	Cable ties  X000010446  X0000060735
Tape measure  X000041680	LCE User Interface Opening tool KM878240G01   X0000054677

X0000113195 B.5

11.2 Take elevator out of use

1. Place 'Out of service' signs to all landings.



X0000091647

2. Drive the elevator car to the floor closest to the controller.

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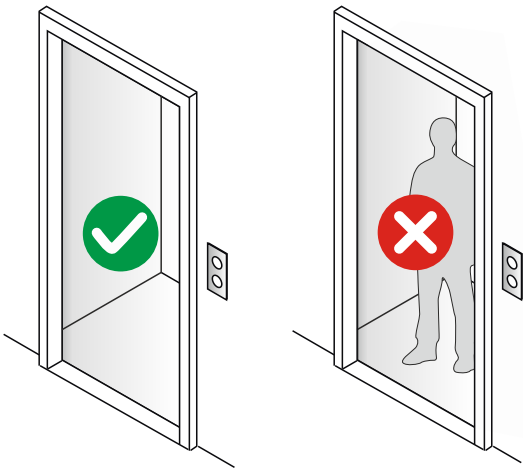
3. Make sure that the elevator car is empty (or both car when applicable).



X0000091662

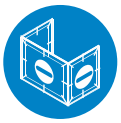
4. Switch on recall drive feature (RDF), if necessary.

   It depends on your upcoming task, whether it is necessary or not.

5. Disable the landing calls and door openings, if necessary.

   It depends on your upcoming task, whether it is necessary or not.

6. Place safety fences to working floors to prevent unauthorized access.



X0000070698 J.2

11.3 Perform periodical tests for SAM and SSA**E

These components are optional.

1. Switch off RDF.
2. Switch on the maintenance access panel (MAP) and shaft lights.

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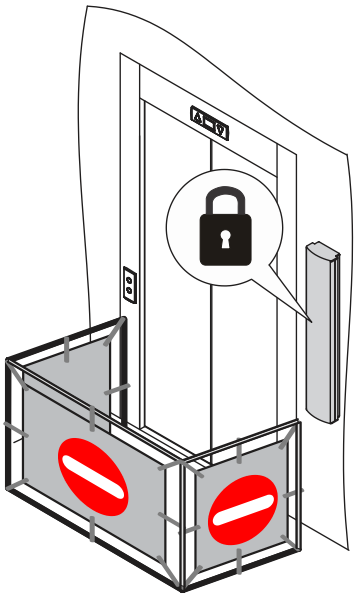
3. Close and lock the MAP.



X000010464

4. Test:
   - Landing door opening detectors
   - Safety buffer and car top balustrade switches
5. De-activate landing calls.

   LCEUI switch 261.
6. Close and lock MAP.
7. Test:
   - Telescopic apron

X0000115259 C.2

11.3.1 Test landing door opening detectors

By using the emergency opening key, verify that SSA switches are working on each landing.

NOTE: Enable landing calls and door opening for this test.

1. Call the elevator to the topmost floor.
2. When the doors are open, turn the landing door emergency opening device with a triangle key.

   SAM activates and prevents the doors from closing.

X000094188

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3. Reset SAM.

   You can reset SAM with button 141:P in the maintenance access panel (MAP) or with the lowest landing door key switch 141:S.

4. Repeat the test on all floors.

X000094190 A.5

Related information

*– SSA**E (169)*

11.3.2 Test telescopic apron

Before this procedure, make sure that you have:

– Taken the elevator out of use
– De-activated landing calls

NOTE: Telescopic apron is an optional component.

1. Travel in the elevator car to the second floor.
2. Make a car call from the second floor to the bottom floor and go to the landing.

   Stop the elevator at a suitable position by operating the emergency release key. Elevator car roof must be at a suitable height for safe moving between it and the second floor landing.

3. Push down the car roof stop button.
4. Set the pit buffers to position for inspection drive, if applicable.
5. Go to the elevator car roof.

6. Drive on inspection to a suitable position for accessing the car apron from the bottom landing.
7. Fix a rope to a suitable point on the elevator car roof and drop the other end to the car apron.

WARNING: The rope must be fixed to point which enables you to be in the middle of the elevator car roof when pulling up the rope and pushing the inspection drive buttons.

---

8. Go to the landing.

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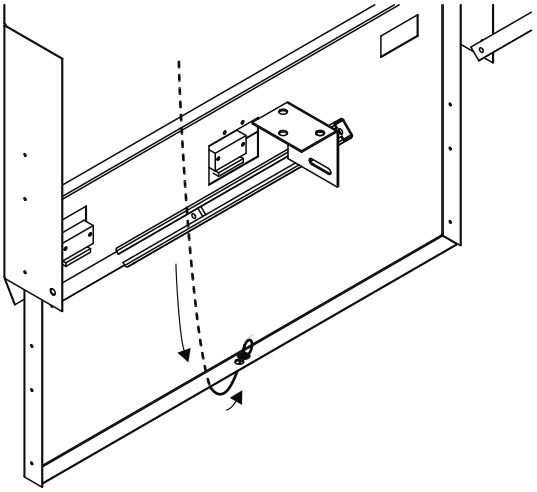
9. Open the bottom floor landing door with the emergency opening key.

L0000000197

10. Fix the rope to the bottom part of the car apron.

L0000000197



X000011540

11. Close the landing doors and check that they are mechanically locked.

L0000000197

12. Go to the elevator car roof.

L0000000197

13. Pull the rope to raise the bottom part of the car apron approximately 100 mm.

WARNING: Stand in the middle of the elevator car.

---

14. Release the stop switch.
15. Try to drive downwards on inspection.

    The elevator car must not move.
16. Keep pushing the inspection drive buttons and at the same time, lower the apron with the rope until the elevator car moves.

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17. Repeat the same test by driving upwards on inspection.

WARNING: Be extremely careful when driving upwards on inspection. Stand in the middle of the elevator car.

---

18. Remove the rope.

X0000103292 B.2

Related information

– *SSA**E (169)*
– *Take elevator out of use (68)*

11.3.3 Test safety buffer and car top balustrade switches

Before this procedure, make sure that you have:

– Taken the elevator out of use
– Enabled door opening
– Enabled landing calls

This section describes testing that the switches in the safety buffers and car top balustrade operate correctly, that is, they de-activate and enable correctly normal drive and inspection drive.

The following tables describe inspection and normal drive operation with SSA**E components.

Car roof balustrade	Inspection drive	Normal drive
Down	No	Yes[6)]
Up	Yes[7)]	No

Car buffer 1	Car buffer 2	Counterweight buffer	Inspection drive	Normal drive
Buffer rack	Under car	Down	No	No
Under car	Buffer rack	Down	No	No
Under car	Under car	Up	Yes[8)]	No

6) If equipped, all car and counterweight pit safety buffers must also be set to position for normal drive.
7) If equipped, all car and counterweight pit safety buffers must also be set to position for inspection drive.
8) If equipped, car roof balustrades must also be set to position for inspection drive.

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Car buffer 1	Car buffer 2	Counterweight buffer	Inspection drive	Normal drive
Buffer rack	Buffer rack	Down	No	Yes[9)]
Buffer rack	Buffer rack	Up	No	No
Under car	Buffer rack	Up	No	No
Buffer rack	Under car	Up	No	No

Check that every safety buffer and car top balustrade (if applicable) alone de-activate normal drive when in position for inspection drive. Check each component one by one. For more information, see the tables above.

1. Ensure that the elevator moves on normal drive.
2. Set a buffer or balustrade to position for inspection drive.
3. Return to landing and reset the shaft access monitor.
4. Make a landing call: the elevator car must not move.
5. Set the buffer or balustrade back to position for normal drive and reset the shaft access monitor.

X000094193 B.3

Related information

*– SSA**E (169)*

11.4 Perform periodical tests at MAP

1. Verify that the maintenance access panel (MAP) door lock operates correctly.
2. De-activate door opening and landing calls by using LCEUI switches 263 and 261.
3. Switch off the car light (290:1).
4. Switch off the main switch.
5. Open car doors partially if closed.

   NOTE: Block the doors with door blocking tool to prevent them from closing.

6. Test:
   - Emergency lighting in car
   - Remote or local alarm system and telephone, or intercom connection with back-up power
7. Switch on the main switch.
8. Switch on the car light (290:1).
9. Test the residual current devices.

9) If equipped, car roof balustrades must also be set to position for normal drive.

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10. Check that the car roof stop switch operates.

    1. Send the car one floor down by using car calls (from an upper landing).
    2. Open the landing door with the emergency opening key to stop the car roof on the floor level.
    3. Standing on the landing, push down the stop switch.
    4. Close the landing doors.
    5. Check that the landing doors are mechanically locked.
    6. Make a landing call.

       The elevator car must not move.

11. Check that the inspection switch operates.

    1. Open the landing door with the emergency opening key.
    2. Standing on the landing, switch on the inspection drive.
    3. Standing on the landing, release the stop switch.
    4. Close the landing doors.

       Check that the landing doors are mechanically locked.
    5. Make a landing call.

       The elevator car must not move.
    6. Open the landing door.

12. Go to the car roof.

13. Close the landing doors.

    Check that the landing doors are mechanically locked.

14. Test the inspection drive buttons (down and up).

15. Test:

    – Car and counterweight safety gears
    – One-sided brake test and UCM test
    – Final limit switches
    – Traction
    – Seismic switch, if applicable

X0000305204 A.5

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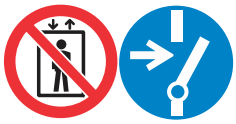
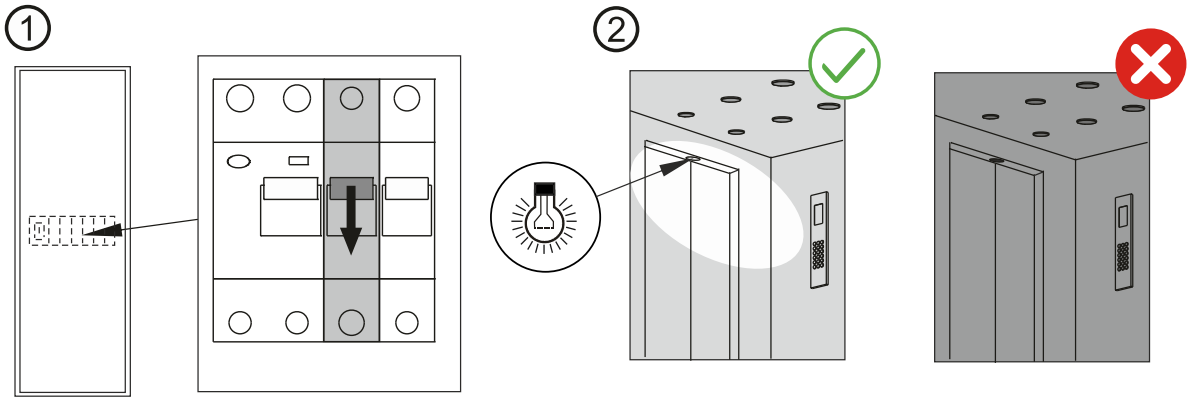
11.4.1 Emergency light in car (condition check)

Switch off the car light to check the emergency light.

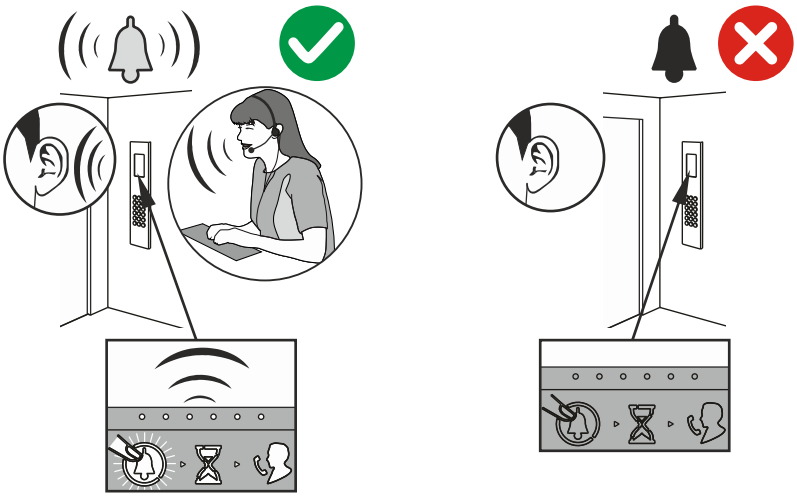




X0000071866
X0000068808 B.2

11.4.2 Remote / local alarm system and telephone / intercom connection with back-up power (condition check)

WARNING: If the elevator does not pass the test, take the elevator out of use. Do not return the elevator into normal use until the problem is solved.



X000048193
X0000070405 B.2

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11.4.3 Test residual current device

There are three residual current devices (RCDs):

– For safety chain at pos. 296
– For car door operator at pos. 297
– For light supply at pos. 236

1. Briefly press the button marked "T" or "Test" on the residual current device to test.

WARNING: The device must be replaced if it does not break the circuit.

The device should operate and break the circuit it is connected to.

2. Reset the device.

X0000002029

11.4.4 Test elevator car safety gear

WARNING: Move safely between car roof and landing.

WARNING: The elevator car must be empty and the landing calls and the door opening must be de-activated.

CAUTION: The safety gear must be tested with empty elevator car at inspection drive speed.

---

1. Go to the maintenance access panel.
2. Switch on RDF.
3. Switch on shaft lights if not already on.
4. Drive on RDF so that the elevator car roof is in the middle of the topmost landing door.
5. Check the elevator car position.
    1. Open the landing door slightly with the emergency opening key (max. 90 mm).
    2. Check the elevator car position.
    3. Close the landing doors.
    4. Check that the landing doors are mechanically locked.
    5. If applicable, reset the shaft access monitor (SAM).

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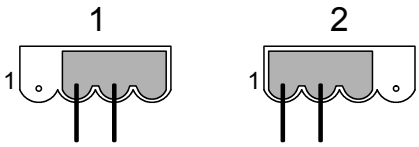
6. Move the plug of the XL8 connector from position 1 to test position 2.



X000010706

1 Normal position

2 Test position

7. Drive downwards on RDF (press 270:RB + 270:N simultaneously) for approximately 2 seconds and push the overspeed governor test button.

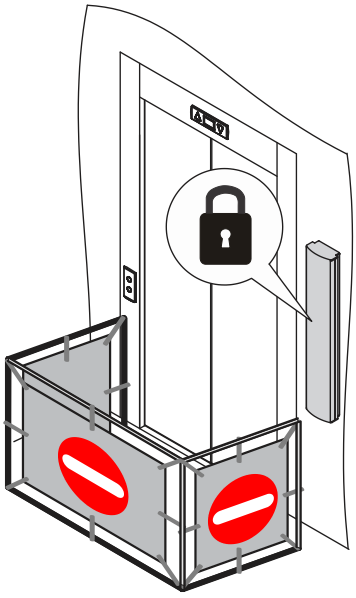
   The elevator must stop immediately.

8. Try to drive downwards on RDF to check that the safety gear is engaged.

   The elevator car must not move downwards when the safety gear is engaged.

   NOTE: If the steel ropes are slipping, do not run more than 3 seconds.

9. Switch off the Recall Drive Feature (RDF).
10. Close and lock the maintenance access panel.


X000010464

11. Go to the elevator car roof.

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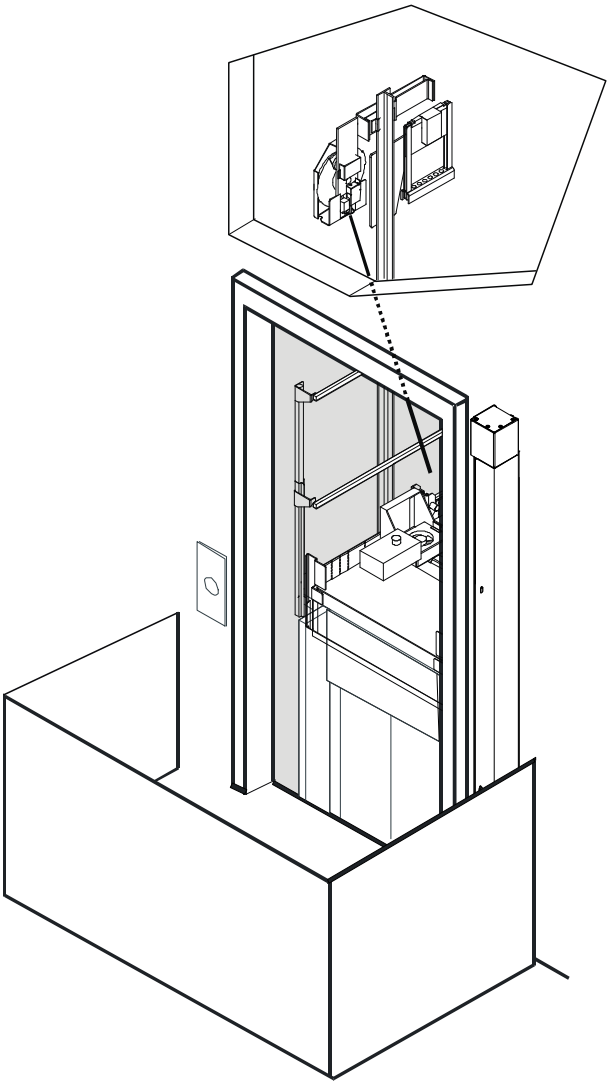
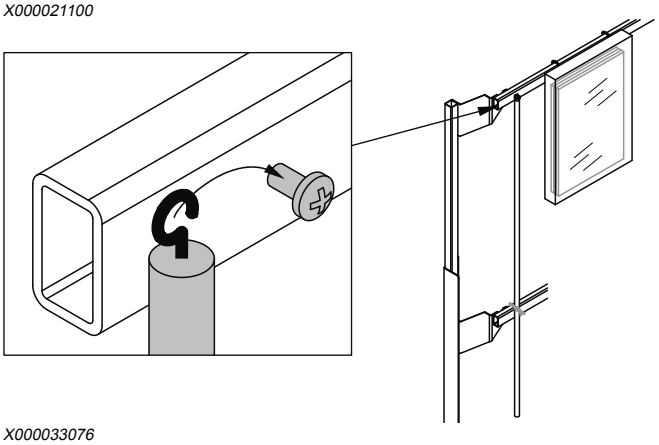
12. Reset the OSG electrical switch with OSG reset stick.

    The OSG reset stick is located on the car roof balustrade. Return the stick to the balustrade after use.



X000021100



X000033076

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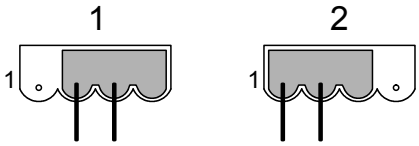
13. Go to the landing.

14. Make a car call upwards from the maintenance access panel.

    The elevator car must not move.

    NOTE: The safety gear switch must cut the electric safety chain.

15. Switch on RDF.
16. Move the plug of the XL8 connector from position 2 to position 1.



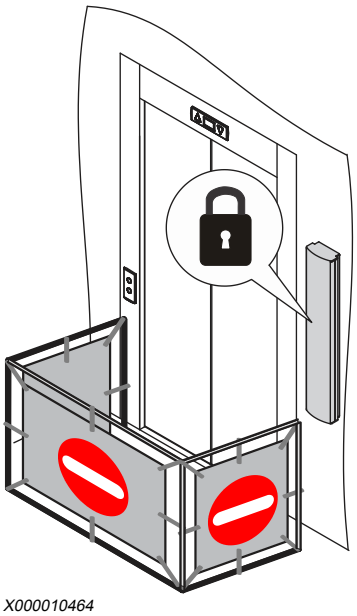
X000010706

1 Normal position

2 Test position

17. Release the safety gear by driving upwards on RDF.
18. Drive the elevator on RDF to a suitable position.

    Elevator car roof must be at a suitable height for safe moving between it and the topmost landing.
19. Open the landing door.
20. Push down the car roof stop button.
21. Switch off RDF.
22. Close and lock the maintenance access panel.



X000010464

23. Set the pit buffers to position for inspection drive, if applicable.

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24. Go to the elevator car roof.

L0000000197

25. Drive downwards on inspection drive until you see the safety gear grip marks on the guide rails.
26. Check the length and the level of the grip marks on both sides.

    The marks must be on the same level. Otherwise the safety gears must be adjusted. If the safety gear does not stop the elevator immediately, the safety gears must be replaced.
27. Remove the safety gear marks using a file.

    Removing the marks avoids excessive wear of guide shoes and roller guide shoes.
28. Drive on inspection to a suitable level for accessing the landing.

WARNING: Be careful when driving upwards on inspection drive.

---

29. Go to the landing.

L0000000197

30. Set the pit buffers to position for normal drive and reset elevator shaft access monitoring, if applicable.

X0000103160 C.6

11.4.5 Test counterweight safety gear

NOTE: Counterweight safety gear is an optional component.

CAUTION: The safety gear must be tested with empty elevator car at inspection drive speed.

WARNING: Move safely between landing and elevator car roof. Follow the method approved by your local unit.

---

1. Give call to bottom floor with LCEUI.
2. Switch on the Recall Drive Feature (RDF).

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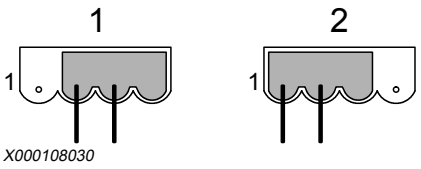
3. Remove the car overspeed governor cable from XL8.

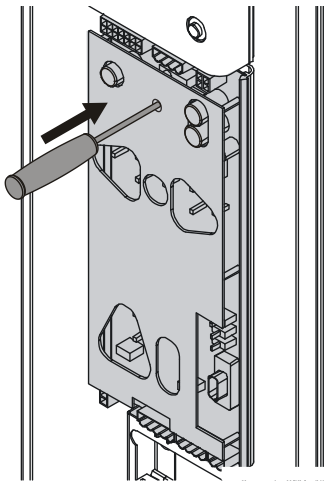
   1 = normal, 2 = test



X000108030

4. Connect the counterweight overspeed governor cable to XL8, to position 2.
5. Drive upwards on Recall Drive Feature (RDF) for approximately 2 seconds and push the overspeed governor test button.

   The elevator must stop immediately.


X000108031

6. Try to drive upwards on Recall Drive Feature (RDF) to check that the counterweight safety gear is engaged.

   The elevator car must not move upwards when the counterweight safety gear is engaged.
7. Put the elevator to the normal mode and check from LCEUI that the electric safety chain is open.

   This is done only if the counterweight safety gear has the switch installed.

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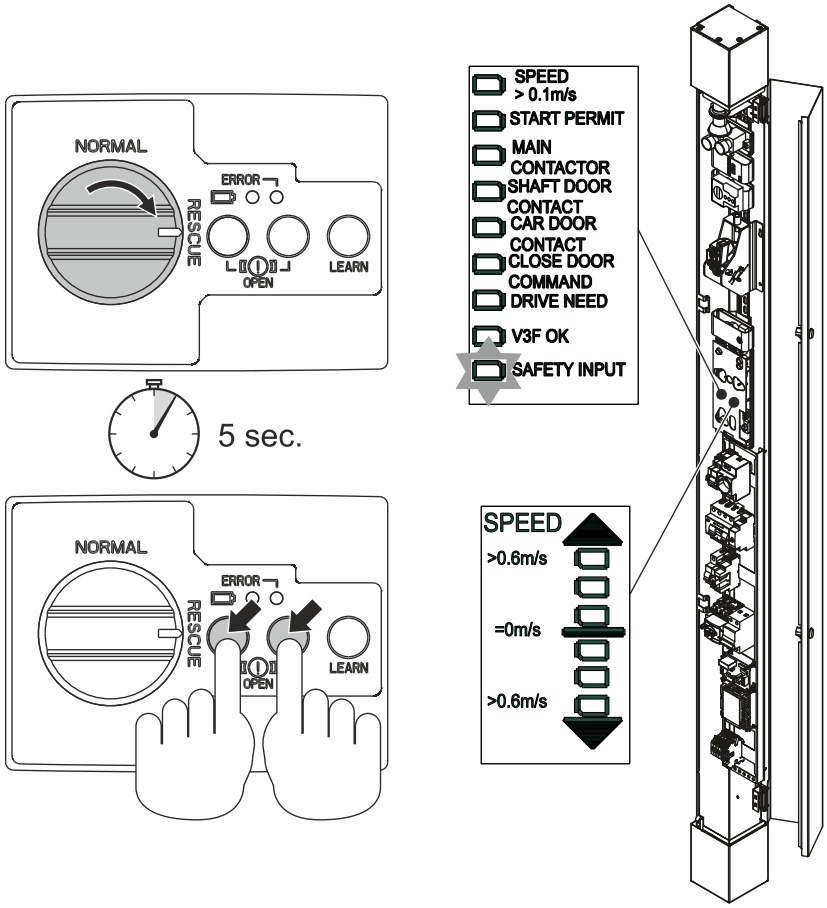
8. Open the machine brakes.
    1. Turn the RBO operation mode switch to "Rescue" position.
    2. Press both brake release buttons at the same time for 3 seconds.
    3. Check that the speed LEDs do not turn on.

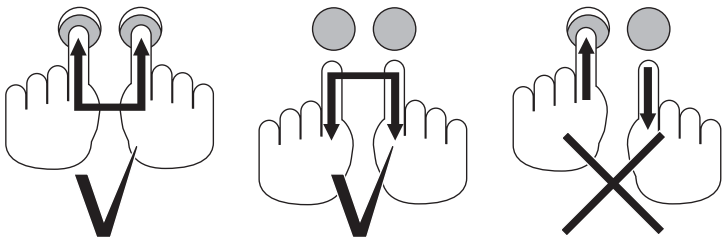
CAUTION: Close the machine brakes immediately if the second speed LED turns on. The car must not move.



X0000310305

The elevator car must not move when the counterweight safety gear is engaged.

NOTE: It is important to press and release the Open buttons simultaneously to avoid "Relay stuck" supervision from triggering.



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X000094312

4. If the brake release buttons were pressed or released separately, recover the RBO by switching operation mode switch to "Normal" and then to "Rescue".

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9. Drive downwards on Recall Drive Feature (RDF) for approximately 2 seconds or at least 150 mm to release the counterweight safety gear.
10. Drive the elevator on Recall Drive Feature (RDF) upwards to the topmost floor.

    Elevator car roof must be at a suitable height for safe moving between it and the topmost landing, maximum 500 mm below or above the landing.
11. Go to the elevator car roof.

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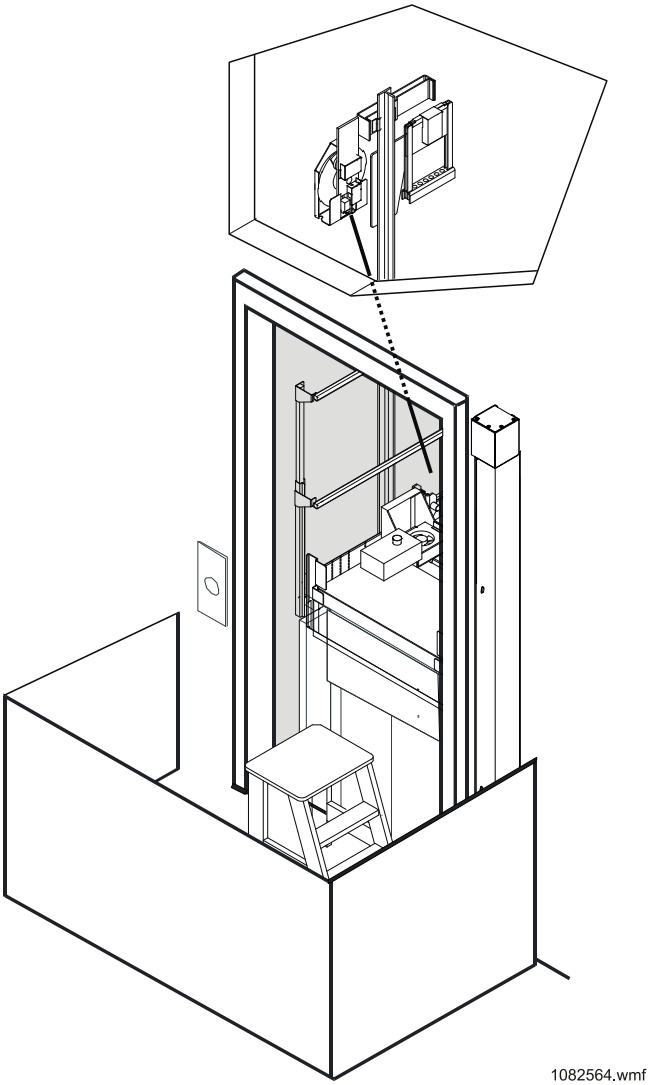
12. Reset the OSG electrical switch with OSG reset stick if necessary.



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The OSG reset stick is located on the car roof balustrade. Return the stick to the balustrade after use.

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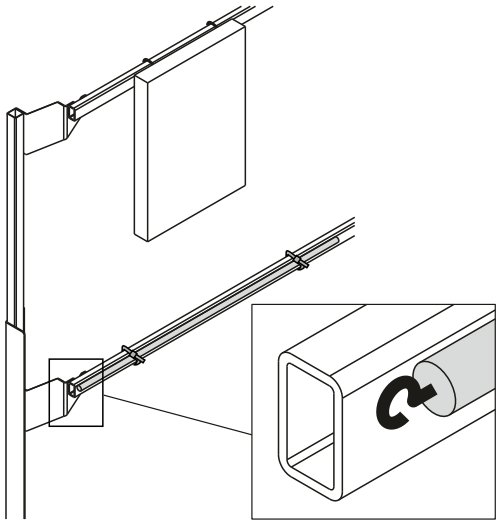
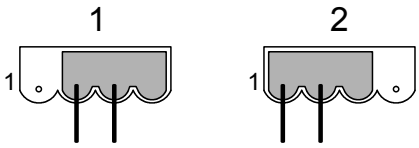


X0000054781

13. Go to the landing.
14. Remove the counterweight overspeed governor cable from XL8.



X000108030

1 = normal, 2 = test

15. Connect the car overspeed governor cable to XL8, position 1.
16. Switch off the Recall Drive Feature (RDF).
17. Close and lock the Maintenance Access Panel (MAP).
18. Go to the elevator car roof.
19. Drive downwards on inspection drive until you see the safety gear grip marks on the guide rails.
20. Check the length and the level of the grip marks on both sides.

    The marks must be on the same level (maximum of 20 mm difference).

    Otherwise the safety gears must be adjusted. If the safety gear does not stop the elevator immediately, the safety gears must be replaced.
21. Remove the safety gear marks by using a file.

    NOTE: Removing the marks avoids excessive wear of guide shoes and roller guides.
22. Drive the elevator car on inspection drive to a suitable level for going to the landing.

WARNING: Be extremely careful when driving upwards on inspection.

---

23. Go to the landing.

X000108034 D.5

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Related information

*– SSA**E (169)*

11.4.6 Perform one-sided brake test

This section describes the periodical tests for the brakes of the hoisting machine.

NOTE: KONE does not recommend to perform the one-sided brake test and UCM test during the periodical inspection for the following reasons:

– The UCM functionality has been tested when the elevator has been taken into use for the first time (certificate test method).

– An automatic daily brake test during the whole lifetime of the elevator verifies the torque of both brakes independently.

  If the test fails, the elevator is automatically switched out of use and a competent person is needed to place the elevator back to use.

– If UCM activates, fault code 00005 displays and is stored in the volatile (permanent) memory of the elevator.

  The elevator is automatically switched out of use and a competent person is needed to place the elevator back to use.

– The UCM door open detection is achieved by using dual door zone monitoring and cutting the safety circuit.

The basic UCM description is available from the EU type examination certificate number 16009,

In a one-sided brake test, the performance of each brake unit of the hoisting machine is tested independently. Each brake alone must be able to hold the empty elevator car in position.

This test also verifies that UCM detection on the ADO/ACL board operates if one brake does not hold the elevator car. The following conditions apply:

– If one-sided electrical braking test passes, UCM test also passes

– If one-sided electrical braking test fails and car moves, UCM detection triggers the machinery brake stopping devices and stops the elevator car

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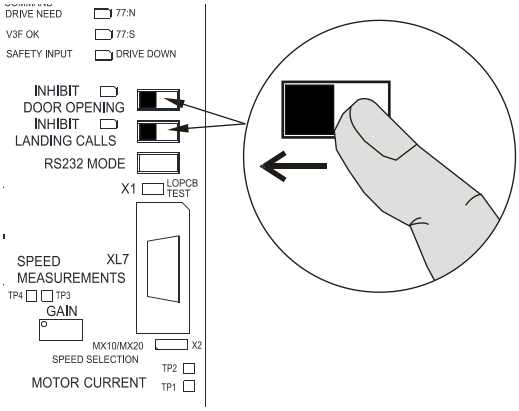
1. Disable landing calls and door opening.

L0000000225

LCEUI switches 261 and 263.



X000094176

2. Make a car call to the topmost floor from the maintenance access panel.
3. Turn the main switch off and back on.

   The controller automatically makes the one-sided braking test in 5 - 10 minutes after powering up. If the test fails, the controller tries to make the test 3 times (fault code 3 x 2072). If all tests fail, fault code 1046 displays.
4. Make notes of the test.

   After completing all tests, record the test date and all results in the elevator's log book at once.

X0000103574 A.3

Related information

– *SSA**E (169)*
– *Operating instructions for SSA**E devices (172)*

11.4.7 Perform UCM test 2/2 (with 0% load)

Unintended car movement monitoring is enabled in the following LCE software versions:

– CPU40/N applications - version 6.11.X or later
– CPU561 applications - version 8.2.X or later

The UCM test verifies that the UCM detection on the ADO/ACL board operates and triggers the machinery brake stopping devices. The following conditions apply:

– Uncontrolled movement of the elevator car with doors open is registered and saved in the memory, in the fault log.
– The elevator remains in fault mode after switching the power off and on.
– The elevator recovers only if RDF (270) is switched on and off.

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WARNING: Before the test, you must perform the safety measures. Failing to complete the safety measures can cause death or serious injury. Make sure that no-one can enter the elevator shaft or car during this test. Safety fences must be in place to prevent access through the landing doors on the second floor from the top.

1. Verify that the RBO is in the COMFORT mode.

   NOTE: When the RBO is in the COMFORT mode, the elevator car moves continuously when brakes are opened with the RBO.

2. Place a safety fence around the entrance of the second floor from the top.
3. Go to the maintenance access panel (MAP).
4. Disable landing calls.

   LCEUI switch 261.
5. Give a car call to the second floor from the top using LCEUI.

   Wait until the car stops and the doors open.

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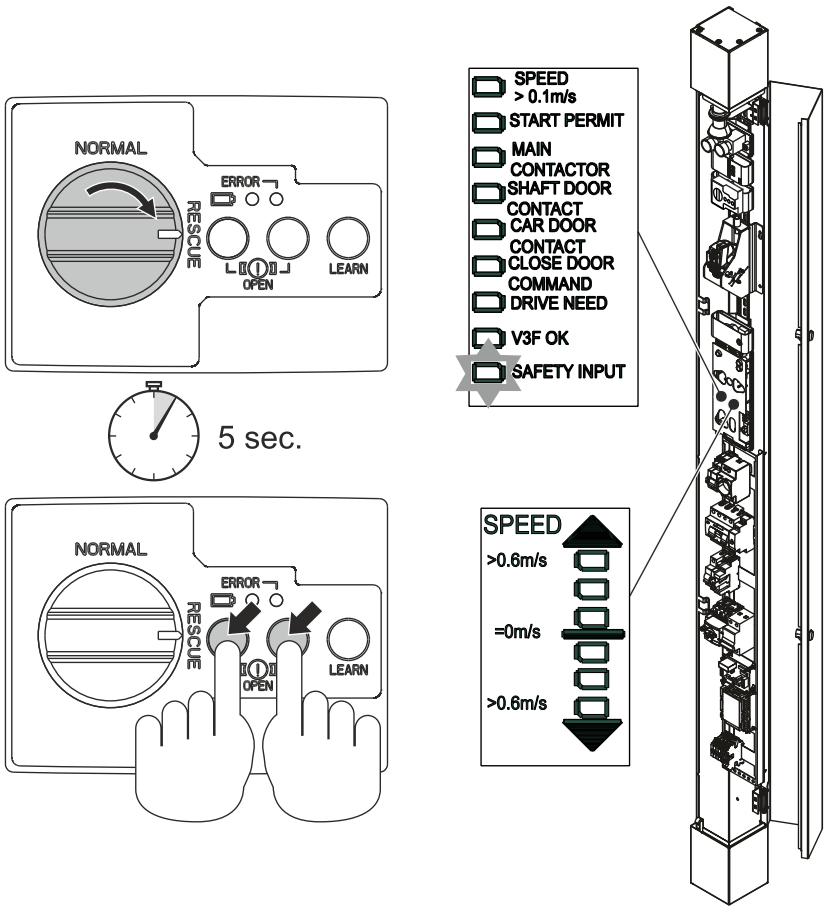
6. When the doors are fully open, switch the RBO operation mode to "Rescue" position.

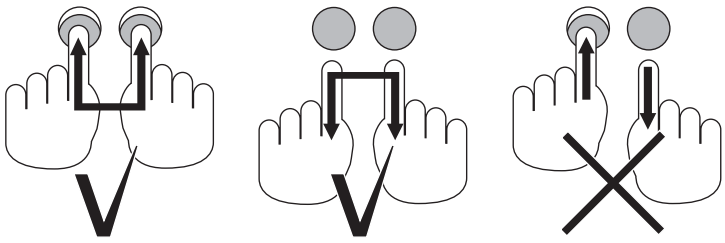


X0000310305

1. Press both brake release buttons at the same time.

   Check that the speed LEDs do no switch on.

   NOTE: Press and release the brake release buttons simultaneously to avoid "Relay stuck" supervision from triggering.



1096935.pdf

X000094312

   If the brake release buttons were pressed or released separately, recover the RBO by switching operation mode switch to "Normal" and then to "Rescue".

2. Raise the car above the door zone (LED 30 and LED 61 must not be on).
3. Switch the RBO to the NORMAL mode and check that the unintended car movement is detected (the fault code 0005 is displayed).

7. Switch off the main power (220).

   Wait until the elevator control system shuts down. Minimum 5 minutes.

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8. Switch on the main power (220).

   Check that the unintended car movement is detected (the fault code 0005 is displayed).

   The elevator must not recover to the normal drive.

9. Switch on RDF.
10. Switch off RDF.

    The elevator car starts to drive and recover to normal drive. Fault code 0005 is not displayed.

11. Enable landing calls.

    LCEUI switch 261.

12. Make notes of the test.

    After completing all tests, record the test date and all results in the elevator's log book at once.

X000108020 B.3

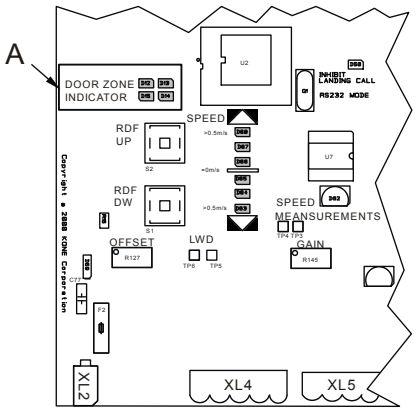
Related information

– Take elevator out of use (68)

11.4.8 Test upper limit switch

1. Open the Maintenance Access Panel (MAP). Switch on the Recall Drive Feature (RDF).
2. Drive the elevator car on RDF to the topmost landing level.

   The DZI (A) switches on.



X000108023

3. Switch off the main power (220).

   Wait until the elevator control system shuts down. Minimum 5 minutes

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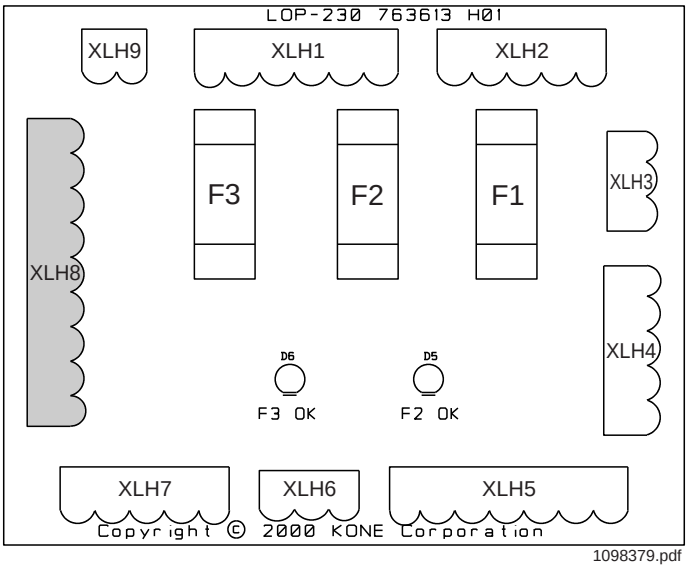
4. Disconnect the plug XLH8 from LOP-230 board in the MAP.

   Measure with multimeter the resistance between pins XLH8/7 and XLH8/9 on XLH8 plug.

   NOTE: The multimeter buzzer is useful if you are working alone.



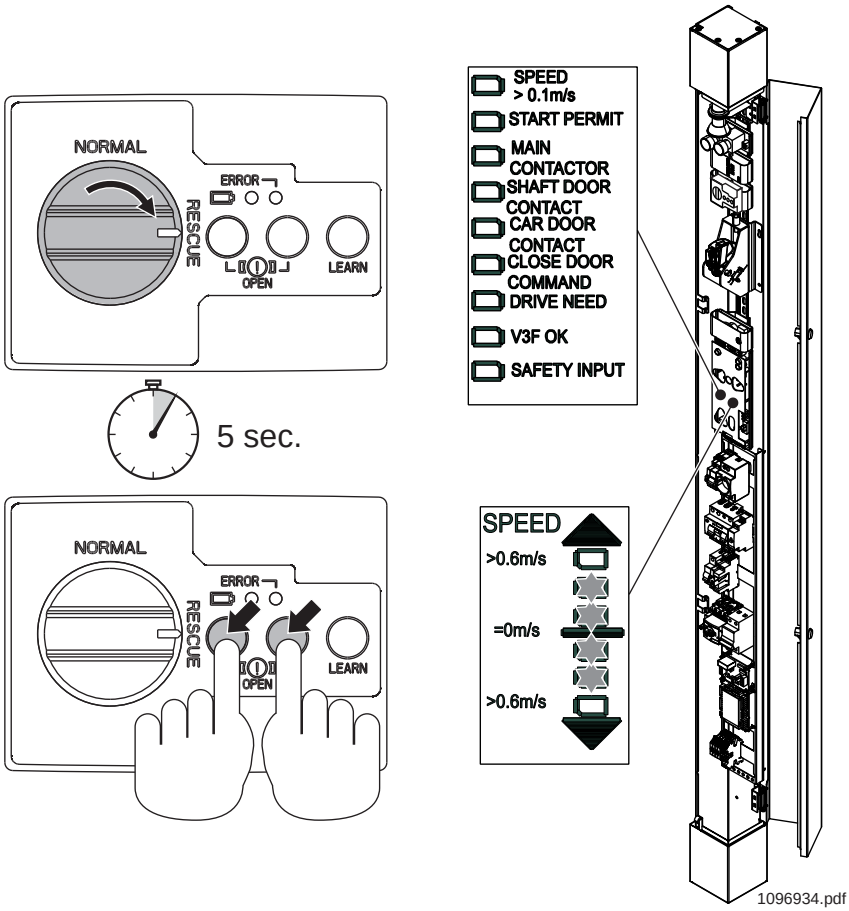
1098379.pdf

X000108024

5. Open the brake with the RBO remote control unit.

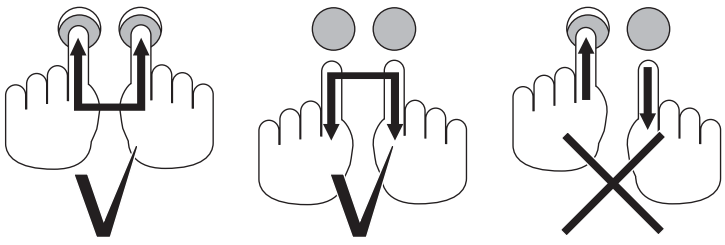
   Move the car approximately 1-2 cm at a time.

WARNING: Always monitor the speed LEDs when releasing the brakes. If the third speed LED starts to blink, immediately stop releasing the brakes.



X000094313

NOTE: Press and release the Open buttons simultaneously to avoid "Relay stuck" supervision from triggering.



X000094312

If the brake release buttons were pressed or released separately, recover the RBO by switching operation mode switch to "Normal" and then to "Rescue".

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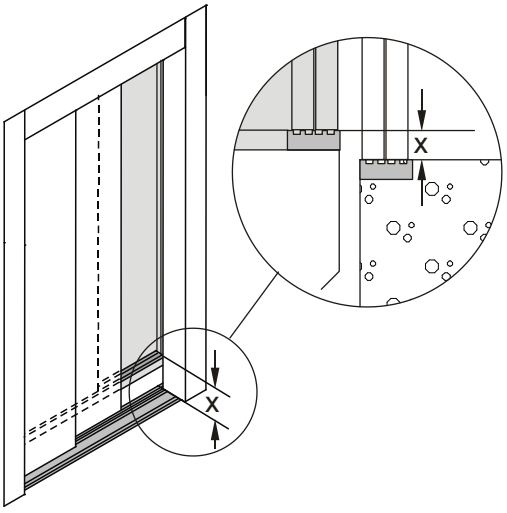
6. The operation point of the limit switch is reached when the multimeter shows "infinity". Stop the car at the operating point. Release the RBO.
7. Open the landing doors.
8. Measure and record the deviation of car and landing door sills.



X000108025

Check that the measurement corresponds to the layout drawings.

9. Close the landing doors.

   Check that the landing doors are mechanically locked.
10. Reconnect the plug XLH8.
11. Switch on the main power (220).
12. Switch the RBO remote control unit to NORMAL mode.
13. Drive the elevator car on RDF back to the topmost floor.
14. Make notes of the test.

    After completing all the tests, record the test date and all results in the elevator's log book.

X000108026 B.3

11.4.9 Test lower limit switch

1. Go to the maintenance access panel (MAP).

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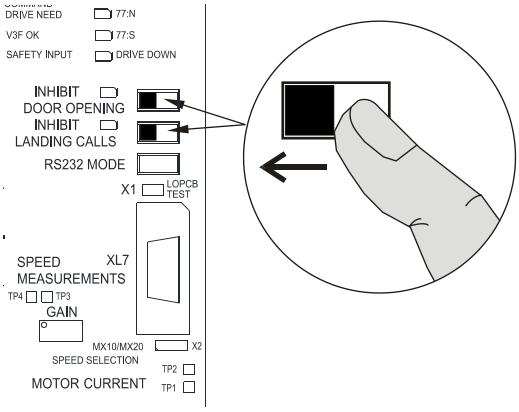
2. Disable landing calls.

   LCEUI switch 261.



X000094176

3. Disable door opening.

   LCEUI switch 263.

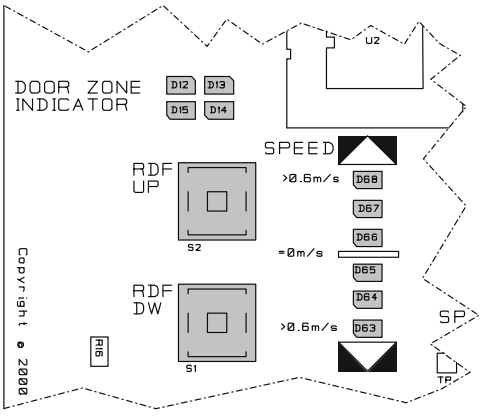
4. Make a car call to the bottom floor.

5. Switch on the Recall Drive Feature (RDF) 270 when the elevator car is on the bottom floor.

6. Drive downwards on RDF until the elevator car reaches the buffer.

   (RDF RUN and RDF DOWN.)

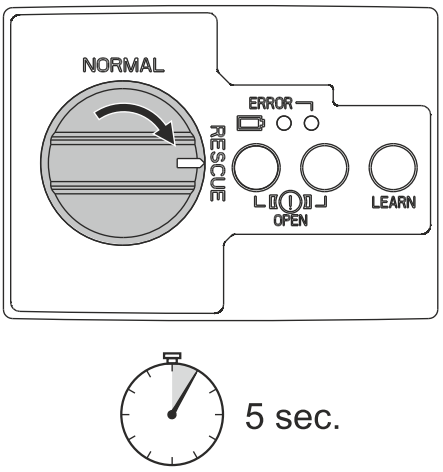
   To make a static buffer test.



X000094177

7. Switch off RDF.

8. Switch the RBO remote control unit to the RESCUE mode.



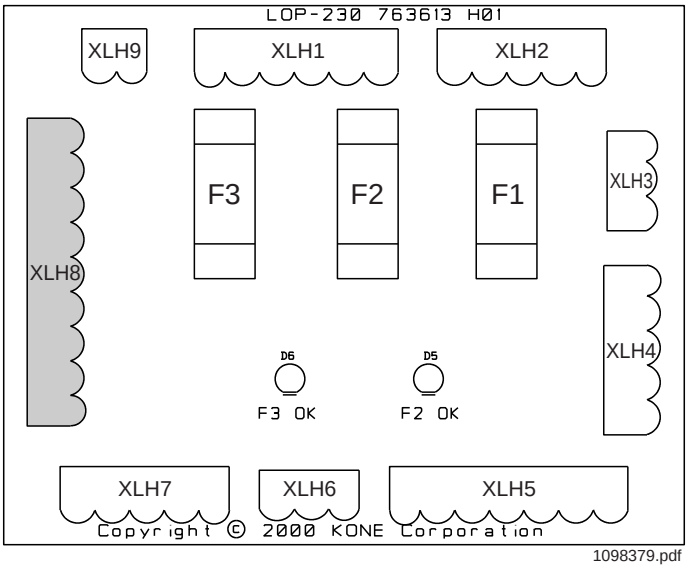
X0000306177

9. Switch off the main power (220).

   Wait until the elevator control system shuts down. Minimum 5 minutes.

10. Disconnect the plug XLH8 from LOP-230 board in the MAP. Measure with multimeter the resistance between pins XLH8/7 and XLH8/9 on XLH8 plug.

    NOTE: The multimeter buzzer is useful if you are working alone.



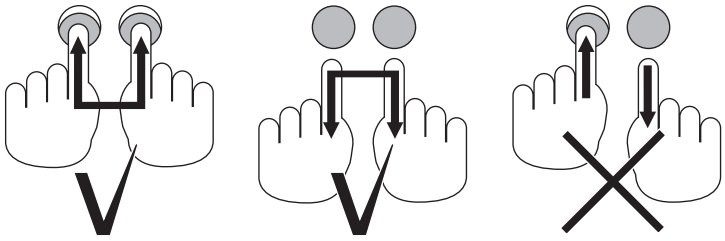
X000108024

11. Open the brake with the RBO remote control unit.

    Move the car approximately 1 – 2 cm at a time.

WARNING: Always monitor the speed LEDs when releasing the brakes. If the third speed LED starts to blink, immediately stop releasing the brakes.

NOTE: Press and release the Open buttons simultaneously to avoid "Relay stuck" supervision from triggering.

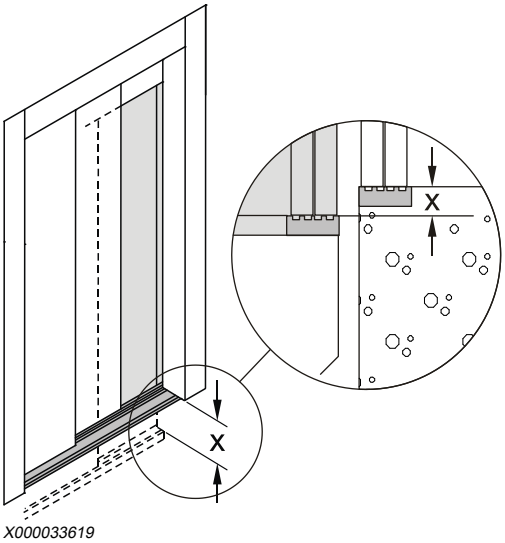


1096935.pdf

X000094312

If the brake release buttons were pressed or released separately, recover the RBO by switching operation mode switch to "Normal" and then to "Rescue".

12. The operation point of the limit switch is reached when the multimeter shows "short circuit".
13. Close and lock the MAP.
14. Walk to the bottom floor. Open the landing doors.
15. Measure the limit switch operating point from the bottom landing door sill to the car sill.



X000033619

Check that the measurement corresponds to the layout drawings. Adjust the magnets if necessary.

16. Make notes of the test.

    After completing all the tests, record the test date and all the test results in the elevator's log book.

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17. Close the landing doors.

    Check that the landing doors are mechanically locked.
18. Walk back to the MAP floor. Open the MAP.
19. Reconnect the plug XLH8.
20. Switch on the main power.
21. Switch the RBO remote control unit to the NORMAL mode.
22. Switch on the Recall Drive Feature (RDF).
23. Drive the elevator car on RDF back to the bottom floor.
24. Switch off the Recall Drive Feature (RDF).

X0000305215 A.4

11.4.10 Test traction (stopping test)

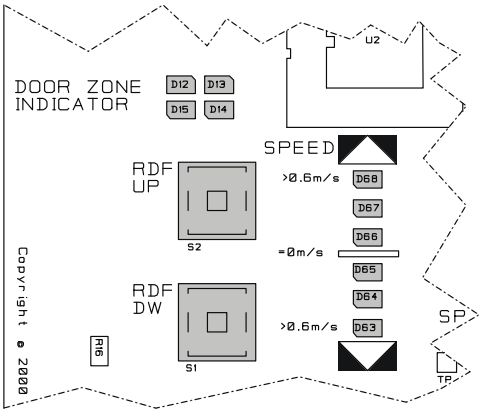
NOTE: Perform the test with empty car (0% load).

1. Make a car call to the topmost floor from the maintenance access panel (MAP).

WARNING: The elevator car must be empty. Landing calls and door opening must be de-activated.

---

2. When the elevator has reached the rated speed, switch on RDF.



X000033116

NOTE: The machine brakes must stop the elevator car completely.

3. Switch off RDF.
4. Repeat the test twice.

X0000103263 A.5

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11.4.11 Test counterweight buffer and traction (stalling)

WARNING: This task requires two maintenance technicians if the maintenance access panel (MAP) is not at the topmost floor. The first person operates the elevator at MAP and the second person observes the elevator car movement on the topmost floor. Adequate communication must be maintained between maintenance technicians at all time. All possible communication devices (for example radios or mobile telephones) must be carefully checked before use.

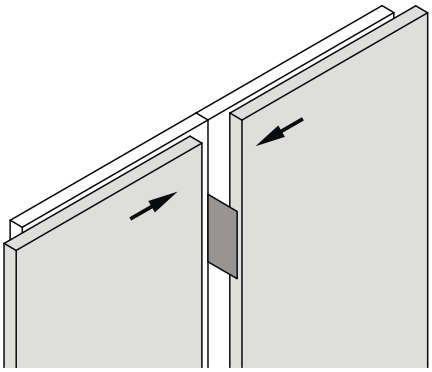
---

1. Drive upwards on Recall Drive Feature (RDF) until the counterweight buffer is fully compressed and the counterweight stops.

   NOTE: Make sure that counterweight buffer is fully compressed by releasing the motor brakes.

2. Open the landing doors slightly with the emergency release key.
3. Fix a piece of paper between the car doors so that it projects through the landing doors.

   The paper indicates if the elevator car moves during the traction test.



X000107748

4. Try to drive upwards on RDF approximately three seconds.

   Observe the speed LEDs in the maintenance interface to ensure that the motor rotates or tries to rotate. Observe the paper between the door panels to ensure that the elevator car does not move even if the motor is rotating. If the paper does not stay in its place, stop driving immediately.

   The elevator car must not move.
5. Repeat the test.
6. Make notes of the test.

   After completing all the tests, record the test date and all results in the elevator's log book.
7. Drive downwards on RDF until the DZI LED turns on.

   The elevator car is then at the topmost floor.
8. Remove the paper from the doors.
9. Close and lock the Maintenance Access Panel (MAP).

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10. Go to the pit.

    Block the landing doors to max. 90 mm open position with the door blocking tool.

11. Check that the counterweight and the counterweight buffer are undamaged. Remove the CWT screen if needed.

    Polyurethane buffers:

    Check that there are no cracks or powdering.

    Oil buffers:

    – Check that there are no leaks.

    – Check the oil level of the buffer.

12. Go to the landing.

13. Make notes of the test.

    After completing all the tests, record the test date and all results in the elevator's log book.

X000107769 B.3

Related information

*– SSA**E (169)*
– Reset inspection control station (42)

11.4.12 Test seismic switch

Refer to manufacturer's manual on how to run a test routine to trigger the seismic switch output.

NOTE: This test puts all elevators in the group into seismic mode.

1. Run the car to the topmost floor.
2. Place a car call from the Lift Controller Electrification User Interface (LCEUI) to the bottom floor.
3. While car is running at rated speed, conduct test routine of the seismic switch.
4. Observe that all cars make a controlled stop at the next available landing. Open their doors.
5. Verify that all elevators in the group show elevator mode 4-1-16.
6. Place a car call from the LCEUI on each car. Observe that neither of the cars responds to it.
7. Follow manufacturer's instruction. Reset the seismic switch.
8. Observe that the elevators do not respond to the car or landing calls.
9. Verify that the elevator mode shows 4-1-16.

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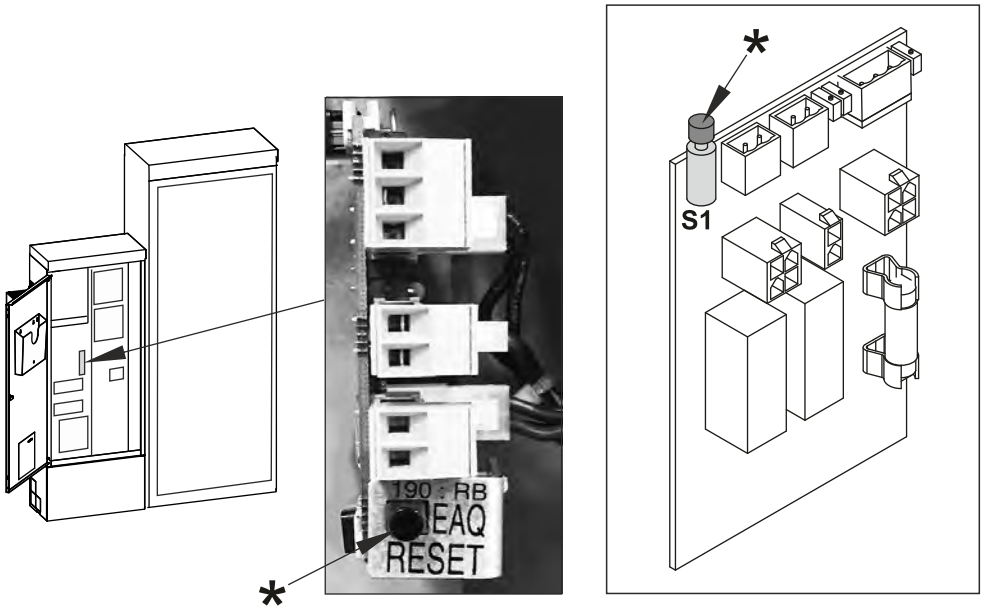
10. Press earthquake (EAQ) reset push button on each car. Observe that the elevator mode has changed to 4-1-0 on each car.

    Seismic device reset is done from 373 LCEEAQ board. Press the reset button.

    Board location possibly varies in different controllers.



X0000092816

11. Verify that the elevators are in normal drive. Make a few car and landing calls.
12. Enable landing calls and door operation. Use LCEUI switches 263 and 261.

X0000091338 D.2

11.5 Perform periodical tests in elevator shaft

WARNING: Move safely between car roof and landing.

---

1. Go to car roof.

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2. Test or check:
   – Car roof safety switches
   – Diverting pulley in the headroom of the shaft (KONE TranSys™)

WARNING: Before touching the diverting pulley, make sure that the car does not move at all.

---

3. Drive downwards on inspection drive.
4. During the drive, check:
   – Elevator shaft lights throughout the elevator shaft
   – Snag point protection devices, if applicable
5. On each landing, test the electrical and mechanical function of landing doors.
6. In the top of the elevator shaft, check the suspension ropes.
7. In the middle of the elevator shaft, check:
   – Overspeed governor rope
   – Car and counterweight retainers, if applicable
   – Compensation chain fixings from counterweight side, if applicable
   – Pulleys on top of counterweight
   – Counterweight OSG tripping
8. In the bottom of the elevator shaft, check the compensation chain, if applicable.
9. Go to the landing.

X0000115143 C.2

11.5.1 Car roof safety switch tests

NOTE: The same procedure can be used to test all safety chain switches on the elevator car roof, for example trap door and blocking device.

1. Open the trap door, if applicable.
2. Try to drive with inspection drive.

   The elevator car should not move.
3. Test the other trap or exit doors in the same way.

X0000074955 B.2

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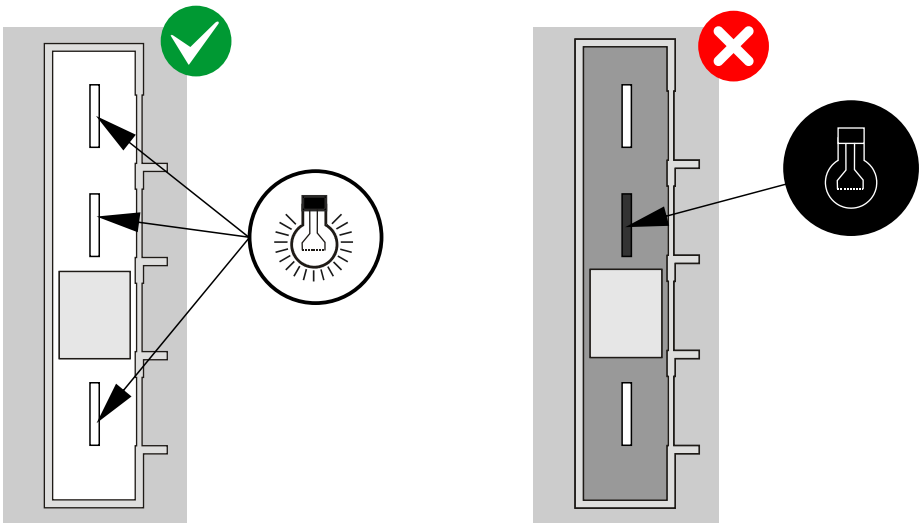
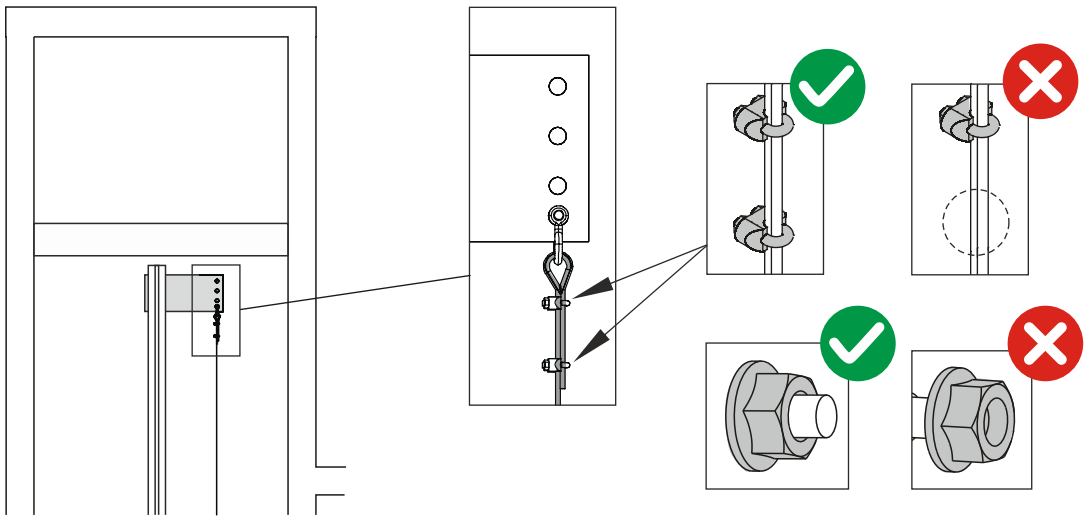
11.5.2 Shaft lighting (condition check)



X0000054741
X0000003019

11.5.3 Snag point protection devices (condition check)



X0000149846
X0000086004 C.2

11.5.4 Test landing door electrical and mechanical functions

WARNING: Move safely between car roof and landing. Use work positioning equipment or restraint systems when required.

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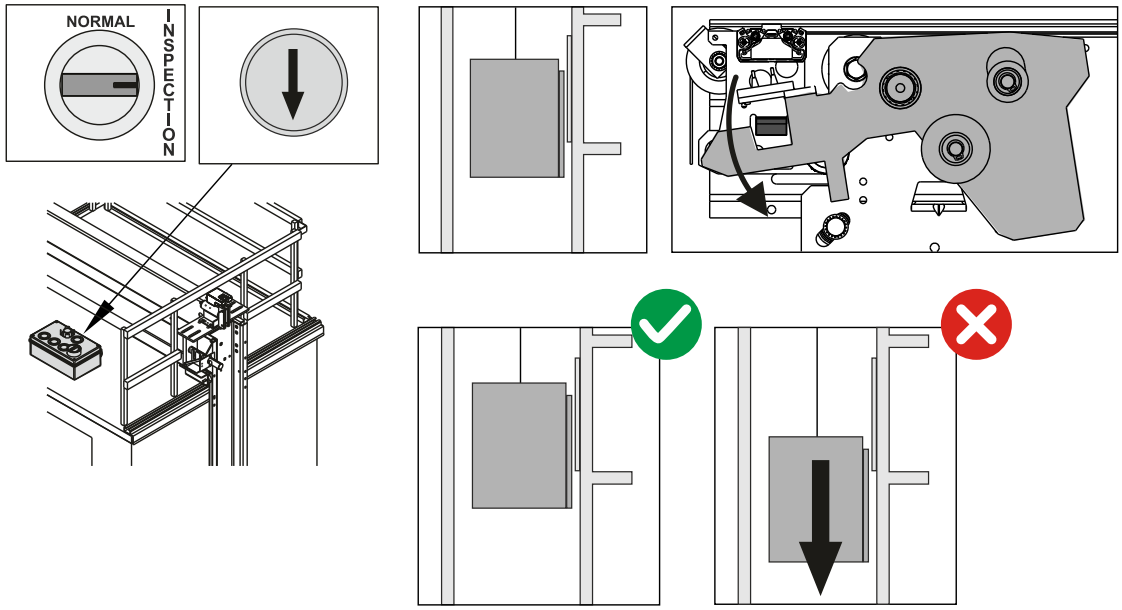
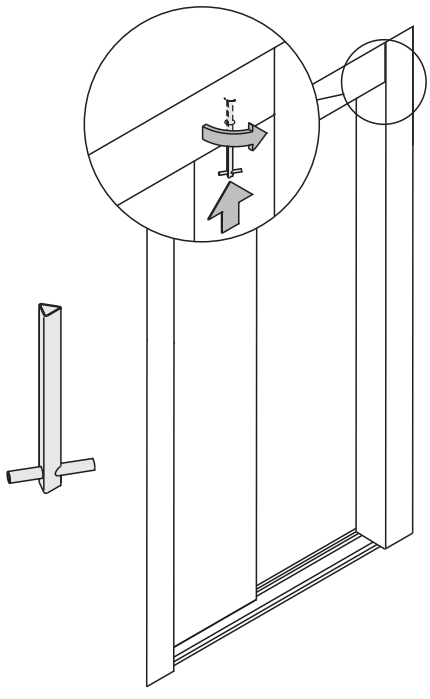
1. Drive down on inspection from car top.
2. Open the landing door lock from the lock roller, when the elevator car is moving.
   The car must stop.



X0000104481

3. Push or pull the landing door to open direction.
   Landing door lock must keep the door locked mechanically.
4. Go to the landing, when the car roof is on landing level.
5. Manually open the landing door with the emergency opening device (EOD).
   Verify that EOD operates.



X0000056767

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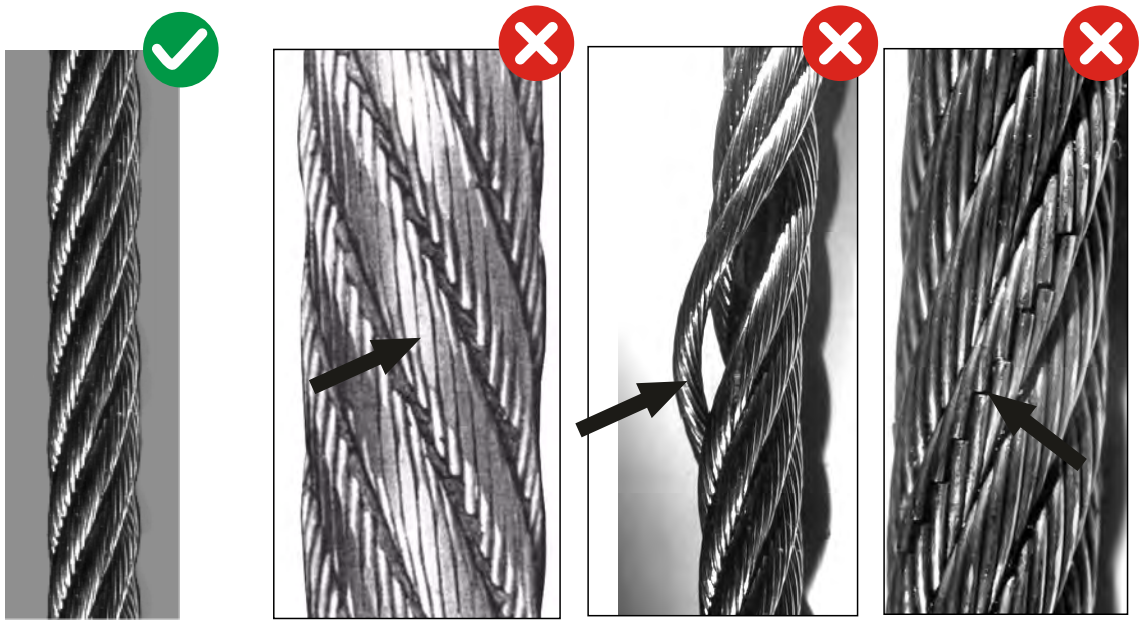
6. Repeat EOD test on each landing.

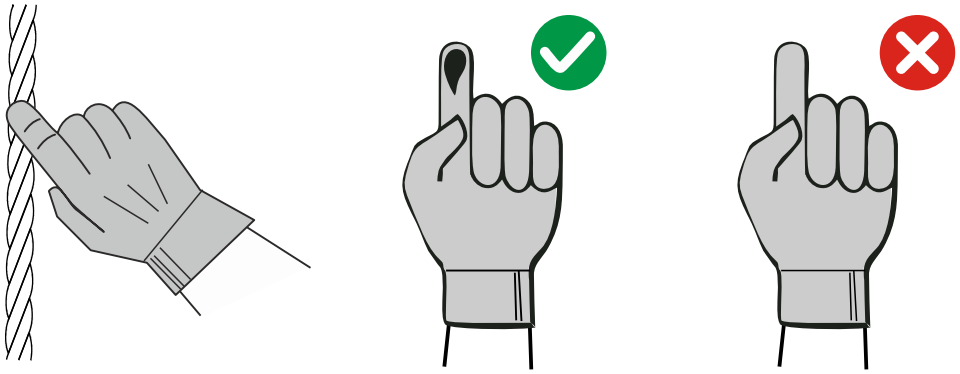
X0000074969 E.2

11.5.5 Steel suspension ropes (condition check)



X0000055039

WARNING: If the elevator does not pass the test, take the elevator out of use. Do not return the elevator into normal use until the problem is solved.



X0000055214
X0000003017

11.5.6 Overspeed governor rope (condition check)

WARNING: Do not lubricate the overspeed governor rope.

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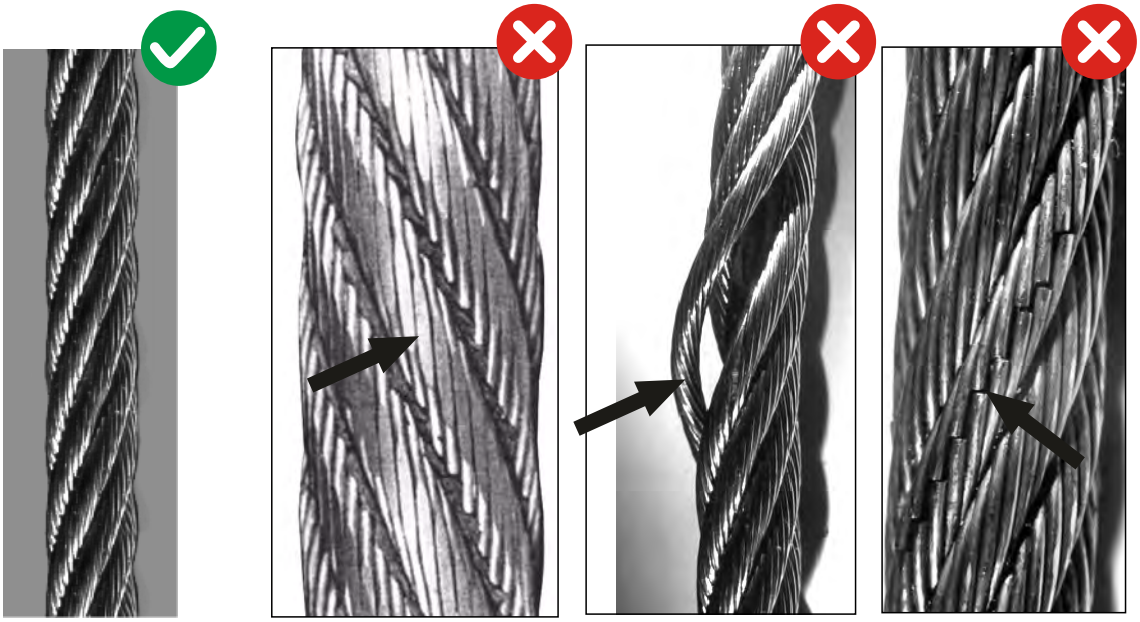

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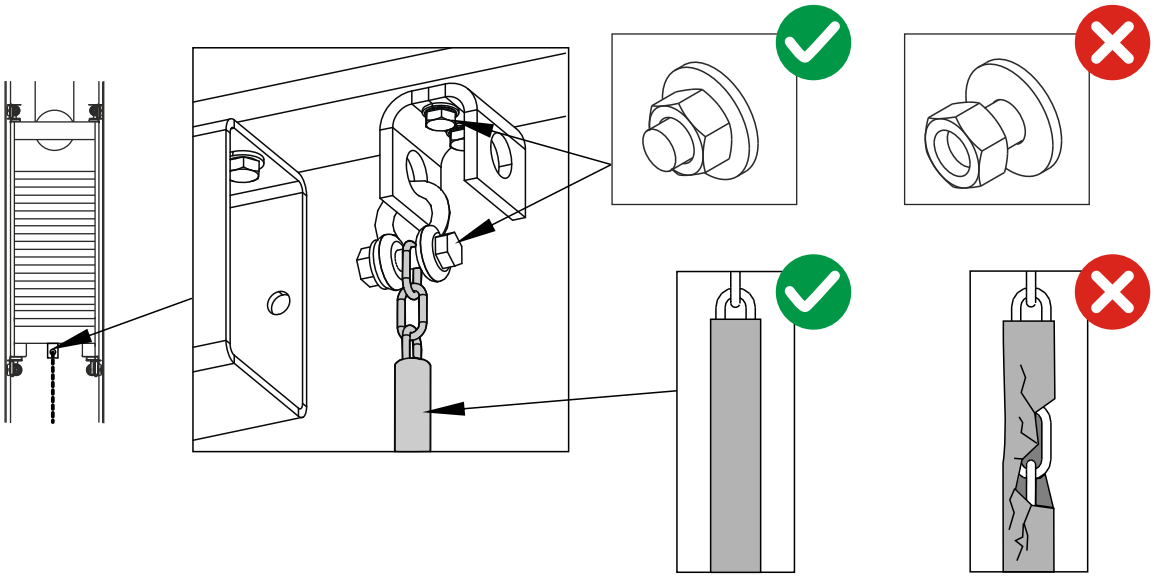
X0000003021

11.5.7 Compensation chain (condition check)



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X0000003026

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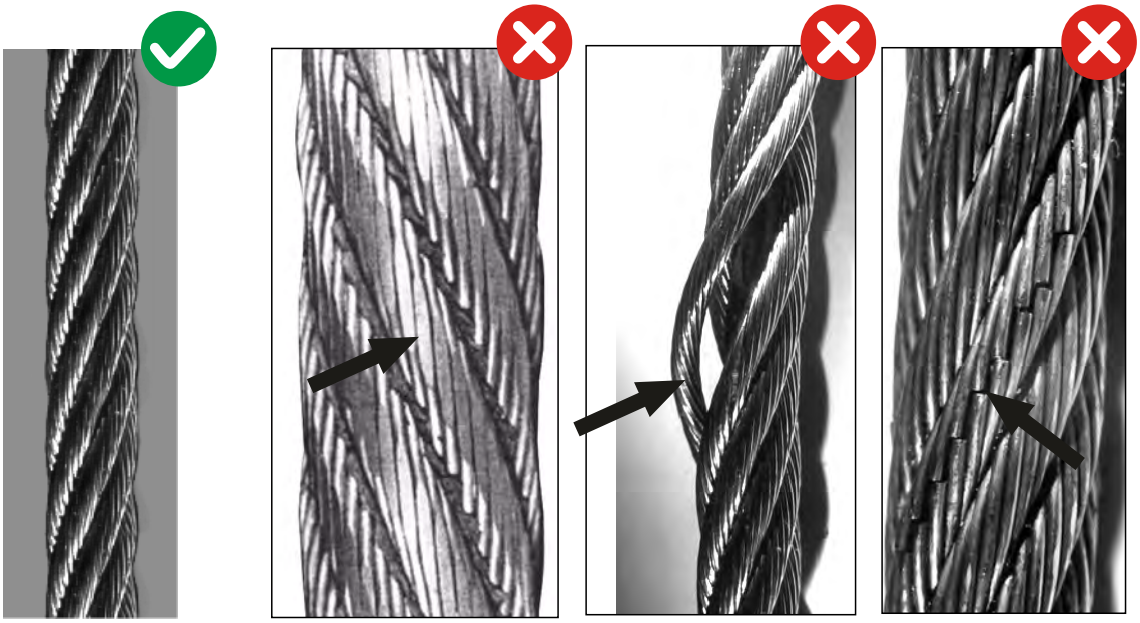
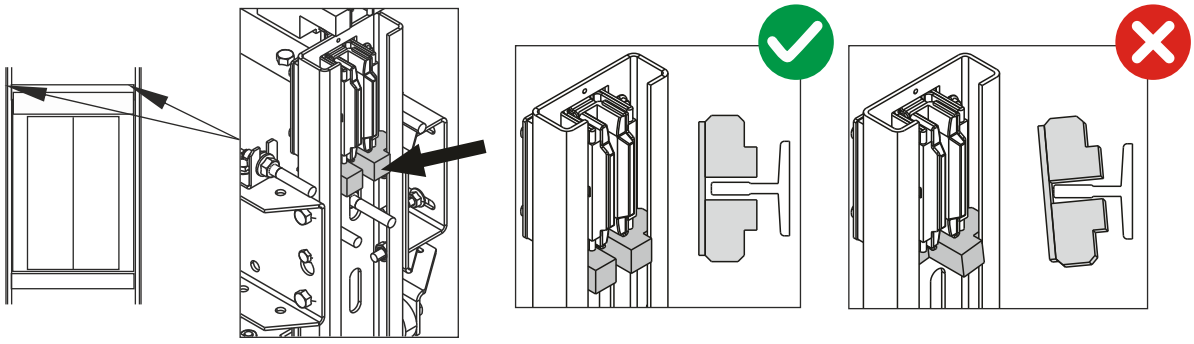
11.5.8 Steel compensation rope (condition check)



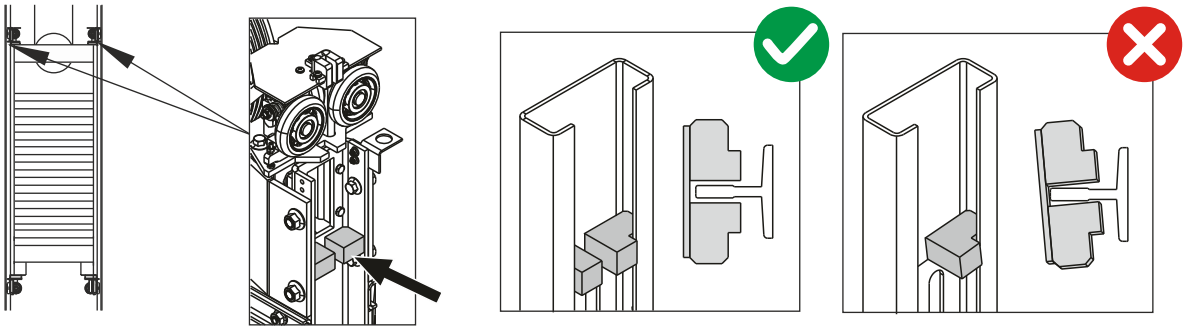
X0000055039
X0000056729 A.4

11.5.9 Upper car retainers (condition check)



X0000107470
X0000068082 A.7

11.5.10 Upper counterweight retainers (condition check)



X0000107655
X0000106982 A.3

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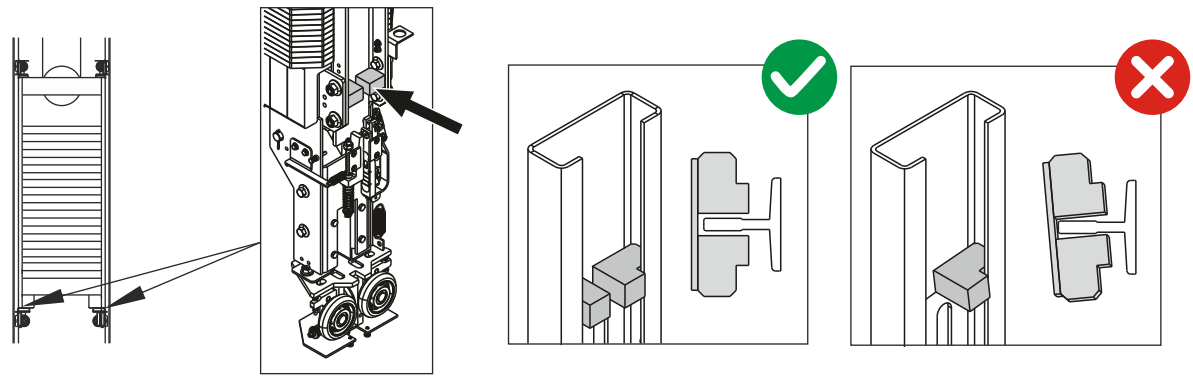
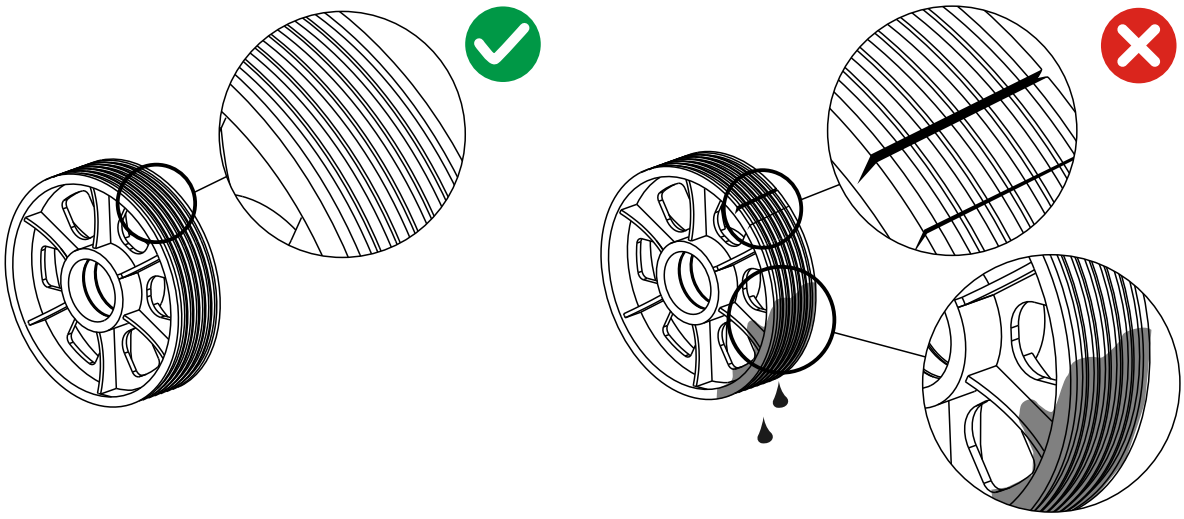
11.5.11 Lower counterweight retainers (condition check)



X0000107653
X0000106981 A.3

11.5.12 Diverting pulleys (condition check)



X0000055223

NOTE: Install all covers to diverting pulley if removed.

X0000056389 B.2

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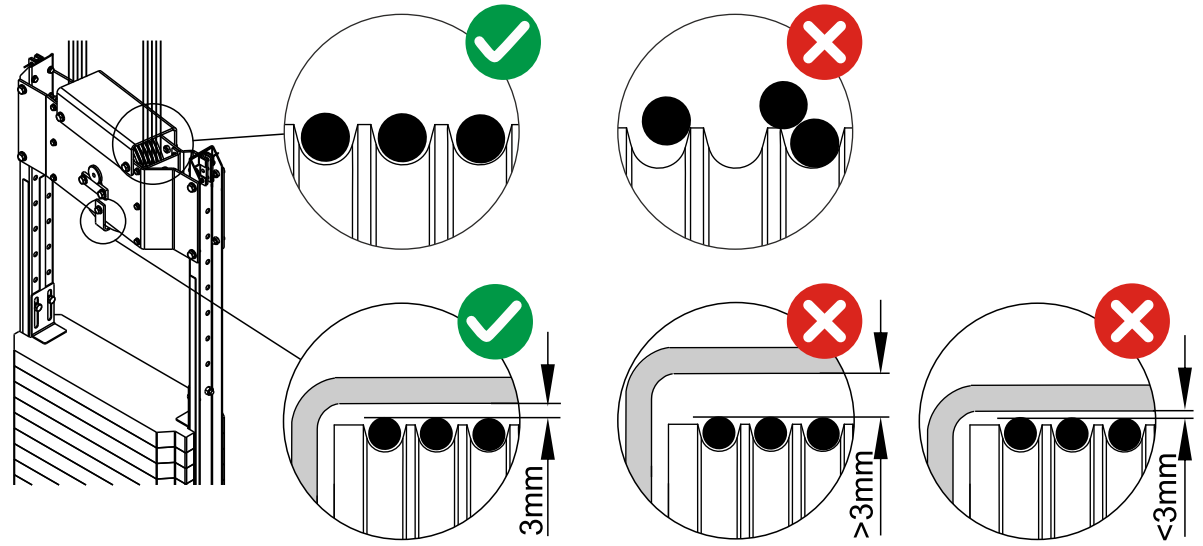
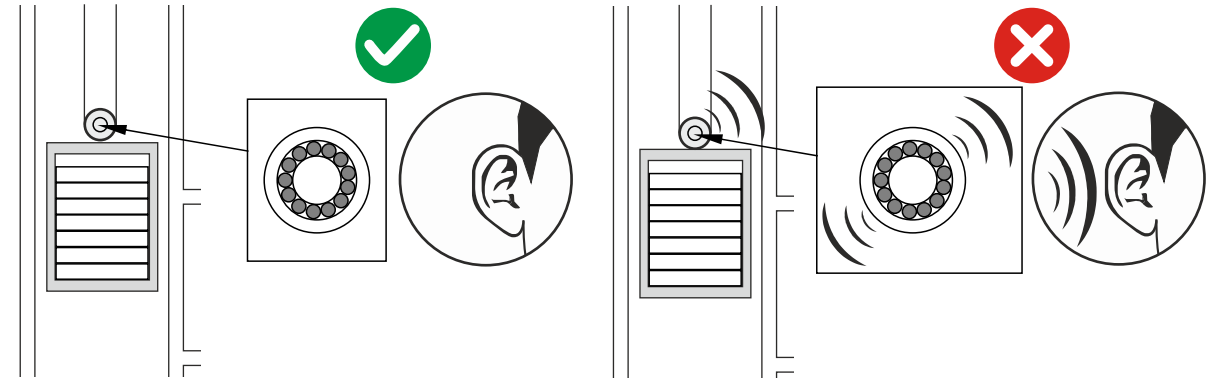
11.5.13 Steel rope counterweight frame, pulleys, rope guards and filler weights (condition check)



X0000054910



X0000054936
X0000003025

11.5.14 Test counterweight OSG tripping

NOTE: Counterweight (CWT) overspeed governor (OSG) is an optional component.

WARNING: Move safely between car roof and landing.

---

1. Go to the elevator car roof.

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2. Drive on inspection to a position where you can access the safety gear.
3. Disconnect the overspeed governor rope wedge assembly point from the safety gear levers.

   NOTE: Beware not to drop the wedge to prevent the overspeed governor electrical switch from tripping.

4. Secure the rope wedge assembly to the car roof balustrade with a cable tie.
5. Drive on inspection to a position where you can access the electrical switch of the counterweight overspeed governor.

WARNING: Be extremely careful when driving upwards in inspection.

   Check that there is enough space for going from the elevator car roof to the landing.

6. Cut the cable tie which secures the rope wedge assembly.
7. Let the rope wedge accelerate the speed of the OSG rope and at the same time, measure the mechanical tripping speed by using a hand tachometer.

   Measure on the rope on the opposite side of the wedge. Check the correct tripping range from the OSG ID plate and log the results.

8. Test the overspeed governor electrical switch operation. Try to drive downwards on inspection drive.

   The elevator must not move

9. Pull up the rope wedge assembly.
10. Secure the rope wedge assembly to the car roof balustrade with a cable tie.
11. Reset the overspeed governor electrical switch.
12. Drive on inspection to a position where you can access the counterweight safety gear.
13. Cut the cable tie which secures the rope wedge assembly.

    NOTE: Beware not to drop the wedge to prevent the overspeed governor electrical switch from tripping.

14. Connect the overspeed governor rope connection point to the counterweight safety gear levers.
15. Drive on inspection to a suitable level for going to the second floor landing.
16. Go to the landing.

X000094179 C.2

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11.6 Perform periodical tests in elevator pit

WARNING: Move safely between shaft pit and landing.

1. Check that the pit stop switch operates.
   1. Open the landing door with the emergency release key.
   2. Push down the stop switch standing on the landing.
   3. Close the landing door.
   4. Make a landing call.

      The elevator must not move.
2. Open the landing door and go to the pit.

3. Return the ladder to the storage position if applicable.
4. Close the landing doors and verify that they are mechanically locked.
5. Check:
   - Refuge space labels
   - Car and counterweight buffers
   - Pulleys under car
   - Lower guide shoes
   - Lower car retainers, if applicable
   - Compensation chain guides, if applicable
   - Compensation chain fixing to car, if applicable
6. Test:
   - Inspection control station, if applicable.
   - Safety switches
   - Car overspeed governor
7. Go to the landing.

X0000150920 D.3

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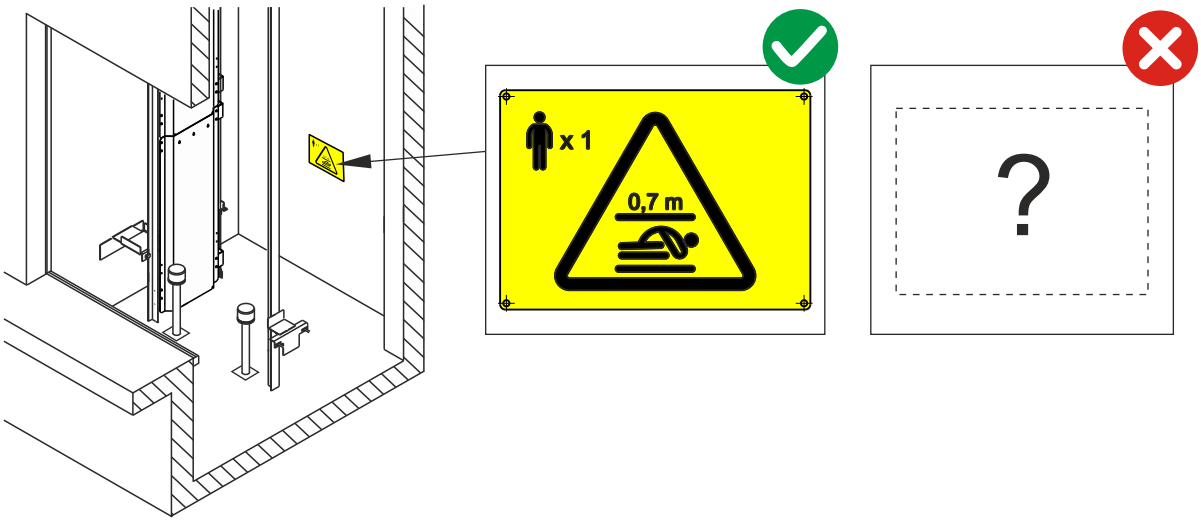
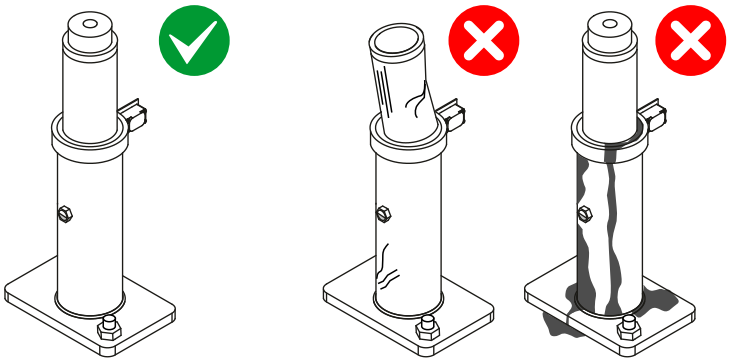
11.6.1 Refuge space labels in shaft pit (condition check)



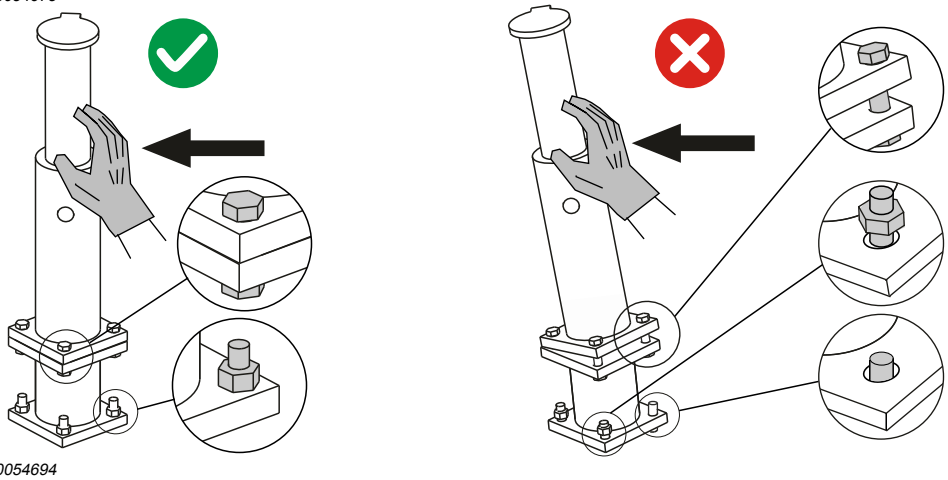
X0000059093
X0000056570 A.5

11.6.2 Oil buffers (condition check)

WARNING: If the buffer is not in full working order (it does not last until the next scheduled maintenance visit), arrange the replacement of the buffer immediately. If the buffer has failed already, take the elevator out of use until the buffer has been replaced.



X0000054675



X0000054694
X0000003001

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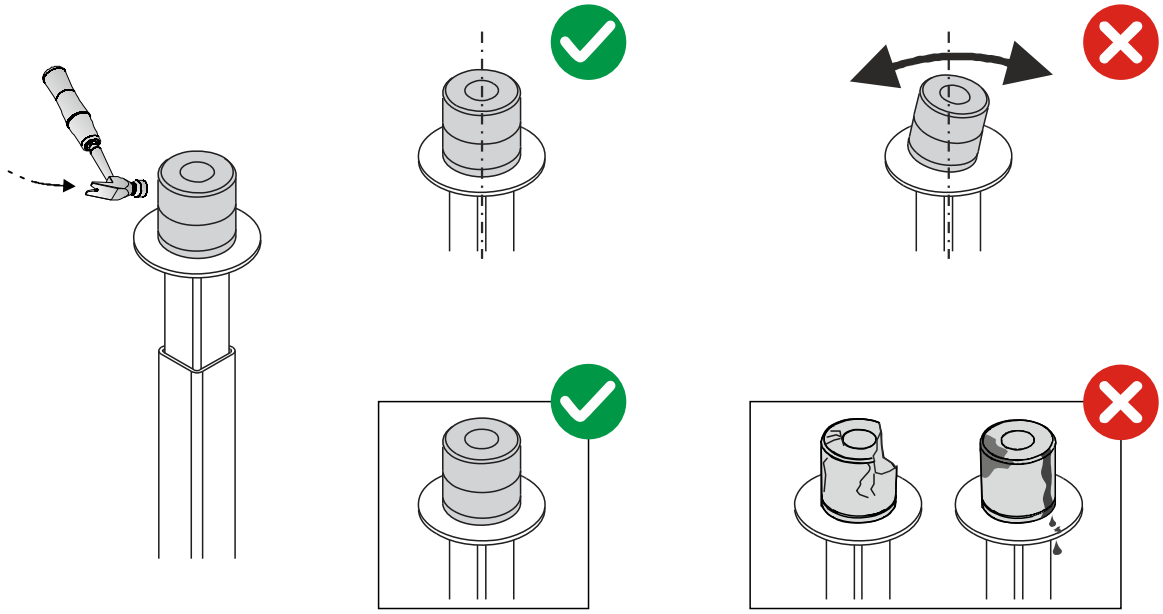
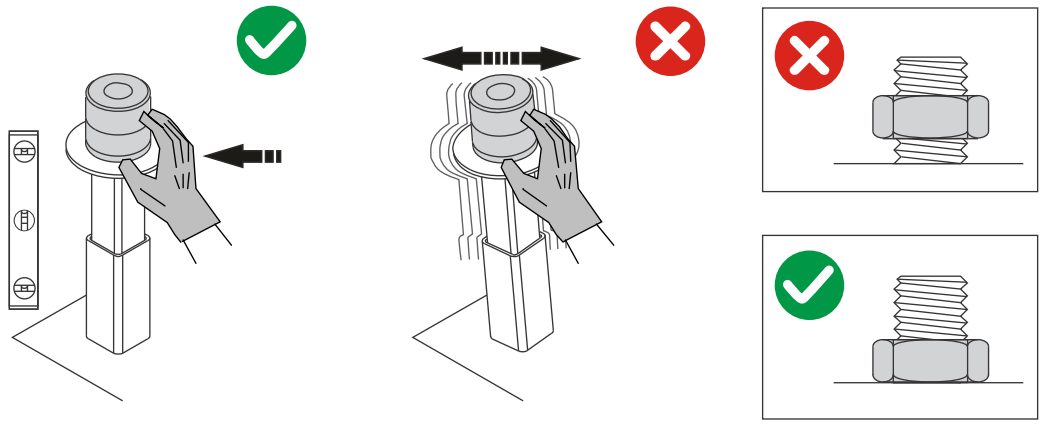
11.6.3 Polyurethane buffers in pit (condition check)

WARNING: If the buffer is not in full working order (it does not last until the next scheduled maintenance visit), arrange the replacement of the buffer immediately. If the buffer has failed already, take the elevator out of use until the buffer has been replaced.



X0000104873



X0000104875
X0000103179 A.5

11.6.4 Polyurethane buffers under car (condition check)

WARNING: If the buffer is not in full working order (it does not last until the next scheduled maintenance visit), arrange the replacement of the buffer immediately. If the buffer has failed already, take the elevator out of use until the buffer has been replaced.

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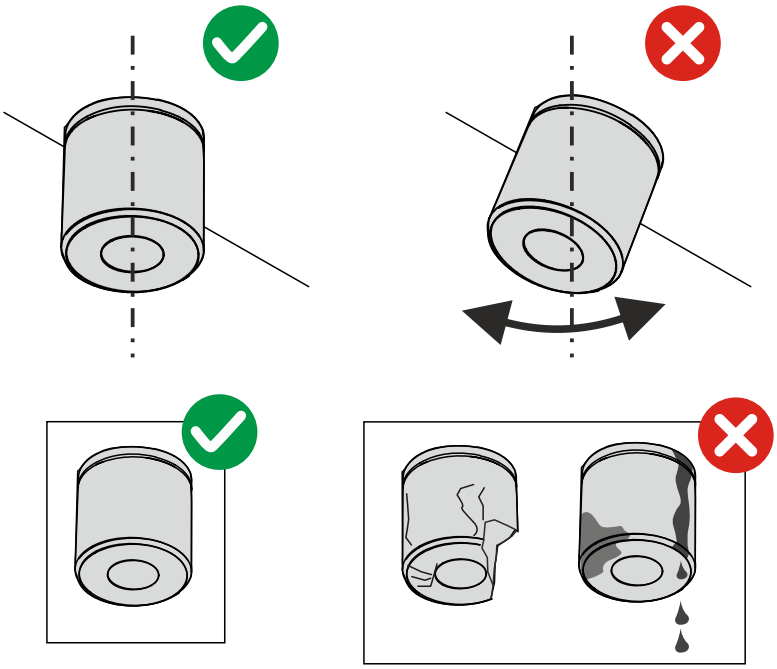
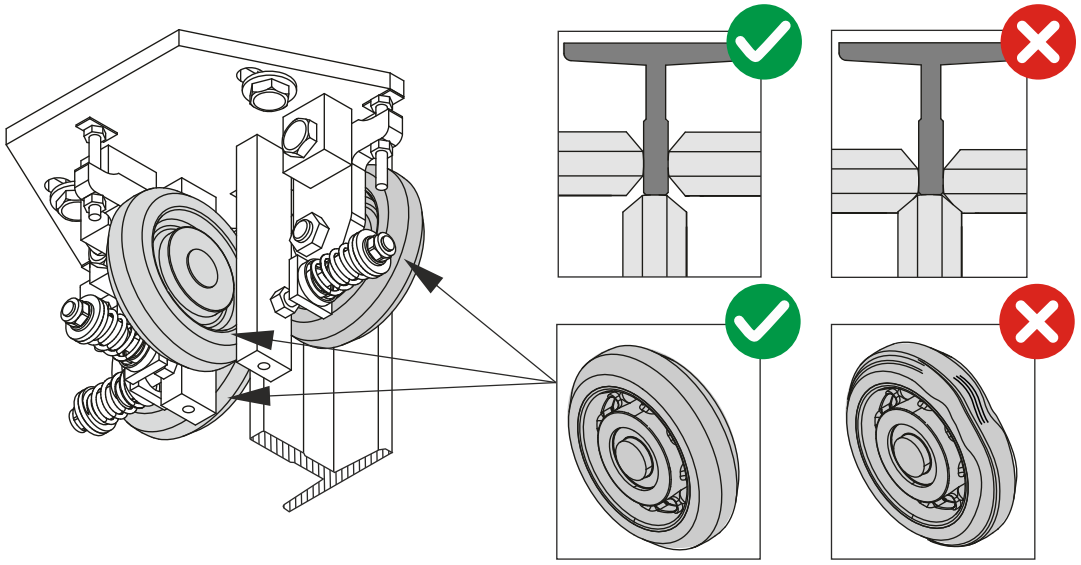


X0000089248
X0000003000

11.6.5 Lower roller guide shoes (condition check)



X0000061857
X0000056573 A.3

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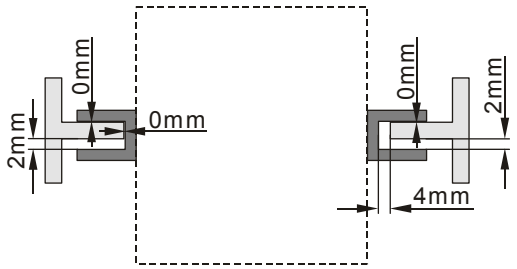
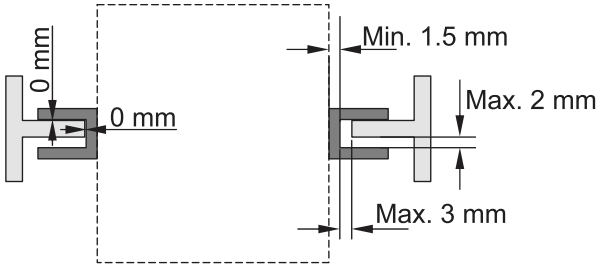
11.6.6 Sliding guide shoes (condition check)

Maximum values allowed



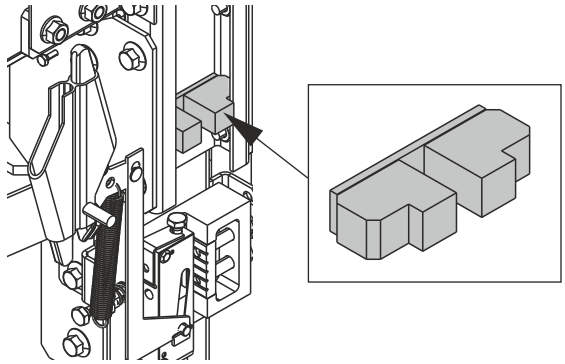
X000033006
X0000078784 B.3

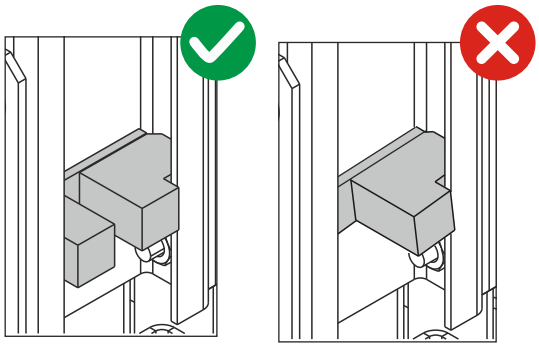
11.6.7 Sliding guide shoes of EuReCa elevator car (condition check)



X0000310668
X0000002991

11.6.8 Lower car retainers (condition check)





X0000085826
X0000086003 A.6

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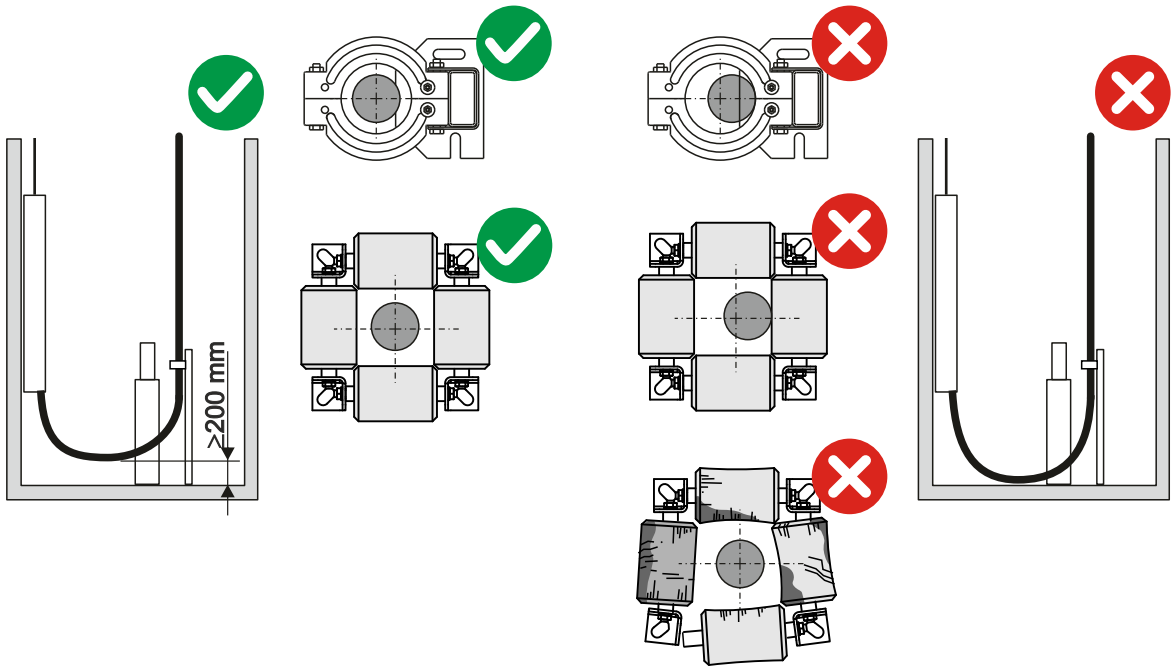
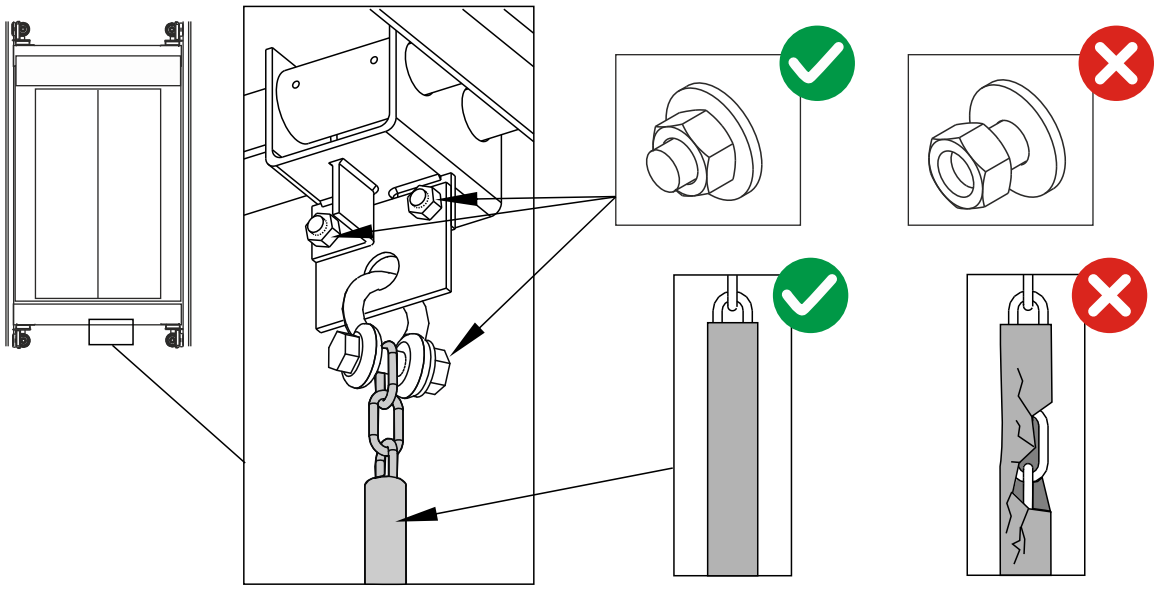
11.6.9 Compensation chain guide (condition check)



X0000103469
X0000102599 A.3

11.6.10 Compensation chain (condition check)



X0000109277
X0000108503 A.3

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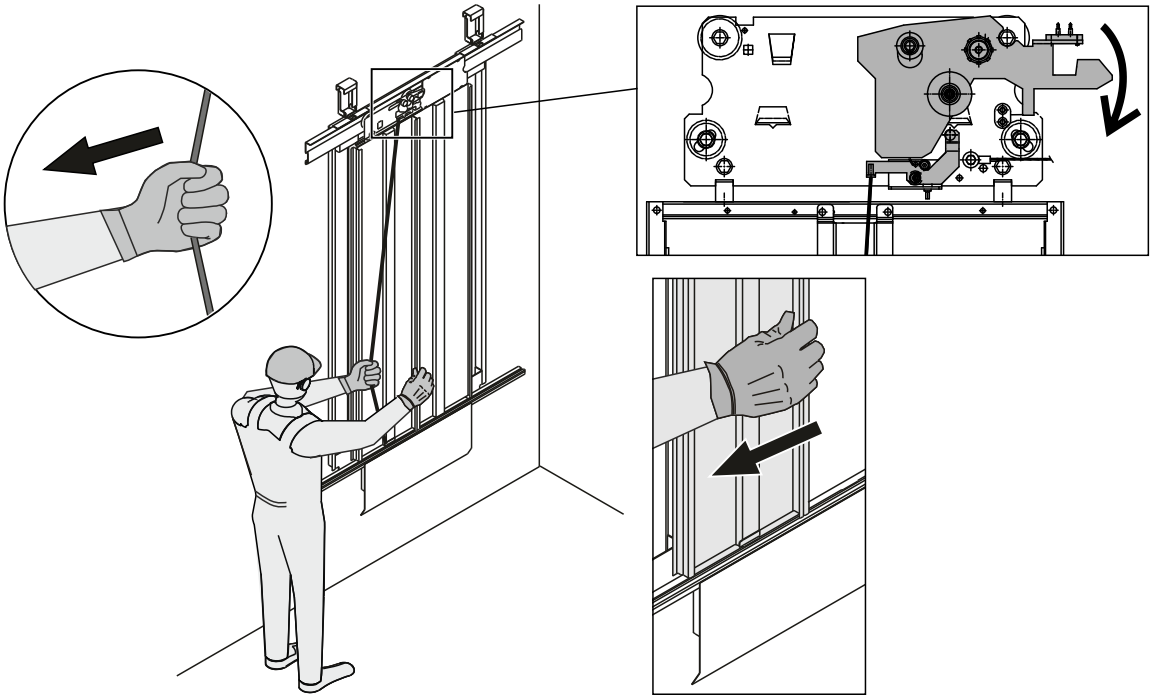
11.6.11 Test inspection control station in pit

WARNING: Before you use the EN 81-20 compliant inspection control station in the pit, ensure that:

– Landing doors have a pit exit device (PED) or local solution for opening the landing doors from the pit. Optionally, have a second person on the landing. Using the pit inspection control station requires you to close the landing doors. Ensure that you can get out of the pit.



X0000054314

– The refuge space in the pit is EN 81-20 compliant.

If the criteria above is not met, do not use the inspection control station in the pit.

1. Activate the inspection control station stop switch.
2. Pick up the inspection control station from the holder, activate inspection drive and try to move the elevator car upwards.

   The elevator car must not move.
3. Release the stop switch.

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4. Move the elevator car with the inspection control station, first upwards and then downwards.

WARNING: Stay in the refuge space.

X0000151865 C.2

11.6.12 Check safety switches

1. Manually trigger the switch in question.
2. Try to move the elevator car with inspection control station.

   The elevator car must not move.
3. Repeat the test for all safety switches in the elevator shaft pit.

X0000089215 B.2

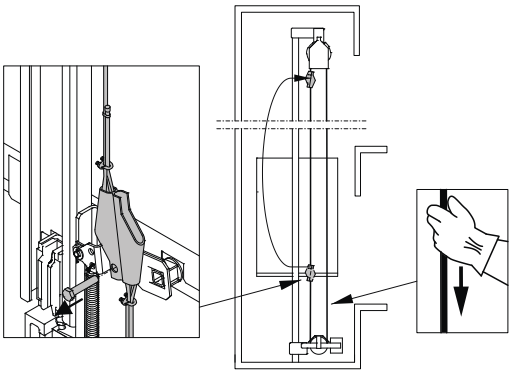
11.6.13 Test car overspeed governor

NOTE: The tripping speed of the overspeed governor (OSG) is measured with a manual tachometer. As an option, the tripping function of the overspeed governor can be tested without measuring the tripping speed. If the tripping speed is not measured, verify that a right type of overspeed governor is installed. Check delivery documents for details.

1. Disconnect the overspeed governor rope wedge assembly from the safety gear levers.

   Use a work stool, if necessary.

   X000103022
2. Lower the rope wedge assembly to the tension weight pulley.
3. Pull the rope from overspeed governor rope free side downwards until the rope wedge assembly reaches the topmost floor.

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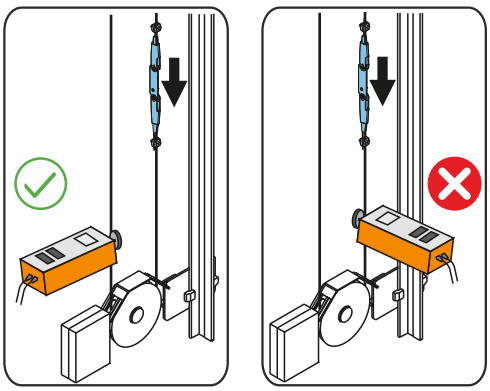
4. Let the rope wedge assembly accelerate the OSG rope speed.

   Simultaneously measure the mechanical tripping speed of the OSG with a hand tachometer on the rope opposite side to the wedge assembly, near the tension weight. Record the measurements.

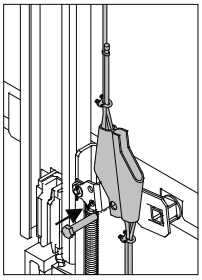
CAUTION: Watch out for the falling rope wedge.



X000033117

5. Lower the OSG rope wedge assembly down.
6. Connect the OSG rope wedge assembly to the safety gear levers.

Use a work stool, if necessary.



X000103024

7. Go to the landing.
8. Go to the MAP level.
9. Switch off Recall Drive Feature (RDF).

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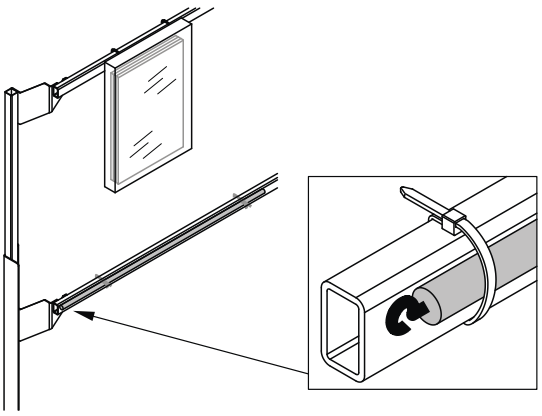
10. Make a car call from the MAP.

    The elevator must not move.

11. Switch on RDF and drive the car to a suitable position.
12. Go to the elevator car roof.
13. Reset the OSG electrical switch.

    If applicable, use the OSG reset stick. The OSG reset stick is located on the car roof balustrade. Return the stick to the balustrade after use.



X000103025

14. Go to the landing.

X0000149777 E.2

11.6.13.1 OSG tripping ranges

Nominal speed (Vn) m/s	Electrical tripping (min) Vn x 1.15 m/s	Mechanical tripping (max) Vn x 1.25 + (0.25 / Vn) m/s
0.63	0.7	1.0
1	1.2	1.3
1.25	1.4	1.7
1.4	1.6	1.8
1.6	1.8	2.0
1.78	2.0	2.3
2	2.3	2.5
2.5	2.9	3.2
3	3.5	3.8
3.5	4.0	4.2
4	4.6	4.8
5	5.8	6.0
6	6.9	7.2

X0000072659 A.7

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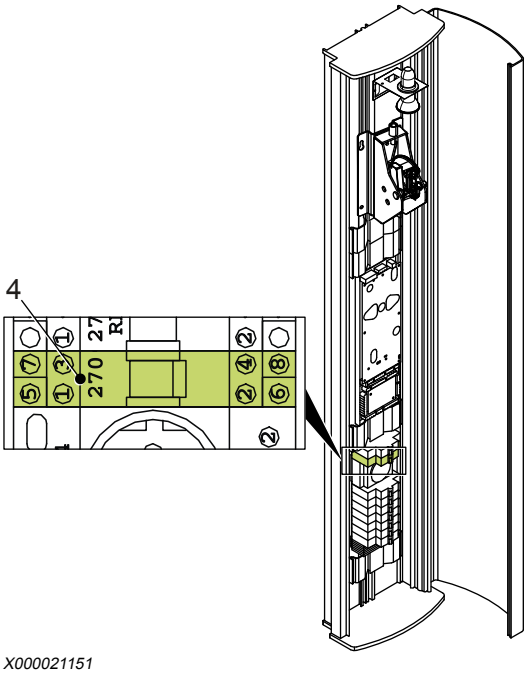
11.7 Finalize maintenance

1. Perform a test run for the elevator.
2. Travel in the elevator to the topmost floor.
3. Mark the maintenance work to the elevator's log book.

   NOTE: The maintenance log book is in a rack on the elevator car roof.

4. Switch off RDF (4).



X000021151

5. Enable landing calls and door opening (261 and 263).
6. Switch off the elevator shaft lights (268).

   Check that the elevator shaft lights go off.

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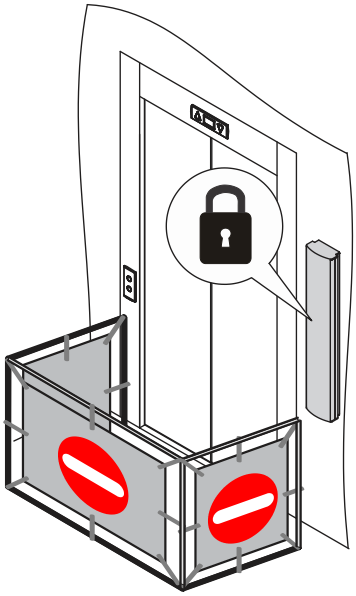
7. Close and lock the maintenance access panel.



X000010464

8. Remove the tools.
9. Clean the site.
10. Remove the safety fences.
11. Remove the "Under maintenance" signs from all landings.
12. Return the elevator to normal use.

WARNING: If any of the periodical tests fails, or danger or hazard to people is detected:

– Inform the owner of the equipment that you have taken the elevator out of use and the reason why the elevator cannot be used.

– Inform your supervisor that the elevator is out of use.

X000094195 B.3

X0000072784 C.2

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12 RESCUE OPERATIONS

12.1 Contact qualified personnel

Only trained and experienced elevator emergency personnel can rescue passengers from elevators. The following persons are allowed to rescue trapped passengers:

– Maintenance personnel of the building, if allowed by national legislation, provided that they have received proper training for rescue procedures, and taking into account local regulations

– Competent elevator maintenance persons with knowledge of general maintenance procedures and the KONE elevator

– Third party personnel, for example, firemen, provided that they have received proper training for rescue procedures, and taking into account local regulations

1. Contact a trained person or a competent maintenance person at the earliest opportunity.
2. Wait for the qualified person to arrive.

WARNING: Danger of severe accident. Passengers must not try to exit the elevator without the assistance of a competent person. Passengers must wait for a trained person to arrive on the scene and follow the trained person's instructions.

X0000088218 A.3

12.2 Rescue categories and authorization

Rescue operations are divided into three different categories:

1. **Normal rescue**, allowed for trained maintenance personnel of the building or trained elevator personnel.
2. **Technical rescue**, allowed only for trained elevator personnel.
3. **Emergency rescue**, specially trained emergency personnel, (rescue in emergency situation).

X0000065984 B.1

12.2.1 Definition of normal rescue

Normal rescue describes the release of passengers from a trapped elevator car without moving the car, entering the elevator shaft or using special rescue tools. In practice this means that specially trained and authorized personnel are able to open the landing doors to release the passengers when the car is in the door zone.

If rescue cannot be done using the normal rescue methods, professional and authorized elevator maintenance personnel must be contacted for technical rescue.

X0000088561 D.1

12.2.2 Definition of technical rescue

Technical rescue operation is required when an elevator car is trapped more than 200 mm above or below the landing or there is a gap below the apron.

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This means that persons authorized to perform technical rescue must move the car using recall drive feature (RDF) or brake releasing device. Exact methods vary case-by-case, they depend for example on the position of the car and the load inside the car.

In some cases the car must be released with special equipment before the car can be moved to the door zone.

If technical rescue does not succeed, emergency rescue is needed.

X0000088562 E.1

12.2.3 Definition of emergency rescue by emergency services

Emergency rescue is required when the elevator car is trapped between landings and it cannot be moved to a door zone (technical rescue is not successful).

WARNING: This kind of rescue operation must always be performed by emergency services trained and authorized for these tasks. It is possible that passengers are too frail, injured, disabled (for example blind) and, for example, cannot climb ladders.

NOTE: The site-specific rescue plan must define the exact number of rescue persons needed!

Building configuration, elevator accessories and local level emergency rescue procedures create a wide range of possible variations for emergency rescue requirements and actual tasks. Emergency rescue plans must therefore be made locally.

Normally the building owner, professional elevator maintenance organization and local emergency services make such plans together. The procedures are then incorporated into the building rescue plans. In countries where it is required, a site specific rescue plan must be available in the elevator controller or machine room (if applicable). It must include relevant parts of this instruction and additional, site specific content. All parties who are to be involved in any possible emergency scenario are then trained according to the emergency plan. Practice drills are to be held according to the local safety policy.

KONE specified rescue devices are stored in the elevator controller or machine room (if applicable). Fall protection equipment is provided by emergency services.

NOTE: For emergency rescue by emergency services, KONE only describes the usage of KONE elevator components. The emergency rescue method selection is the responsibility of the emergency services.

X0000088563 H.1

12.3 Communication with passengers during rescue

Good communication between the passengers and responsible personnel is extremely important. The elevator is always equipped with 2-way communication between controller and car.

When you are about to start the rescue operation, inform passengers that:

– They are safe and should remain calm.

– Help is on the way to safely rescue them from the elevator car.

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– Car ventilation is adequate even if car fan does not operate.
– They should stay away from the elevator door, so the doors can be opened safely.
– Ask reassuring questions from passengers and find out what happened:
  • How many passengers are inside the elevator car?
  • Are passengers ok?

    Does anyone need medical help?

    If medical help is needed, contact paramedics at once in order to start treatment without delay.
  • Are the lights still functioning inside the elevator car?
  • Are any of the call buttons lit?
  • Is there a floor number displayed on the floor position indicator, which position?
  • Which direction was the elevator going when it stopped?
  • Which floor did you last leave?
  • Which floor was to be your last stop?

X0000065985 D.3

12.4 Rescue safety

The following safety rules are mandatory:

– When starting the rescue operation, make sure that the rescue is not already in progress by somebody else.

  Coordinate with others if needed.
– Do not leave an open landing door unguarded.
– Follow the local safety regulation and safety rules (no exceptions because of an unusual situation).
– Do not release the brake when the elevator is in the door zone (the door zone indicator (DZI) LED is on).
– Keep in mind that the DZI LED and speed and direction LEDs do not operate if the emergency battery is empty and normal power supply is unavailable.
– Be careful if manually releasing the hoisting machine brakes. If the elevator does not have an electrical brake release device (RBO), do not keep the brakes open for more than 1 second at a time.

  Risk of the elevator car moving too fast.
– Do not move the car without direct supervision if passengers may be able to open the car doors.
– If there is a power break down and you cannot use the machine room or shaft lights, use headlights or flashlights.

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WARNING: If there is risk of falling for example, to stairs, use additional fall prevention system and barriers as necessary.

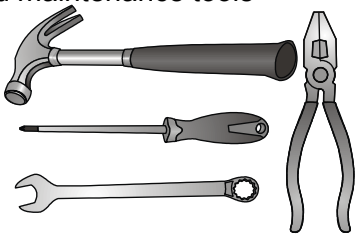
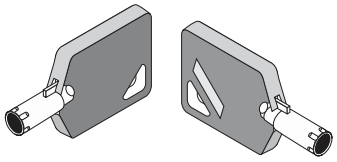
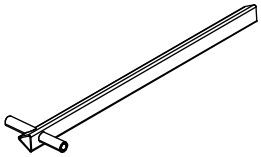
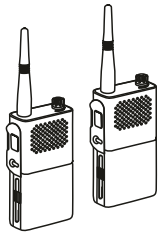
WARNING: Always push a stop button down before entering the elevator shaft, car roof or pit.

WARNING: If the main brake does not hold or the gear mechanism is damaged, it is not allowed to open the auxiliary brake (if equipped). In this case, emergency rescue is needed.

X0000088918 D.2

12.5 Tools, controls and rescue equipment

12.5.1 Tools

Standard maintenance tools  *X000010935*	MAP lock keys KM278355  *X0000209966*
Emergency opening key: – KM748001G01, length 200 mm – KM748001G02, length 400 mm – KM748001G03, length 700 mm  *X0000210601*	Two-way communication set or equivalent (intercom, walkie-talkie or mobile phone). Locally delivered  *X000010458*

X0000198154 B.2

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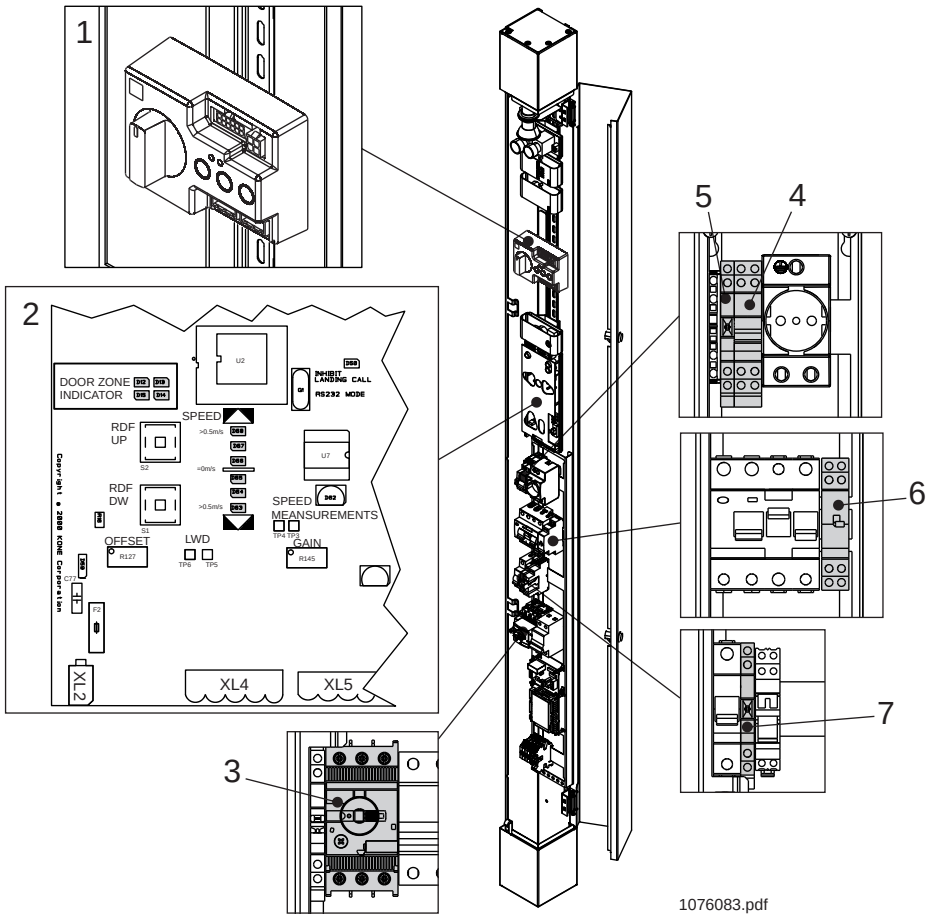
12.5.2 Maintenance access panel

The maintenance access panel (MAP) is usually located on the topmost or second topmost landing. It can be wall mounted or included in the door frame. In the MAP are located the manual operating devices of the elevator.

X000098776 A.2

12.5.2.1 Door MAP



X000098772

1. Rescue Brake Opening Remote Control
2. Door zone indicator (DZI), recall drive feature (RDF) direction buttons, speed and direction LEDs
3. Main switch (220 or 220:2)
4. Recall drive feature (RDF) switch (270)
5. Recall drive feature (RDF) run button (270 RB)
6. Shaft light switch (268)
7. Shaft monitor reset button (141:P) (optional)

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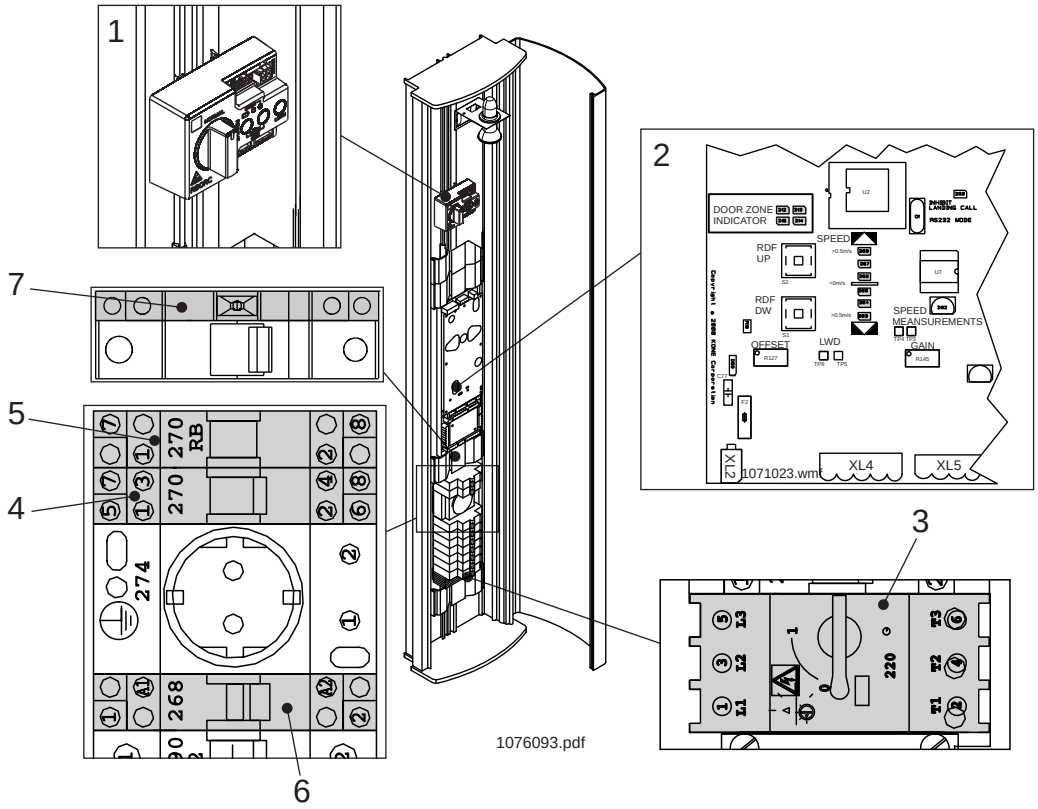
12.5.2.2 Wall MAP



X000098773

1. Rescue Brake Opening Remote Control
2. Door zone indicator (DZI), recall drive feature (RDF) direction buttons, speed and direction LEDs
3. Main switch (220 or 220:2)
4. Recall drive feature (RDF) switch (270)
5. Recall drive feature (RDF) run button (270 RB)
6. Shaft light switch (268)
7. Shaft monitor reset button (141:P) (optional)

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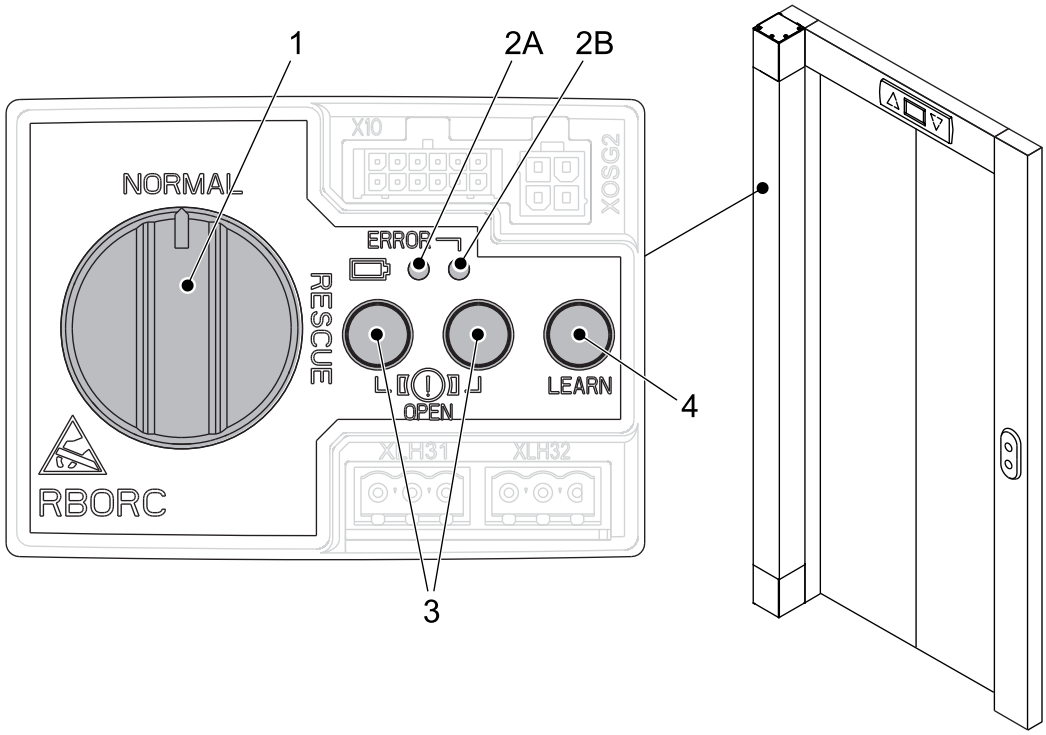
12.5.3 Remote control unit of electrical brake release device



X000086331

1. Operating mode switch (elevator in normal mode or elevator in rescue mode)

2. LEDs:
2a. Battery status and rescue mode indicator
2b. Errors and indicator for the encoder learn drive

3. Brake release buttons

4. Learn button (for encoder learn request)

X0000086575 B.2

12.5.4 RBORC LEDs during rescue

When the operating mode switch is switched to "Rescue" position, the green LED first blinks fast and then stays lit (indicating that rescue mode is on).

LED	Color	State	Meaning	Action
Battery	Green	On  *X000086336*	The rescue mode is on (the switch is in "Rescue" position).	Ready to open the brakes and move the car.
Error	Red	Blinking slowly  *X000086334*	Battery or AC power supply fault	1. AC power supply to RBOMU is disconnected: - Check the power supply fuse / circuit breaker in the MAP. - Check the battery charger fuse F2 on the RBOMU board. 2. Battery voltage is disconnected or too low. - Check the battery cables - Check if the battery is broken.
Error	Red	Blinking fast  *X000086335*	System fault	1. If the brake release buttons were pressed or released separately, recover the RBO by switching operating mode switch to "Normal" and then to "Rescue". 2. Broken RBOMU board - As a last option replaces the RBOMU board.
NOTE: After the operating mode switch is returned to normal position, wait for approximately 2 seconds until the green LED starts to blink slowly (indicating that the normal drive mode is on).				

X0000086599 C.2

12.5.5 Door zone indicator

Door zone indicator (A) must indicate that the elevator car is in a door zone before the car doors are opened. If the indicator is not illuminated, trained elevator personnel must move the car to a door zone using technical rescue procedures. If technical rescue fails, emergency rescue by specially trained emergency personnel is needed.

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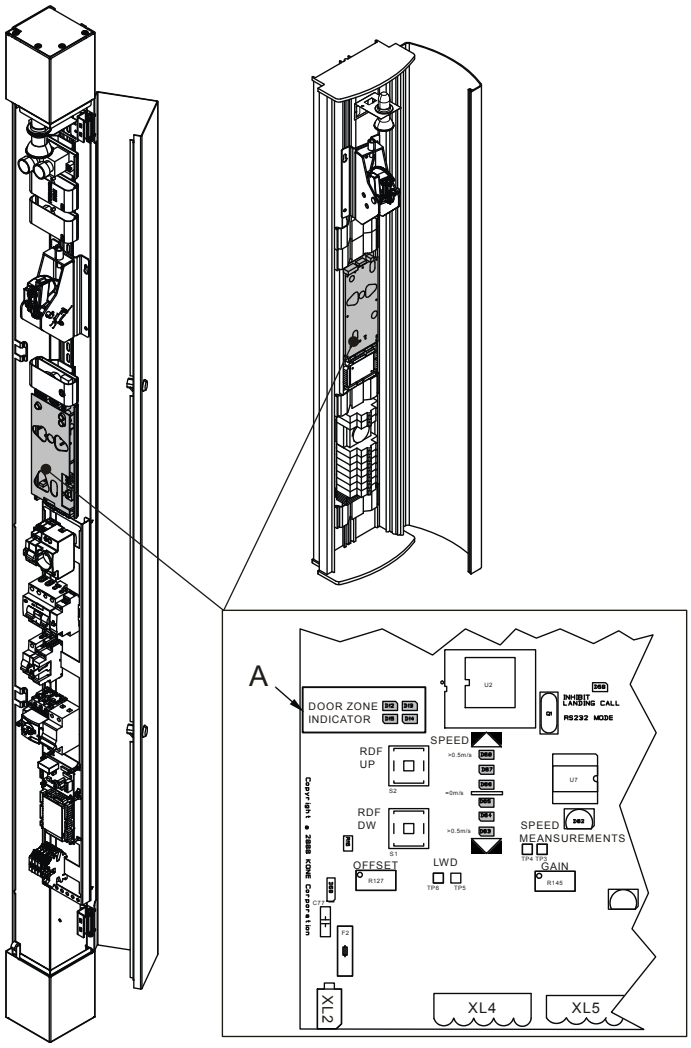

X000093125

X000093126 A.2

12.5.6 Main switch

The main switch is used for switching electrical power to an elevator on or off.

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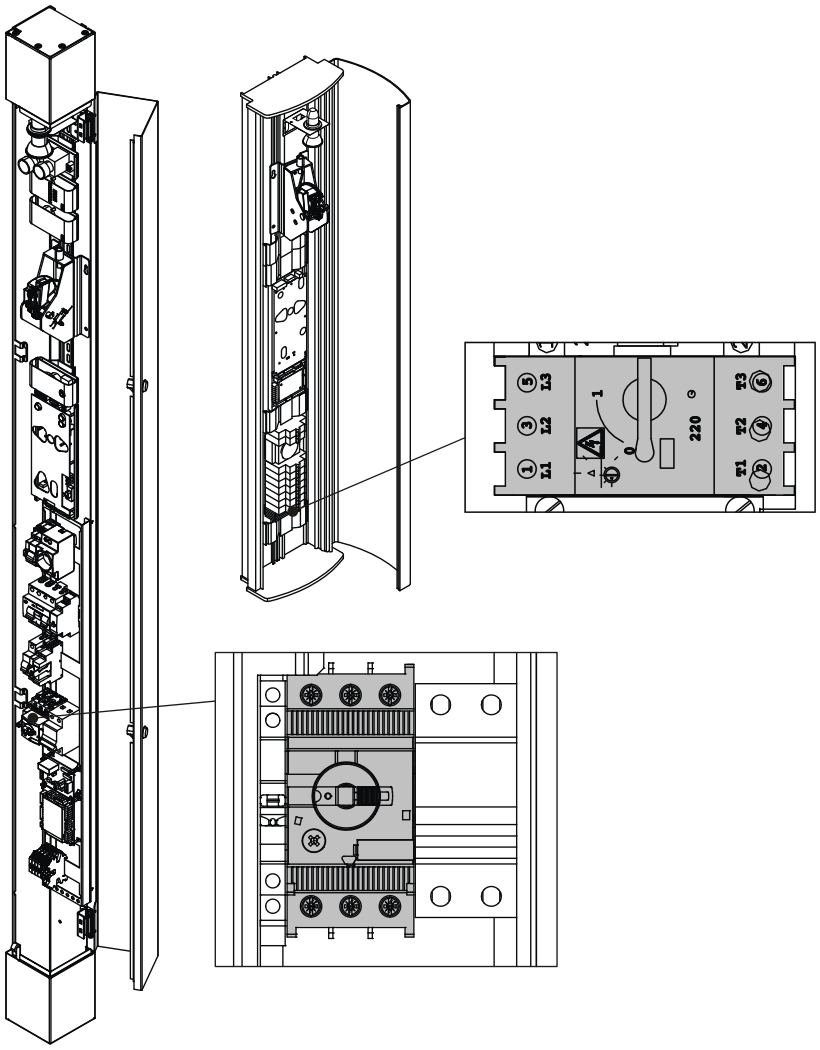

X000093127
X000093128 A.1

12.5.7 Lifting equipment

When the elevator is stuck and cannot be moved by other methods use the car lifting equipment.

NOTE: The chain hoist must be chosen according to lift specifications. They are visible in the MAP (Maintenance Access Panel).

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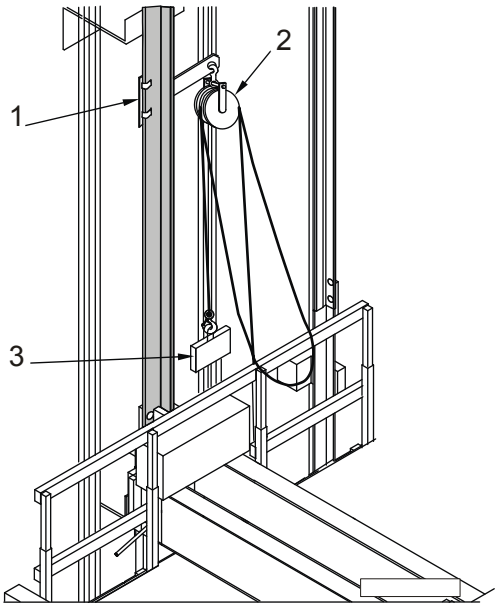

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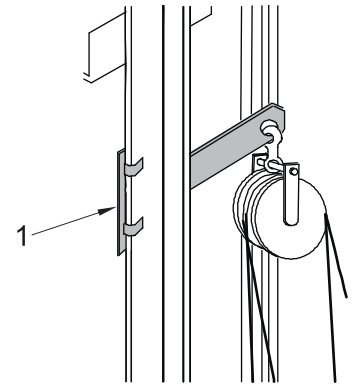
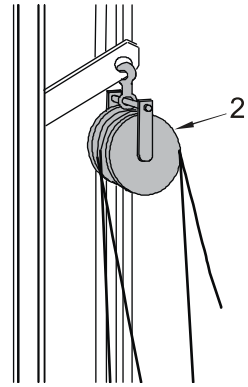
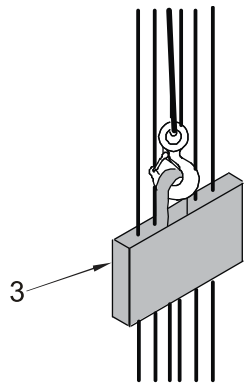
Illustration	Description
 X0000151528	*Guide rail clamp:* Used for fixing the lifting device to the guide rail.
 X0000151530	*Lifting device:* Standard chain hoist block.
 X0000151532	*Rope clamp:* Used for fixing the lifting device to the suspension ropes.

Rope clamp	Ropes
KM741012G01	6 × d8 mm
KM717384G01	8 × d8 mm
KM762959G01	6 × d10 mm
KM766416G01	6 × d13 mm

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Guide rail clamp	Guide rail
KM717385G01	T70, T82, T89
KM766420G01	T89, T125, T127-2
KM741010G01	T70, T75, T82, T89
KM741010G02	T114
KM766420G02	T140-1

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12.6 Normal rescue

1 qualified person needed.

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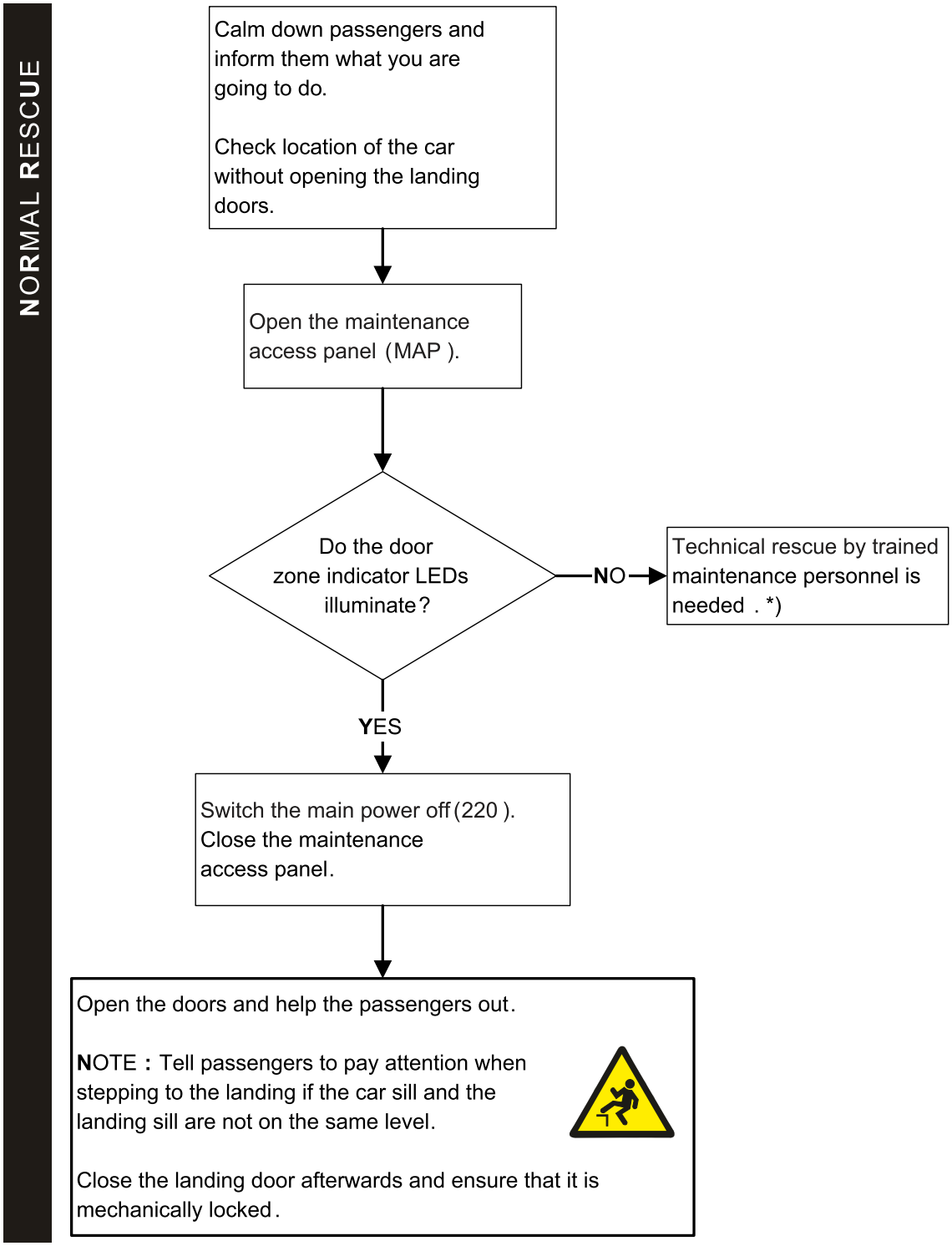

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X000093135 A.4

Related information

*– *) Technical rescue (137)*
– Release passengers (car in door zone) (158)

12.7 Technical rescue

1 qualified person needed. KONE recommends to use 2 qualified persons if you need to use lifting equipment.

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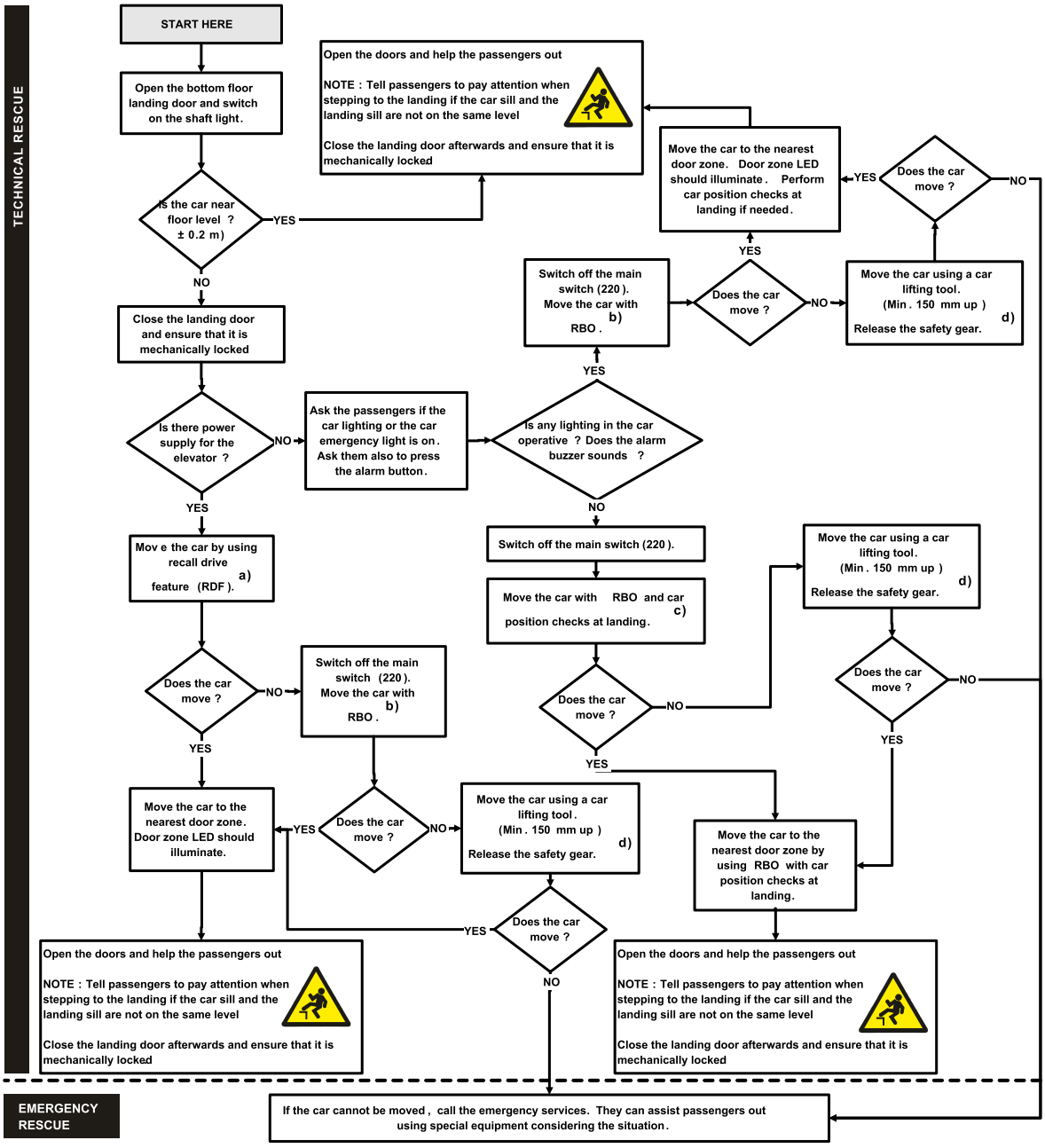

X000098779
X0000104437 A.3

Related information

– a) Use RDF to move car to door zone (138)
– b) Use RBO to move car to door zone (142)
– c) Use RBO to move car to door zone (DZI inoperative) (148)
– d) Use lifting equipment to move elevator car (154)

12.7.1 Use RDF to move car to door zone

Even if the car is stuck on safety gear, recall drive (RDF) is normally enough to move the car.

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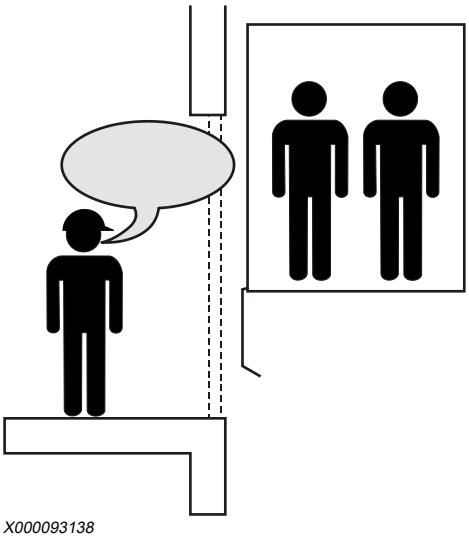
1. Inform the passengers that you are about to move the car in order to let them out and they must stay calm, stand clear of the doors and not try to do anything by themselves.



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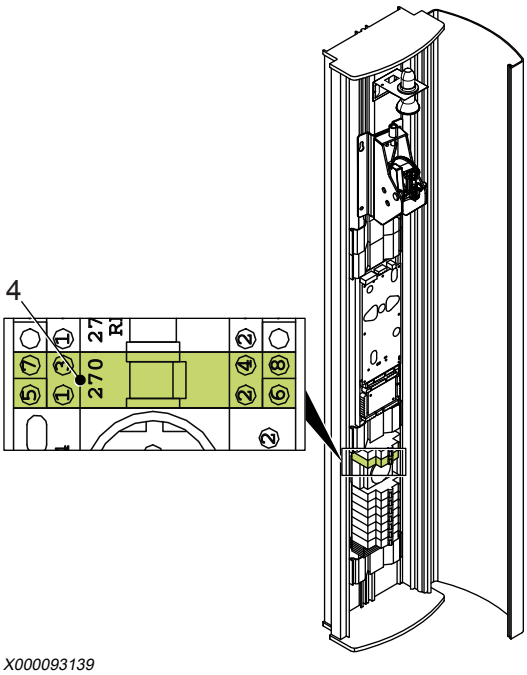
2. Open the maintenance access panel.



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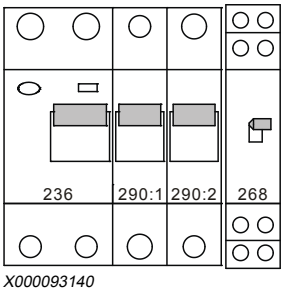
3. Switch RDF (4) ON.
4. Switch the shaft lights (268) ON.



X000093140

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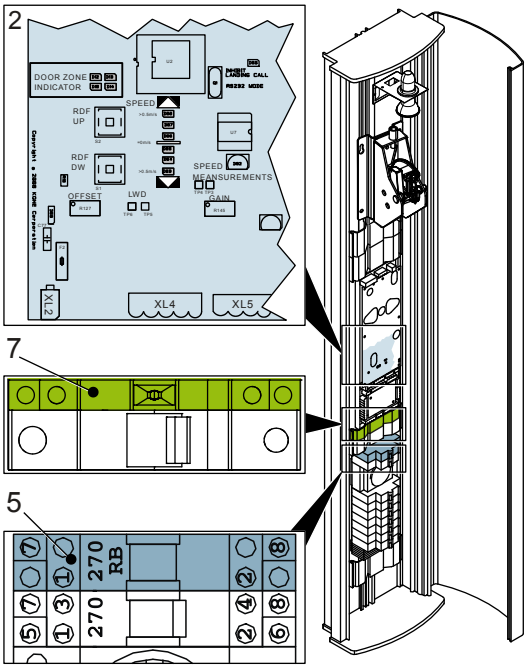
5. If the elevator is equipped with shaft access monitor (SAM) and you have opened a landing door with emergency opening key, reset the SAM by pushing the RDF Run button 270 RB and the reset button 141:P at maintenance access panel simultaneously at least 5 seconds.

   The SAM reset signal sounds.

   If you need to move the car, release the SAM reset 141:P button and while still pressing the RDF RUN button, press the RDF direction button RDF UP or RDF DW.



X000093141

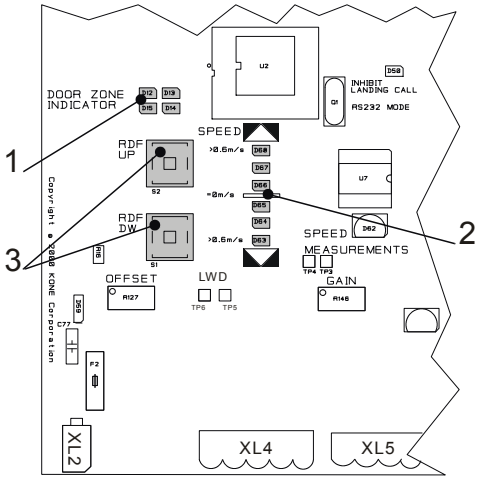
2	Door zone indicator LEDs
5	RDF Run button 270 RB
7	Reset button 141:P

6. Push the RDF run button 270 RB together with direction button (3) RDF UP or RDF DW to drive the car to nearest door zone.

   NOTE: If elevator car is stuck on safety gear, push RDF UP and 270RB. If counterweight is stuck on safety gear, push RDF DW and 270 RB.

CAUTION: If the car does not move (ropes slip on the traction wheel) do not rotate the motor ceaselessly for more than 3 seconds at a time. Repeat the action maximum 5 times with minimum of 5 second pauses between attempts.

Use the car lifting tool if the car cannot be moved on RDF because the ropes slip.

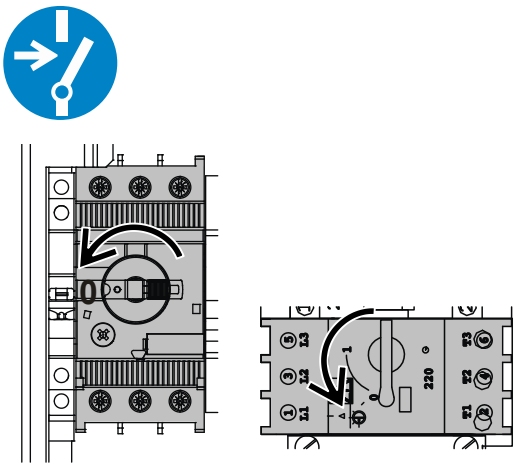


X000093142

7. Check that the car is moving from the direction and speed indicator (2).

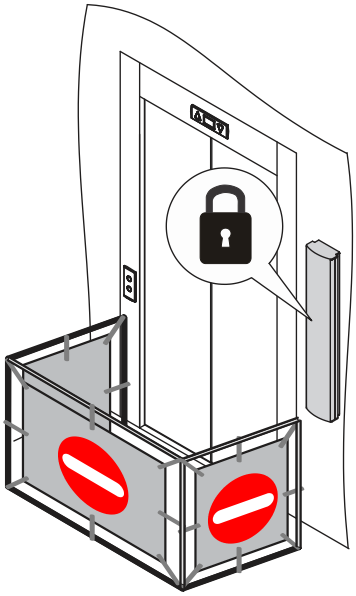
   The car is on the door zone, when any of the DZI LEDs (1) illuminate.

8. Switch off the main switch (220 or 220:2).



X000093143

9. Close the maintenance access panel.



X000093144

X000093146 E.2

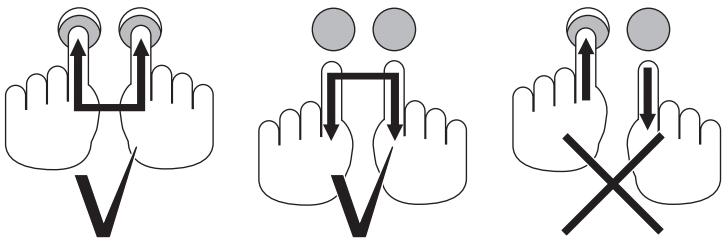
Related information

– Technical rescue (137)
– Use lifting equipment to move elevator car (154)
– Release passengers (car in door zone) (158)

12.7.2 Use RBO to move car to door zone

NOTE: It is important to press and release the Open-buttons simultaneously to avoid "Relay stuck" supervision from triggering.

If the brake release buttons were pressed or released separately recover the electrical brake release device (RBO) by switching operation mode switch to "Normal" and then to "Rescue".



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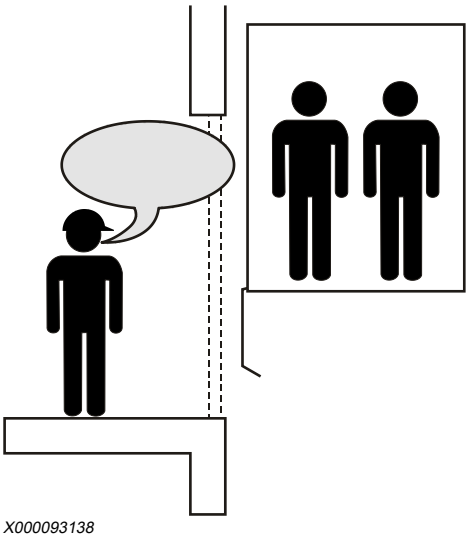
1. Inform the passengers that you are about to move the car in order to let them out and they must stay calm and not try to do anything by themselves.



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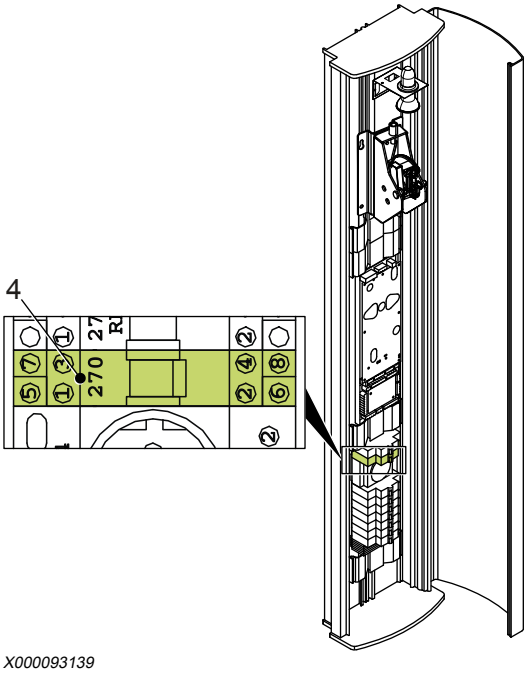
2. Ask the passengers if the car light or car emergency lighting is on.

   If the normal power supply to the elevator car lighting is unavailable, but the car emergency light is on, the emergency lighting battery is operative. It supplies power also to the door zone LEDs and speed and direction LEDs in the LCE user interface.

   NOTE: Battery status can also be checked by pushing the alarm button in car operating panel: If alarm buzzer sounds or a call to the service center is successful, the battery operates.

3. Open maintenance access panel (MAP).
4. Switch RDF (4) ON.



X000093139

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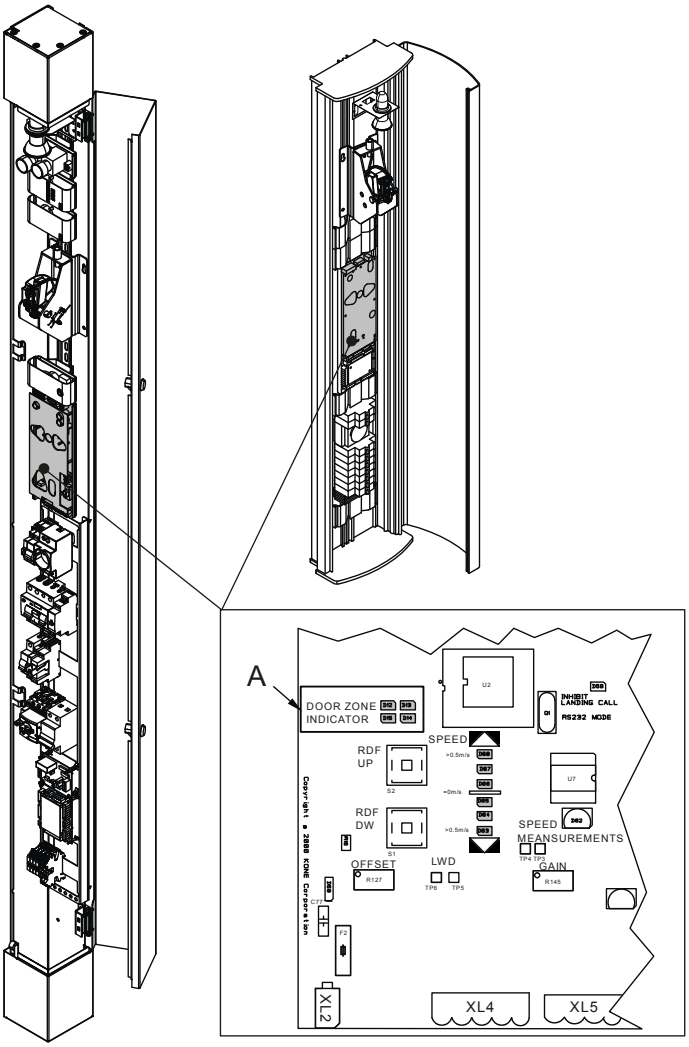
5. Check the elevator car position.

WARNING: Never open the brakes when the elevator car is in door zone. DZI LEDs are on when the elevator car is in door zone (A).

WARNING: If the emergency battery is inoperative, you cannot monitor elevator car position or movement from the LCE user interface LEDs.



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6. Turn the operation mode switch to "Rescue" position. Wait 5 seconds (RBO changes the mode).

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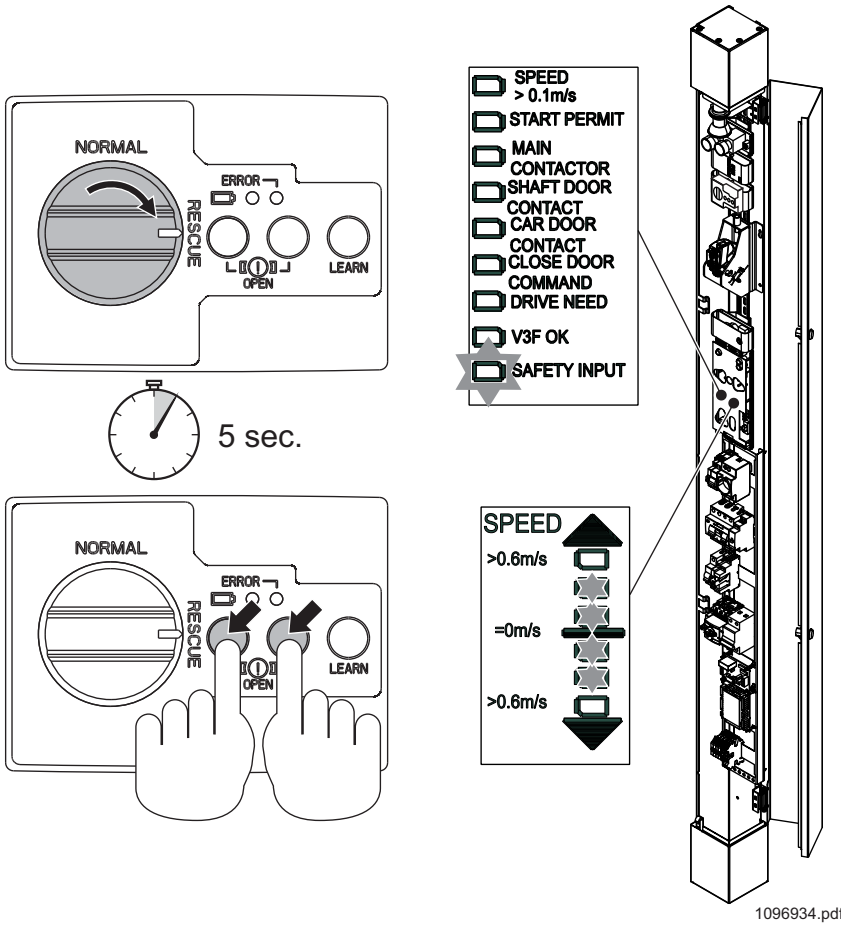
7. Press both brake releasing buttons simultaneously and check from the speed LEDs that the car is moving.

WARNING: Monitor the speed LEDs. If the second speed LED in UP (D67) or DOWN (D64) direction turns on, release the buttons.

You can keep pressing the buttons continuously until the car is in the desired position.



X000086385

8. When DZI is lit, release the buttons.
9. If the car does not move with RBO, press the RDF RUN button together with the RBO buttons.

   Check from the speed LEDs that the car is moving.

WARNING: Monitor the speed LEDs. If the second speed LED in UP (D67) or DOWN (D64) direction turns on, release the buttons.

---

10. When DZI is lit, release the buttons.

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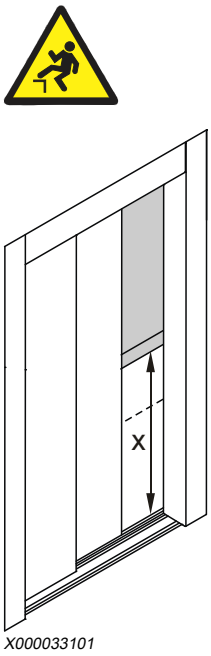
11. Check the elevator car position.

    Select one of the following:

    – If speed and direction LEDs indicated that the elevator moved when the brakes were opened, continue to the next step.
    – If speed and direction LEDs did not turn on, check the elevator car position visually:
        1. Check that safety fences are installed where needed.
        2. Open the landing doors with emergency opening key, max. opening width 90 mm.
        3. Check the elevator car position (x).



X000033101

        4. Close the landing doors.
        5. Check that the landing doors are mechanically locked.

    If the elevator car has moved, the speed and direction LEDs are for some reason inoperative.

    If the elevator car has not moved, select one of the following:

    – Ask the passengers to change their positions in the car. Then try to move the car again.
    – If the elevator is provided with EBD-M, use it to move the car.
    – Use car lifting equipment.

12. Repeat moving the car until the elevator car arrives to door zone.

    The car is on the door zone, when the Door zone indicator LEDs illuminate.

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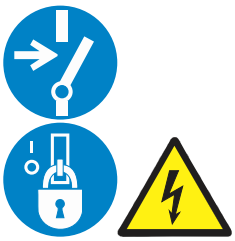
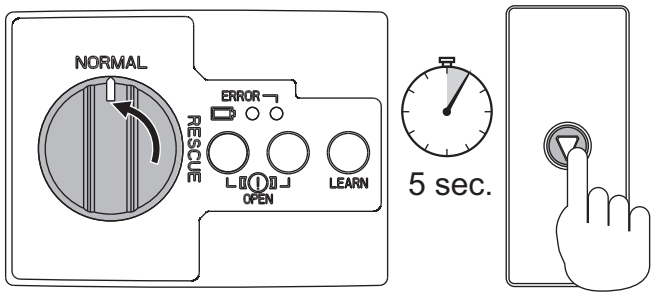
13. Switch off the main switch.

    Lock and tag.



14. Turn the operation mode switch to the Normal position.



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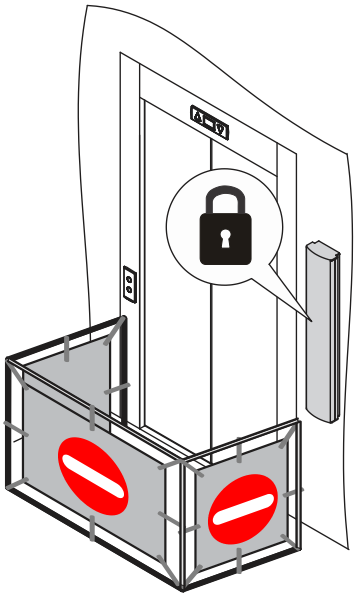
15. Close and lock the maintenance access panel.



X000093144

X0000104527 A.8

Related information

– *Technical rescue (137)*

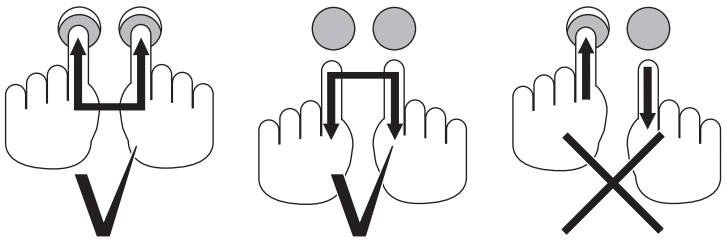
12.7.3 Use RBO to move car to door zone (DZI inoperative)

When the speed and direction LEDs and door zone LEDs do not operate, move the elevator car to a door zone using the electrical brake release device (RBO). It is a remote situation but can occur if, for example, emergency lightning battery has run out.

NOTE: The RBO does not get the encoder information and it automatically switches to the sequence opening mode (brakes are open for one second and closed for two seconds).

NOTE: It is important to press and release the Open-buttons simultaneously to avoid "Relay stuck" supervision from triggering.

If the brake release buttons were pressed or released separately recover the electrical brake release device (RBO) by switching operation mode switch to "Normal" and then to "Rescue".



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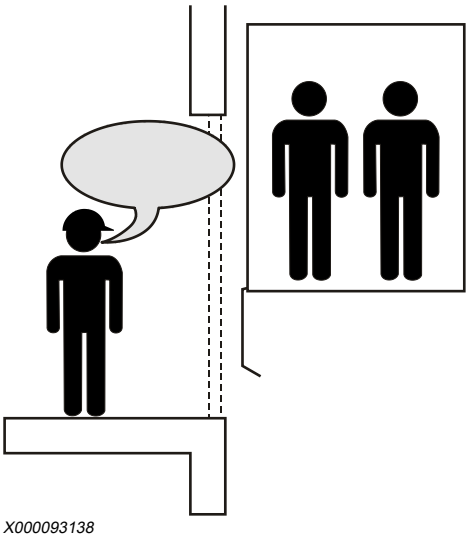
1. Inform the passengers that you are about to move the car in order to let them out and they must stay calm and not try to do anything by themselves.



X000093138

2. Open maintenance access panel (MAP).

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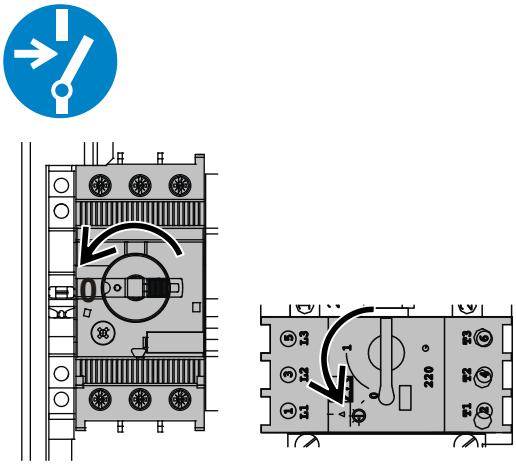
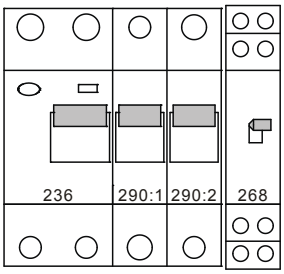
3. Switch OFF the main switch (220 or 220:2).



X000093143

4. Switch the shaft lights (268) ON.



X000093140

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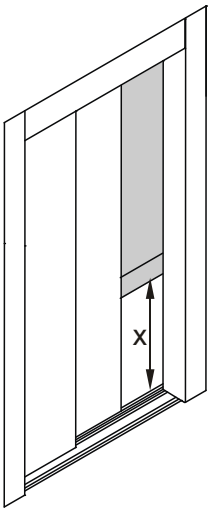
5. Check the elevator car position:
    1. Check that safety fences are installed where needed.
    2. Open the landing doors with emergency opening key, max. opening width 90 mm.
    3. Check the elevator car position (x).



X000093165

    4. Close the landing doors.
    5. Check that the landing doors are mechanically locked.
6. Go to MAP.
7. Turn the operation mode switch to "Rescue" position. Wait 5 seconds (RBO changes the mode).

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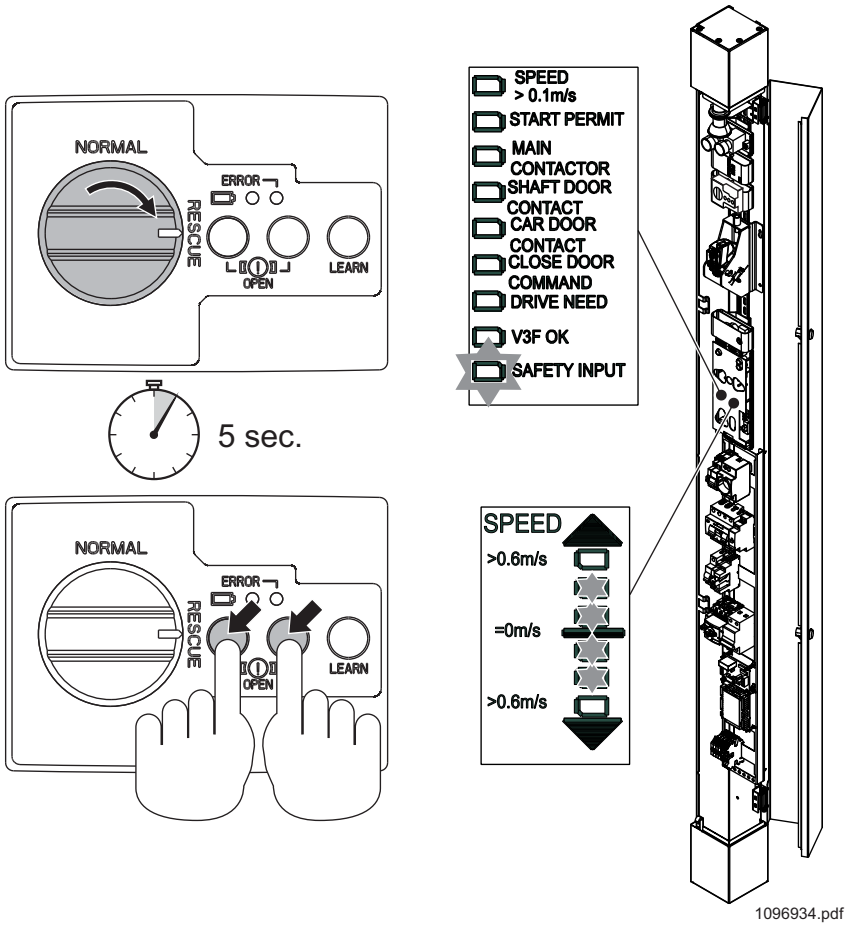
8. Press both brake releasing buttons simultaneously and check from the speed LEDs that the car is moving.

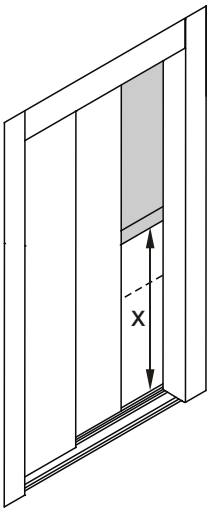
WARNING: Monitor the speed LEDs. If the second speed LED in UP (D67) or DOWN (D64) direction turns on, release the buttons.

You can keep pressing the buttons continuously until the car is in the desired position.



X000086385

9. Check the elevator car position.
   1. Check that safety fences are installed where needed.
   2. Open the landing doors with emergency opening key, max. opening width 90 mm.
   3. Check the elevator car position (x).



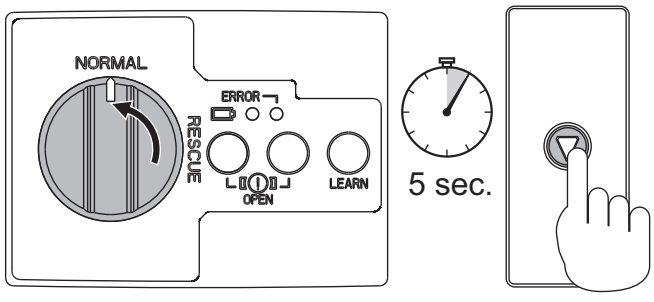
X000033101

   4. Close the landing doors.
   5. Check that the landing doors are mechanically locked.

NOTE: If the elevator car has not moved, there may be a balanced load in the car. Select one of the following:

– Ask the passengers to change their positions in the car. Then try to move the car again.
– If the elevator is provided with EBD-M, use it to move the car.
– Use car lifting equipment.

10. Repeat moving the car and checking the car location until the elevator car arrives to door zone.
11. Turn the operation mode switch to the Normal position.



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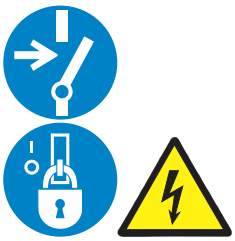
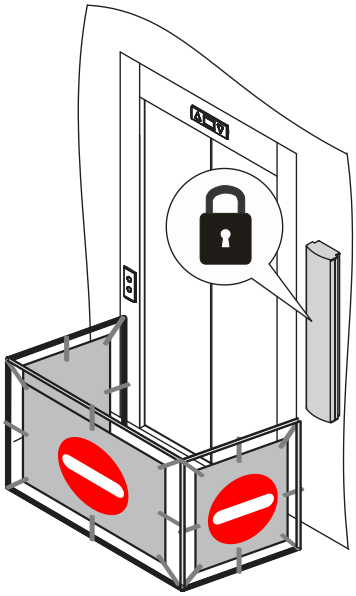
X000086386

12. Switch off the main switch.

    Lock and tag.



13. Close and lock the maintenance access panel.



X000093144

X0000104545 B.2

Related information

– Technical rescue (137)
– RBORC LEDs during rescue (130)
– Resolve balanced load with EBD-M (153)
– Use lifting equipment to move elevator car (154)
– Release passengers (car in door zone) (158)

12.7.4 Resolve balanced load with EBD-M

NOTE: Emergency Battery Drive Tool is an optional device. The device can be used only when there is balanced load in the car.

NOTE: Emergency lighting battery is not the power source for EBD-M. EBD-M can be used even if the emergency lighting battery is inoperative and the door zone and speed LEDs are inoperative.

1. Open the brake with RBO before EBD-M operation is activated.

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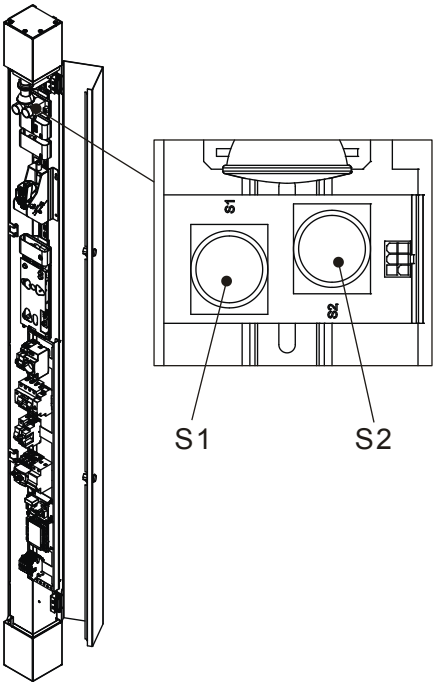
2. Push button S1 (Down) or S2 (Up) on the EBD remote control board.



X000033102

3. Stop EBD-M operation and release the RBO buttons when the door zone is reached (door zone indicator LED is lit).

WARNING: Monitor the speed LEDs. If the second speed LED in up or down direction turns on, release the buttons.

X0000104608 A.8

Related information

– *Release passengers (car in door zone) (158)*
– *Use RBO to move car to door zone (142)*
– *Use lifting equipment to move elevator car (154)*
– *Use RBO to move car to door zone (DZI inoperative) (148)*

12.7.5 Use lifting equipment to move elevator car

WARNING: Wear protective cut-resistant safety gloves.

NOTE: Use special lifting devices only.

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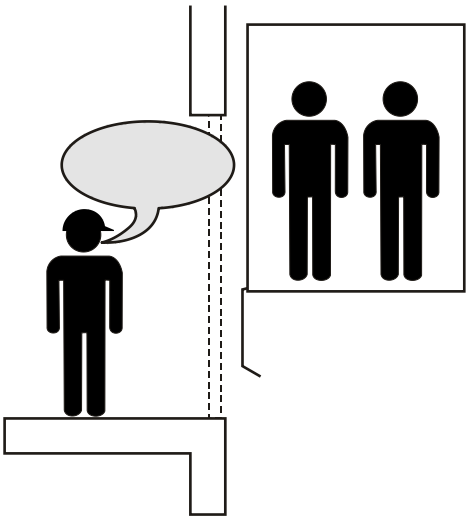
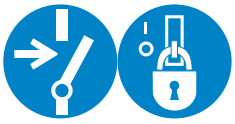
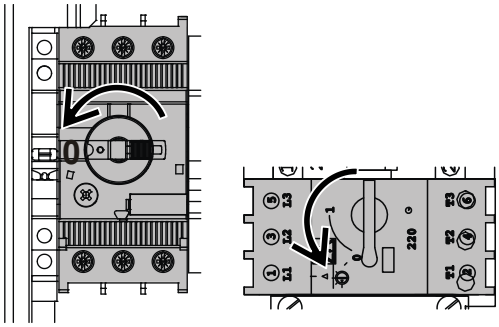
1. Inform the passengers that you are about to rescue and not to try anything by themselves.



X000093138

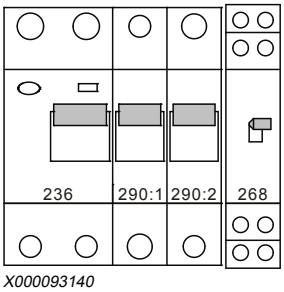
2. Switch the main switch (220 or 220:2) OFF. Lock and tag the main switch.





X000093143

3. Switch on the elevator shaft lights (268).



X000093140

4. Close the maintenance access panel.
5. Go to elevator car roof.

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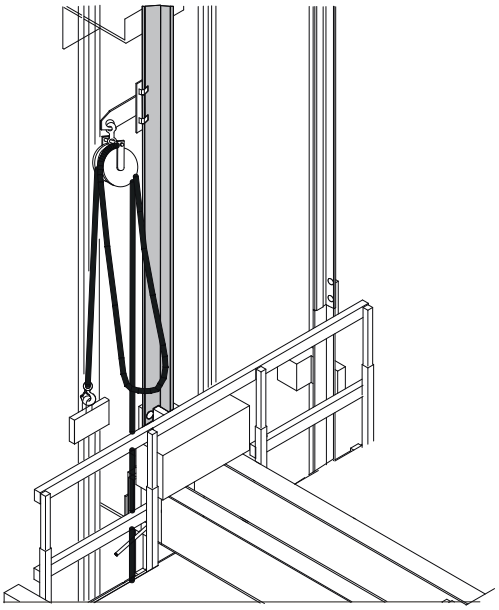
6. Move the elevator car.

   For moving up the elevator car, do the following:

   1. Connect the guide rail clamp to the car guide rail (to the machinery side of the elevator shaft).

      X000034456

      NOTE: Always use car guide rail as a fixing point, never a single guide rail bracket.

      NOTE: If the elevator car is too high for using the guide rail clamp, connect the chain hoist block to a lifting chain which is fixed to the elevator shaft ceiling.

   2. Connect the rope clamp to the ropes (ropes between the traction sheave and car).
   3. Attach the chain hoist block (between the guide rail lifting clamp and rope clamp).
   4. Move the car upwards min. 150 mm to release the safety gear.
   5. Continue moving the car to door zone with Recall Drive Feature (RDF), manual brake release device or lifting tools.

      CAUTION: If you continue moving the car with RDF or brake, remove the lifting tools from the guide rails to the car roof.

      ---

   6. When you have finished the rescue and people are out of the car, remove the tools and lifting equipment from the car roof.

   For moving the elevator car down, do the following:

   1. Connect the guide rail clamp to the car guide rail (to the machinery side of the elevator shaft).

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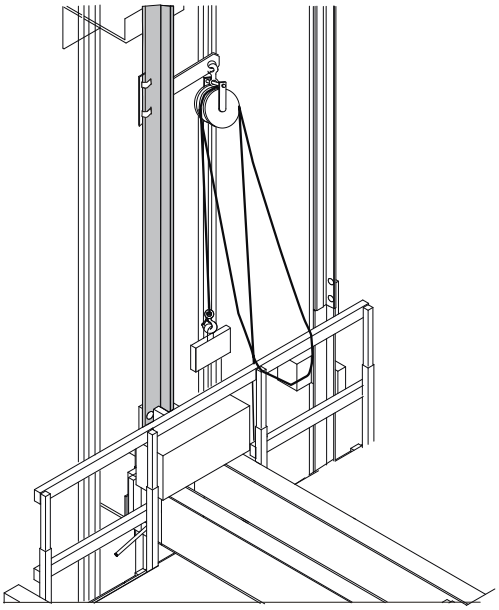

X000033104

NOTE: Always use car guide rail as a fixing point, never a single guide rail bracket.

2. Connect the rope clamp to the ropes (ropes between the traction sheave and counterweight).
3. Attach the chain hoist block or ratchet between the lifting bracket and rope clamp.
4. Move the elevator car downwards min. 150 mm to release the safety gear.
5. Continue moving the car to door zone with Recall Drive Feature (RDF), manual brake release device or lifting tools.

CAUTION: If you continue moving the car with RDF or brake, remove the lifting tools from the guide rails to the car roof.

---

6. When you have finished the rescue and people are out of the car, remove the tools and lifting equipment from the car roof.
7. Go to the landing.

X000093169 D.2

Related information

– *Technical rescue (137)*
– *Lifting equipment (132)*
– *Use RBO to move car to door zone (142)*

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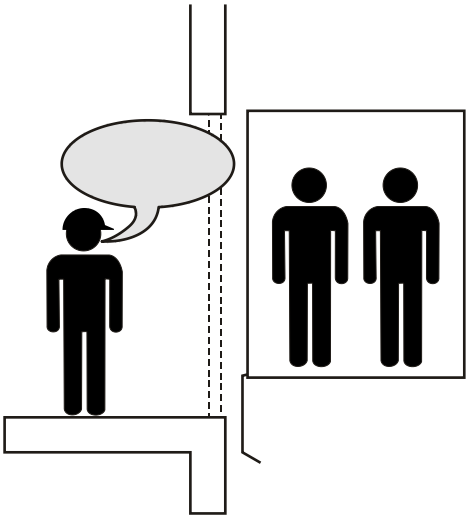
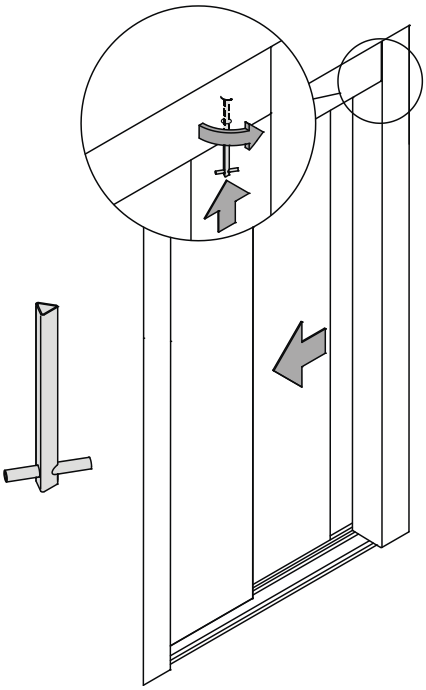
12.7.6 Release passengers (car in door zone)

1. Inform the passengers about how to act when you open the doors:
   - They must stay calm.
   - They must obey the instructions you give.
   - They must move away from the car door when the door is opened.
   - They must exit the car one by one.



X000093170

2. Open the landing door with emergency opening key.



X000093171

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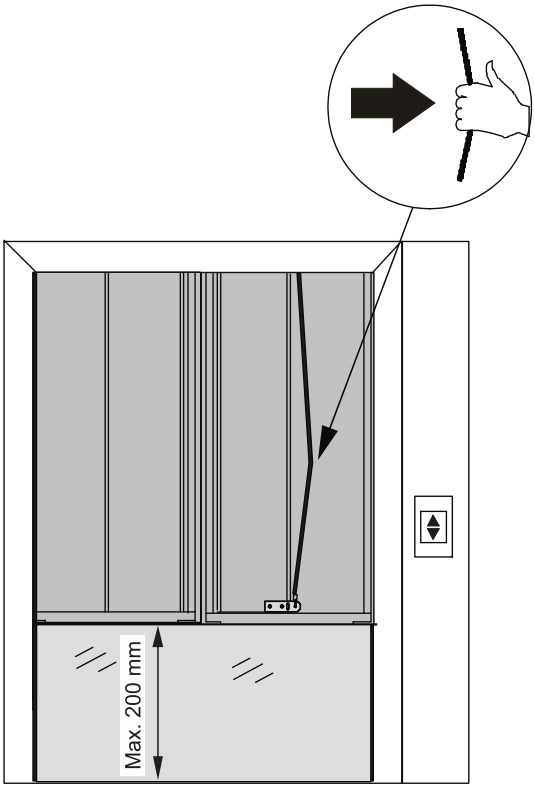
3. If the car door does not open along with the landing door, pull the wire rope and manually push/pull the car door to open. It is possible only when car door is equipped with an emergency unlocking wire rope.

WARNING: Wear protective cut-resistant safety gloves.



X000093172

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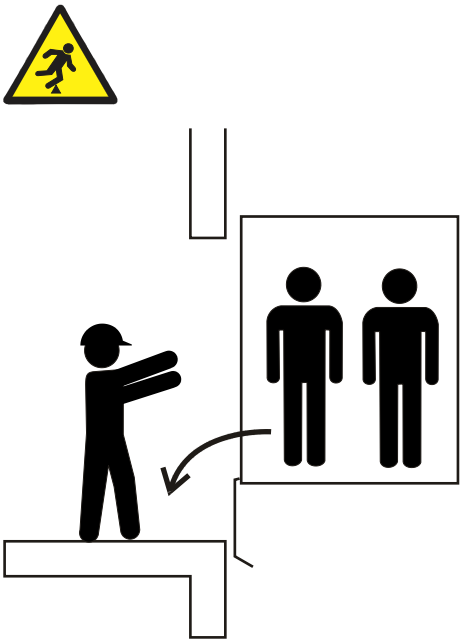
4. Assist the passengers out from the car.

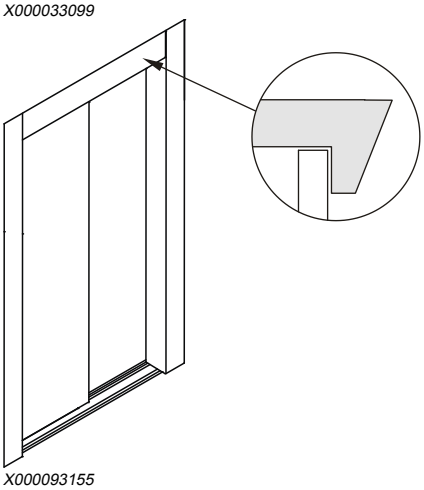
   Ensure that the passengers will not stumble if the elevator car is not exactly at the sill level.



X000093173

5. Close the landing door and ensure it is mechanically locked.

X000033099



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X000093175 D.2

12.8 Emergency rescue

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– If the trap door is equipped, do the emergency rescue through the trap door.

  Minimum 3 qualified persons needed:

  • 1 on rescue car roof
  • 1 in rescue car
  • 1 on landing

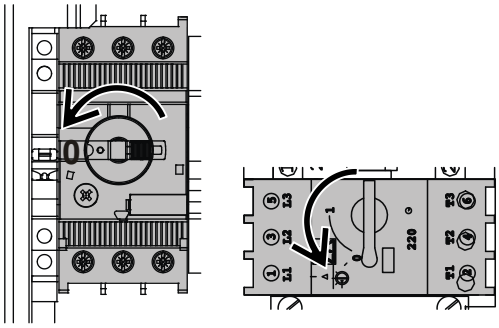
– If there is no trap door, contact professional emergency personnel.

  Professional emergency personnel perform the rescue with special emergency rescue equipment according to the site specific emergency rescue plan, considering the situation.

X000093176 C.2

12.8.1 Secure trapped elevator car

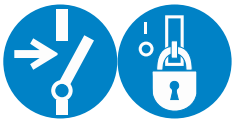
1. Switch off the main switch (220 or 220:2).



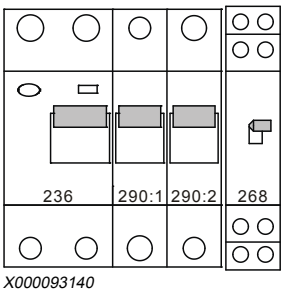
X000093143

NOTE: If group connection, be careful to use the correct switch (switch that is marked with the same number as the elevator).

2. Lock and tag the main switch (220 or 220:2).



3. Switch on the elevator shaft lights (268).



X000093140

4. Place warning signs near the manual brake opening device in the maintenance access panel (MAP) to inform others that the brakes must not be operated.
5. Close and lock MAP.

X000093179 C.2

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12.8.2 Access trapped car

1. Attach life lines to a suitable point above the door.

   One for passengers and one for each rescue person who will enter the shaft. Passengers and rescue personnel must use personal fall protection equipment the whole time a fall hazard exists.
2. Lower the rescue equipment onto the roof of the trapped car.

   For example, safety harnesses.
3. Climb down to the car roof.

   Use fall protection.

X000093180 A.3

12.8.3 Open car inner ceiling

1. Warn the passengers before opening the ceiling.

   

   Passengers must pay attention when the ceiling is lowered.

WARNING: Careless opening of the ceiling locks can cause injury to passengers.

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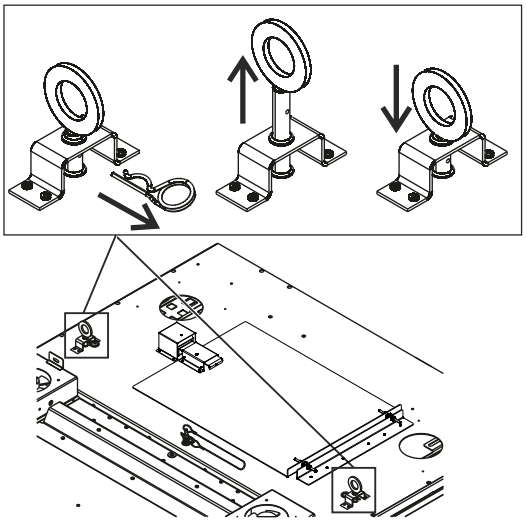
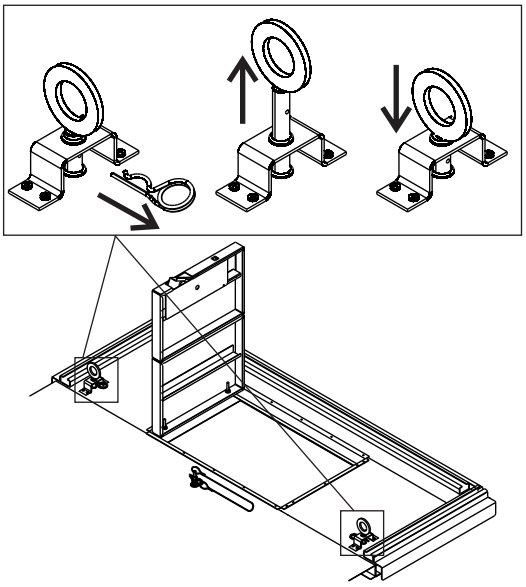
2. Release the ceiling locks:
    1. Remove the cotter pin.
    2. Pull up the rings.
    3. Release the rings.



X0000090929



X000098785

Figure 16: Optional designs

NOTE: The ceiling locks are not opened yet, only released.

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3. Open the ceiling locks:
    1. Remove the cotter pin.
    2. Pull up the safety wire to lift the ceiling upwards.
       Hold on to the safety wire.

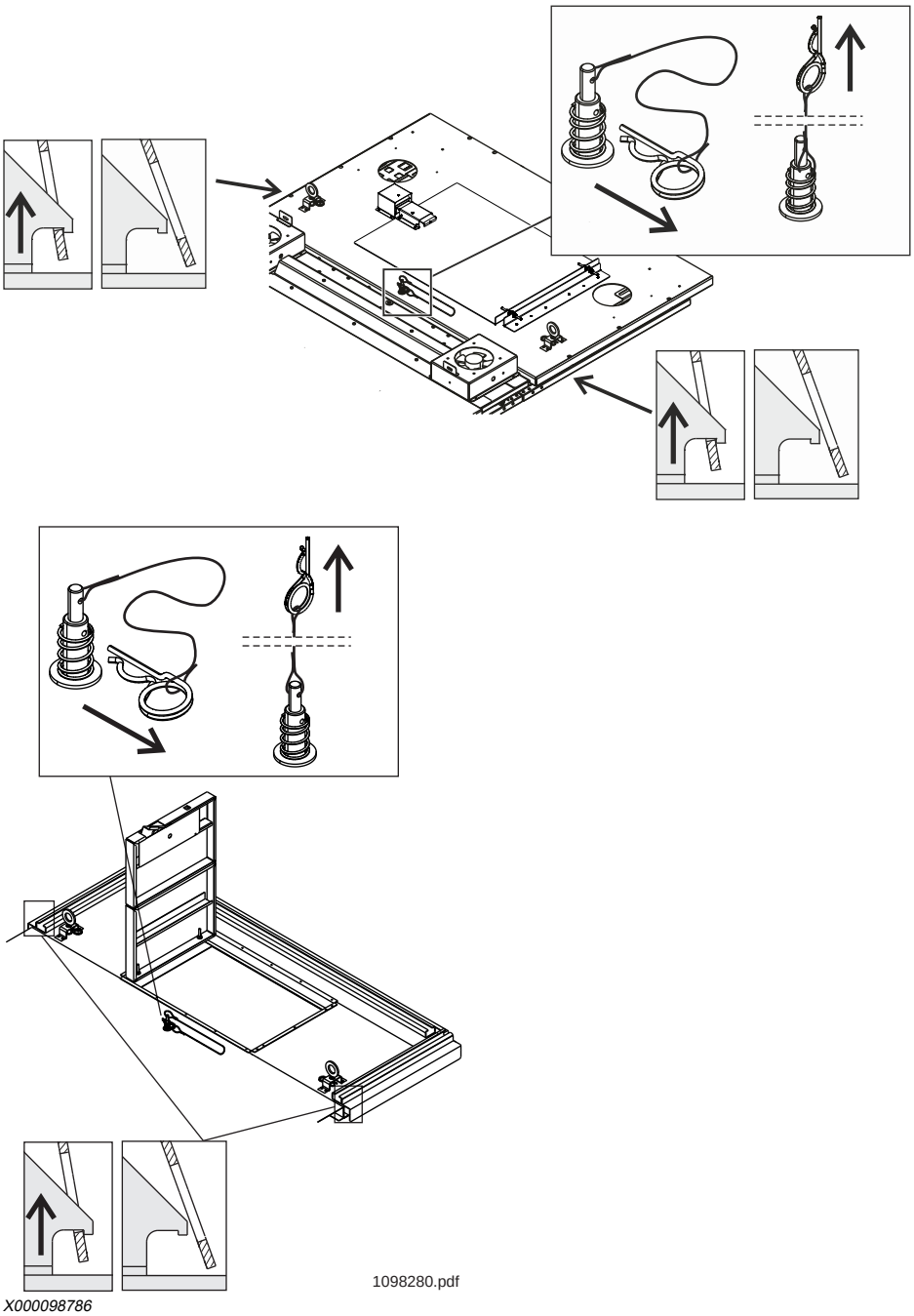

Figure 17: Optional designs

WARNING: The ceiling locks are now open, do not let the ceiling drop.

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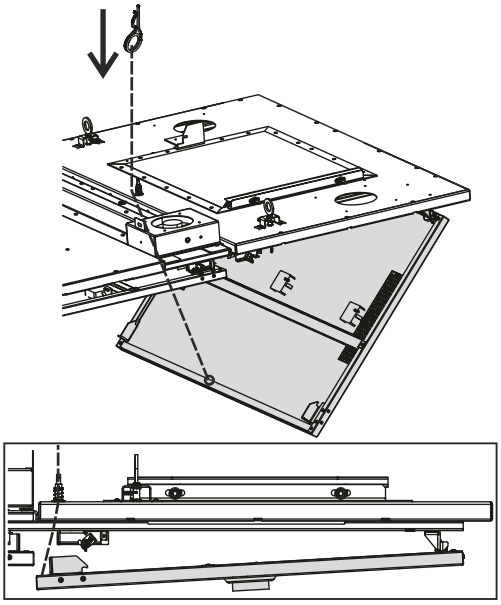
4. Lower the ceiling carefully down.

WARNING: Tell the passengers to pay attention and move away from the lowered ceiling.



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X0000066605 F.2

12.8.4 Open trap door on car roof

NOTE: The trap door design may vary depending on the roof type. The opening principle is similar.

WARNING: Wear protective cut-resistant safety gloves.

---

1. Open the trap door by releasing the locking mechanism.

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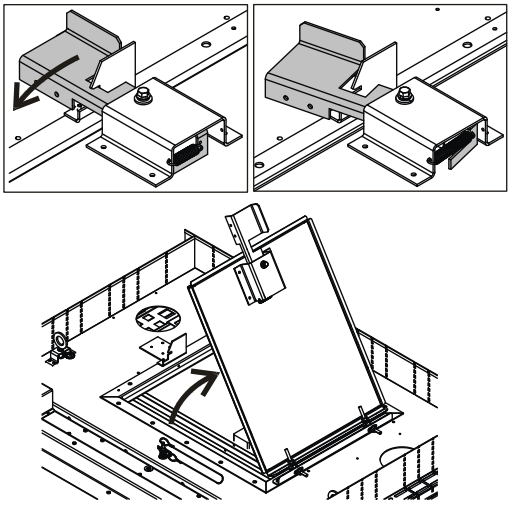
2. Open the elevator car roof trap door.



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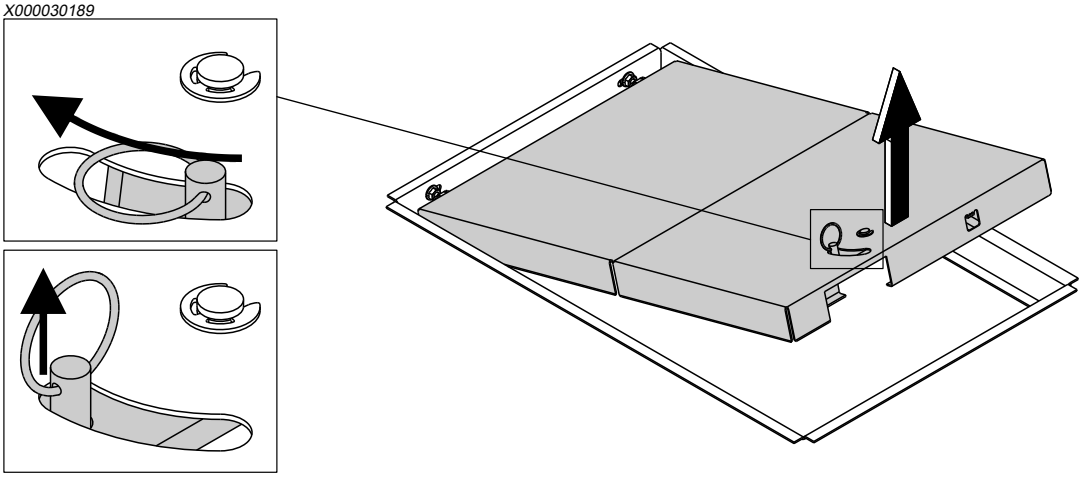

X0000060336

Figure 18: Optional designs

NOTE: Some elevator cars have only one integrated ceiling.

3. Continue the rescue operation according to site specific rescue plan.

X0000066609 C.2

12.9 Finalize rescue

WARNING: Wear protective cut-resistant safety gloves.

X0000089044 A.8

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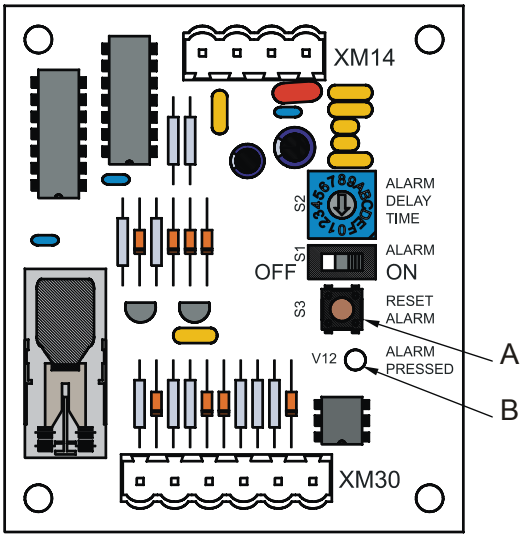
12.9.1 Reset alarm

1. Locate the LCERAL board in MAP.



X000033325

2. Push the RESET button (A) in the LCERAL board to reset the alarm.
3. Check that the alarm LED (B) goes off.

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12.9.2 Inform and finalize

After the rescue proper reporting must be performed.

1. Inform the elevator maintenance service desk that the situation is over.

X000034462

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2. Inform the building maintenance about what happened.

X000034463

3. Remove used rescue tools.
4. Ensure the safety of the elevator before taking it into normal use after rescue (safety check). Find the root cause for the failure and do not take the elevator in use if not fixed. Do safety checks and make sure that the elevator is safe to put in normal use.

   To ensure that the elevator is working properly:

   – Check that the car and landing door functions, and other passenger safety devices are operative as appropriate.
   – Make several test runs between the terminal floors.
5. Record to logbook how many persons were in the car and if safety gear was activated.
6. Turn off the shaft lights.
7. Close and lock all controller-related doors.

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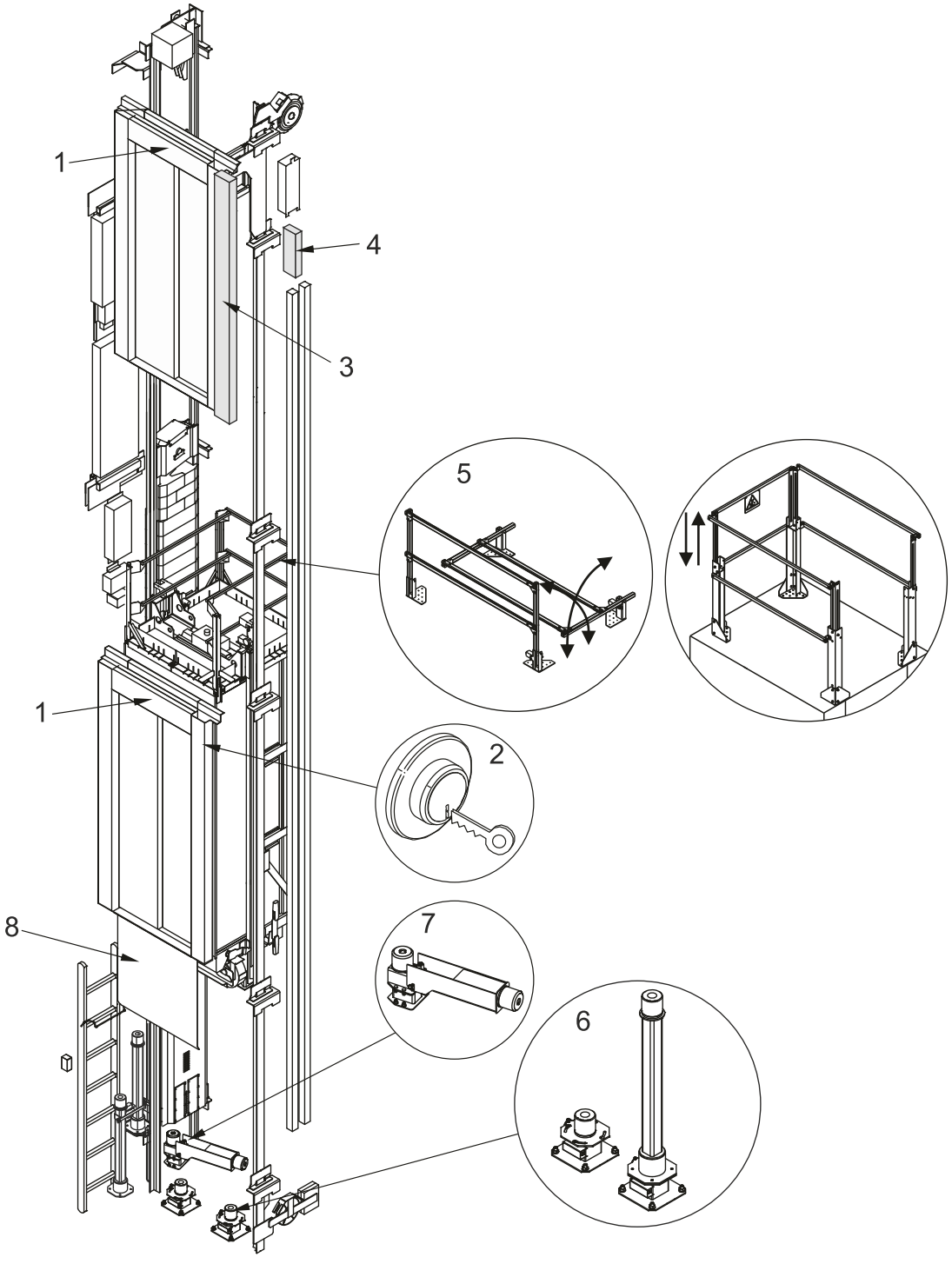
APPENDIX A. SSA**E

A.1 Safety space arrangement, option E (SSA**E)



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1. Landing door opening detectors at all landing doors.
2. Reset key switch at bottom landing.
3. Reset buttons (141:P and RDF Run) inside the maintenance access panel.
4. Shaft access monitor (SAM).
5. Car top balustrade (telescopic/hinged).
6. Safety buffers in pit under the elevator car.
7. Safety buffer in pit under counterweight.
8. Car apron

A.2 Shaft access monitor

The shaft access monitor (SAM) unit is installed beside the landing door inside the shaft at the topmost floor. It includes control relays and relay memory.

The SAM detects the shaft access by monitoring the operation of emergency opening devices on landing doors. When shaft access has been detected, the SAM is triggered and it neutralizes the normal operation of the elevator by disconnecting the normal drive safety circuit until a reset is made. When the SAM has been triggered, inspection drive from the inspection drive unit on car roof can be enabled. Battery back-up ensures operation during short power interruptions.

A.3 Landing door opening detectors

Microswitch assemblies at all landing doors include two microswitches and an actuator-cam in railing of a sliding door.

Opening of a landing door by means of an emergency opening key is detected. Shaft access monitor (SAM) neutralizes the normal operation of the elevator until a reset is made. One of the microswitches cutting the supervision line is enough to neutralize the normal operation of the elevator, but both lines must be cut before the SAM reset is possible.

A.4 Safety buffers

The safety buffers are dimensioned according to standard and equipped with certified polyurethane elements. The safety buffers can be located in the pit below the elevator car or in the pit below the counterweight.

Normal drive is enabled when all the buffers are in 'down' position and the inspection drive when they are in 'up' position. **In some cases the buffers are removable, and 'down' position means that the buffer has been stored to storage place.** If the buffers are in any other position the electrical drive system is de-activated.

The buffers are provided with separate 'buffer up' and 'buffer down' safety switches. When the buffer is out of its 'down' position the 'buffer down' safety switch cuts the safety circuit. When the buffers are in 'up' position, the 'buffer up' switches bridge the safety circuit. Then the inspection drive signal can be connected.

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A.5 Car top balustrade

The balustrade is used when the gap between car and shaft wall is larger than required by the EN—code and headroom is smaller than the height of standard balustrade. The balustrade can be either telescopic or foldable.

The balustrade includes position detecting switches. Balustrade position switch contacts are connected in series with normal drive and inspection drive signals. The inspection drive is possible only when the balustrade is raised to its locked up-position. The normal drive is possible only when the balustrade is in down position.

A.6 Inspection drive unit on the elevator car roof

The standard inspection drive unit is modified for safety device connections. Safety circuit points between stop button on car roof and car door contact as well as the separate inspection drive direction signals are taken out from inspection drive unit.

A.7 Car roof connection box

The connection box for balustrade and inspection drive unit position switches and inspection drive unit coupling is located on the elevator car roof.

A.8 Telescopic car apron

All drive modes are de-activated if the telescopic apron is not fully extended. If the pit depth is less than 850 mm, there is an apron by-pass contact on the elevator car roof. The contact allows the elevator to operate on the bottom floor when apron is compressed and apron safety switch is open.

X000033125 B.2

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APPENDIX B. OPERATING INSTRUCTIONS FOR SSA**E DEVICES

B.1 Operating instructions

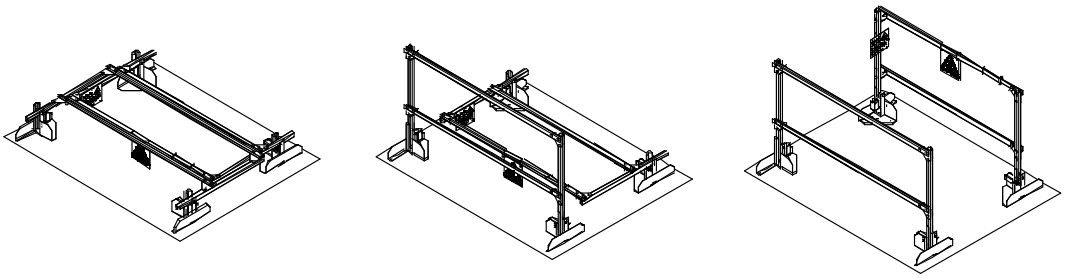
B.1.1 Safety measures

All normal safety procedures must be carried out.

B.1.2 Hinged balustrade on car roof

The following procedure describes raising the balustrade. To lower the balustrade, use a reversal procedure.

WARNING: Balustrades must always be up before going from the landing to the elevator car roof. Raise and lower the balustrades, and operate the front end locking clips standing on the landing. Operate the rear end locking clips on the elevator car roof.



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B.1.3 Telescopic balustrade on car roof

Raise the balustrade up.

NOTE: Release the locking clips (1) before lowering the balustrade (2).

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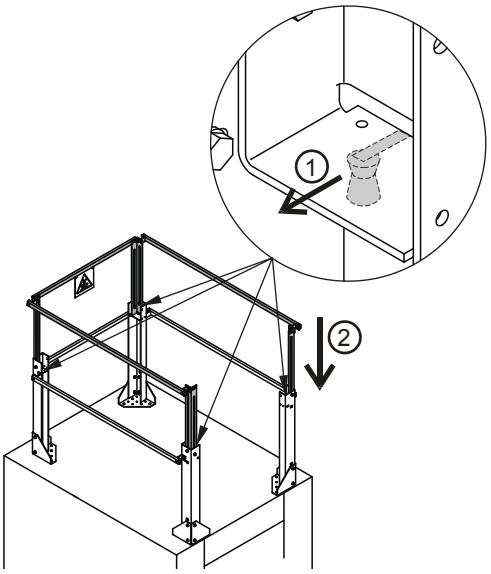

X000012669

WARNING: Balustrades must always be up before going from the landing to the elevator car roof. Raise and lower the balustrades, and operate the front end locking clips standing on the landing. Operate the rear end locking clips on the elevator car roof.

B.1.4 Car safety buffers in the pit

The following procedure describes raising the buffers. To lower the buffers, use a reversal procedure.

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1

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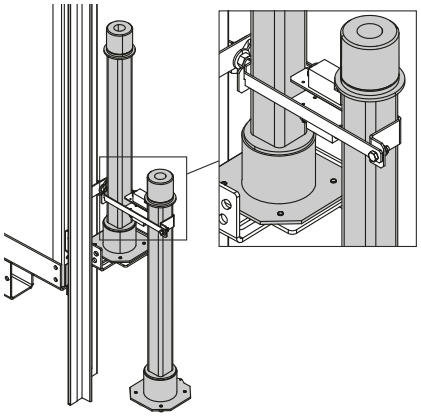

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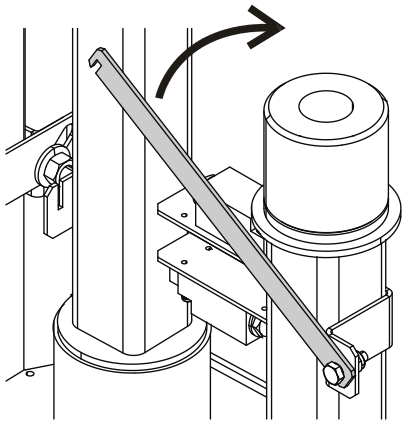

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2

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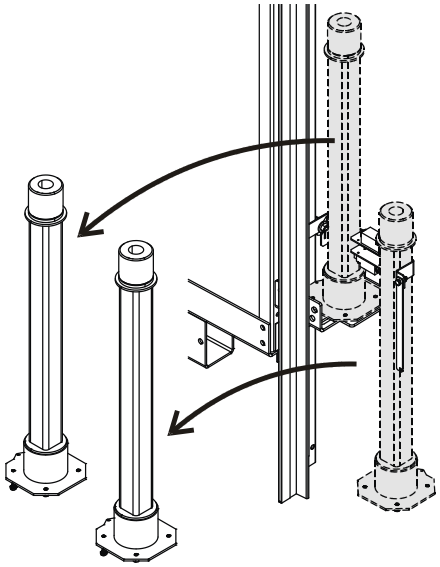

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3

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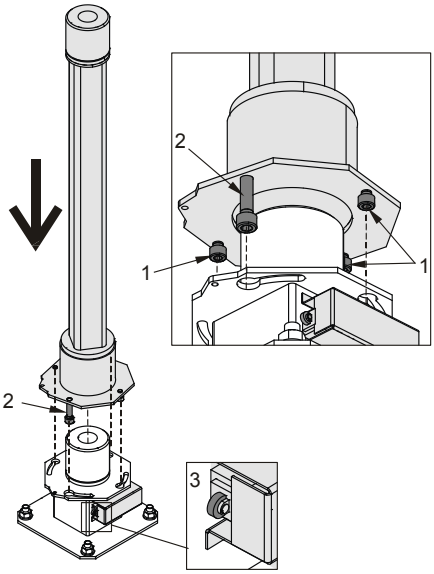
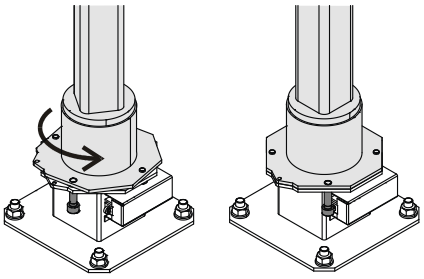


X000010619

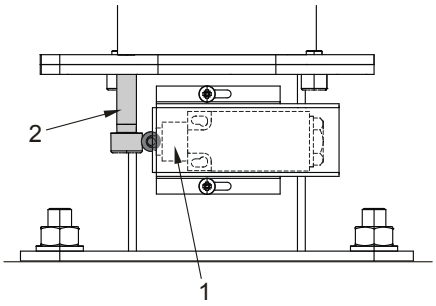
NOTE: Align bolt (2) through the hole next to the buffer safety switch (3). Bolts (1) align the buffer in place.

4

X000009097



X000010620



X000010621

NOTE: Ensure that bolt (2) triggers the buffer safety switch (1).

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5
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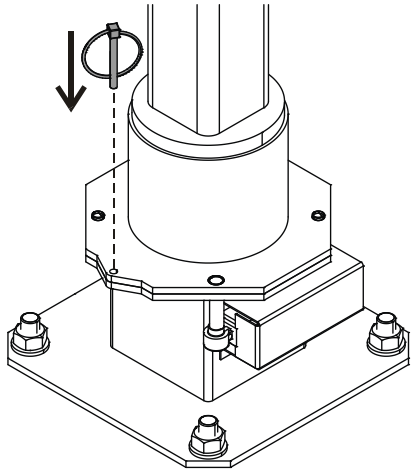

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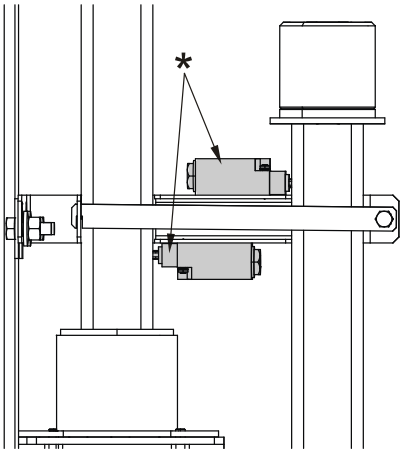
NOTE: When returning to normal drive, place the removable buffers back to the buffer rack. Ensure that the buffers trigger the safety switches (*) on the buffer rack to enable normal drive.



X000010623

B.1.5 Telescopic safety buffer in the pit

The following procedure describes raising the buffer. To lower the buffer, use a reversal procedure.

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1
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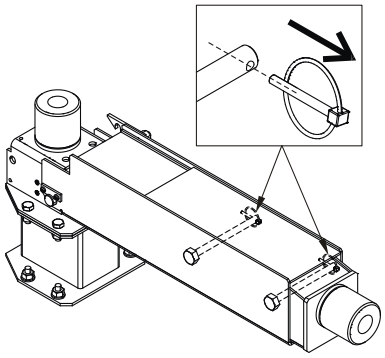

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2
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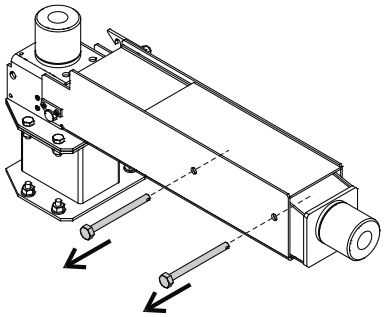

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3
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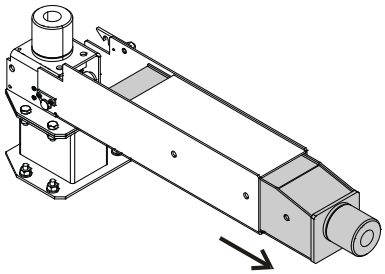

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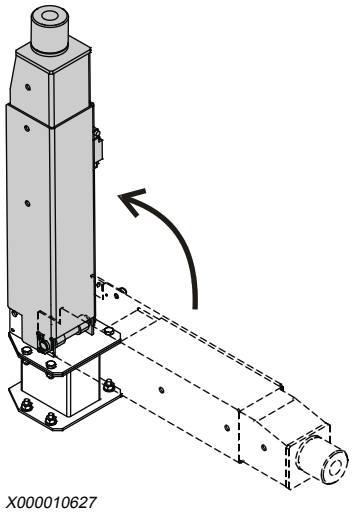
4
X000009097



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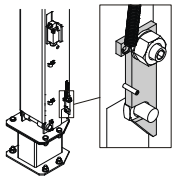

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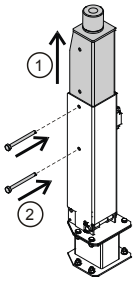

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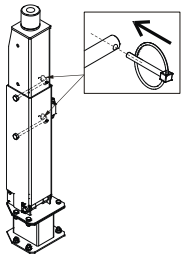

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B.2 Shaft access monitoring (SAM)

The elevator may be equipped with SAM, that detects if someone has entered the shaft and prevents the car from moving. If the elevator has SAM and you open a landing door to estimate where the car is, SAM prevents the elevator from moving and the fault F0089 displays until you reset SAM.

WARNING: SAM protects persons working in the shaft. Before resetting SAM, always verify that nobody is in the shaft.

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1. Check that nobody is in the shaft.

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2. Check that none of the stopping devices are *not* in STOP position.
3. Check that all devices providing safety spaces are in position for normal drive.
4. Check that all landing doors and possible trap doors are closed.
5. Check that the +24 VDC power supply for SAM is available.
6. Reset SAM by:
    1. Pressing the SAM reset 141:P (7) button in MAP, or
    2. Turning the SAM reset key switch (141:S1) on the lowest landing door frame, or
    3. Turning the SAM reset key switch (141:S2) on the topmost landing door frame

    NOTE: Keep the button pressed or key in reset position for at least 5 seconds.

    The SAM reset signal sounds and the elevator returns to normal operation. If SAM does not reset, RDF is on or a safety component, for example, OSG or safety gear, may be cutting the safety chain.

7. If RDF is on or the safety chain is open, reset SAM as follows:

    Keep the RDF RUN 270:RB (5) button pressed throughout this procedure.

    1. Simultaneously press RDF RUN 270:RB + SAM reset 141:P button in MAP until the SAM reset signal sounds.
    2. If you need to move the car, release the SAM reset 141:P button and while still pressing the RDF RUN button, press the RDF direction button RDF UP or RDF DW (2).

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APPENDIX C. TECHNICAL WARRANTY TERMS

KONE warrants that the elevator is to the best of its knowledge free from defects caused by faulty design, material or workmanship, which prevent the electrical or mechanical functioning of the elevator.

C.1 Enforcement of warranty

The owner shall notify KONE in writing of any defect in the elevator, which the owner has detected and requires to be corrected. Such notice shall be made without delay, but in any case within fourteen (14) days of detecting the defect and before the end of the Warranty Period. The notice shall contain a description of the defect and its probable cause. KONE shall be given an opportunity to inspect a claimed defect. If, after appropriate tests and inspections by KONE or on behalf of KONE, the elevator is found to have a defect that falls under this warranty, exclusive remedy shall be made, at the option of KONE, either by repairing the defect at the facilities of KONE, or by supplying the replacement parts free of charge to the owner. Repairs shall be performed, at KONE's discretion, by KONE or a third party.

The cost of dismantling and installing a repaired or replaced part furnished under this warranty is expressly excluded from KONE's liability.

C.2 Preconditions for warranty

This warranty is given on the condition that the elevator is in all respects erected, operated, handled, serviced and maintained properly, in accordance with KONE's instructions and under normal operating conditions.

Without limiting the above, KONE shall specifically have no responsibility for damages of any kind as a result of one of the following events:

1. The repair or replacement of the elevator or any part thereof becomes necessary due to normal wear and tear, vandalism, accident or negligence or otherwise without any fault of KONE;
2. the Product has been used for the transport of goods and machinery in cases where the Product is intended primarily for the transport of people;
3. repairs, alterations or adjustments to the elevator have been performed by the owner or a third party without KONE's prior written consent; or
4. KONE has purchased the part from an identified manufacturer and resold it to the owner under the manufacturer's original warranty and such warranty no longer covers the defect.

C.3 Defective parts

The defective parts replaced in accordance with this warranty shall, at KONE's request, be placed at KONE's disposal. The owner shall bear the cost and risk of transport of defective parts to KONE's plant, or to the nearest KONE service station, and KONE shall bear the risk and cost of transport of the repaired or replacement parts to the owner, to the same extent born by KONE in the contract with respect to the delivery of the elevator.

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C.4 Warranty period

The warranty period for any part or parts of the elevator shall be eighteen (18) months from ex works delivery of the elevator, or twelve (12) months from the date installation of the elevator is completed and handed over to the owner as stated on the first page of this manual, whichever period expires first.

An extension of twelve (12) months to the warranty period is given, under the same terms and conditions as those applicable to the original elevator parts, to parts replaced or repaired under this warranty. This paragraph shall not be construed as extending the period of this warranty as described in the paragraph above.

C.5 Payments due by the owner

Any moneys due to be paid by the owner to KONE shall be paid in full, and KONE shall credit the owner for any warranty claims separately, if necessary. Should the owner make any deductions, KONE shall forthwith be discharged from the performance of its obligations under this warranty until such deduction has been made up in full by the owner.

C.6 Exclusive warranty

The foregoing warranty is exclusive and in lieu of all other warranties, whether express or implied, including but not limited to any warranty of merchantability or of fitness for a particular purpose.

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