

TECHNICAL SPECIFICATIONS

LIFTS QH

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1. General description

1.1. Application

Permanently installed goods passenger lift with hydraulic drive, serving defined landing levels, with a large car, for the following uses:

Goods lift QHG

Vertical transport of heavy goods accompanied by passengers in industrial environments, warehouses, factories, etc.

Car lift QHV

Vertical transport of vehicles with their occupants in car parks of residential buildings, offices, hotels, etc.

Passenger lift (commercial sector) QHP

Vertical transport of passengers accompanied by loads in buildings for public use, such as shopping centres, department stores (furniture, DIY, electrical appliances, etc.), supermarkets, airports, etc.

1.2. Regulations

The lift is compliant with the 2014/33/EC Lifts Directive and may, therefore, be marketed in any country of the European Union. Conformity by way of compliance with harmonised standard EN 81-20.

Different solutions to those of the standard are applied for some options. It has EU Design Examination certificates issued by AENOR for its conformity with the Directive. Any deviations from the standards of reference are indicated in the corresponding sections of the document.

1.3. Features

Rated load (Q)

Use	Q (kg)								
QHG/QHP	2000	2500	3000	3500	4000	-	4500	5000	6000
QHV	-	-	-	3500	4000	4300	4500	5000	-

For QHG goods lifts, the weight of the loading means is included in the rated load. The maximum permissible load at the entrance during loading and unloading operations shall not exceed 85% of the rated load.

Rated speed (s)

0.2, 0.3, 0.4, 0.6 m/s according to car dimensions and rated load.

Floors

Up to 6 stops. Enquire with regard to a larger number of stops.

Travel

Up to 24 metres. Enquire with regard to longer travel.

Electrical specifications

An independent power supply is required for each circuit, with the characteristics described below:

Main circuit

Standard voltages: 400 V $\pm 5\%$ 3/N~50 Hz, 230 V $\pm 5\%$ 3~50 Hz.

Other voltages: 380 V $\pm 5\%$ 3/N~50/60 Hz, 220 V $\pm 5\%$ 3~50/60 Hz, 208 V, 440 V, 460 V, 480 V $\pm 5\%$ 3~60 Hz.

The following table shows the maximum voltage value of the line at full load for 400V power, according to the rated load, the rated speed and the floor area of the car. These values may be higher for other supply voltages, heavier cars or with certain options, such as an oil cooler.

A·B (m ²)	P (kg) ⁽¹⁾	Q (kg) ⁽²⁾	P+Q (kg)	Maximum rated current ⁽³⁾			
				v = 0.2 m/s	v = 0.3 m/s	v = 0.4 m/s	v = 0.6 m/s
2.6	1505	2000	3505	33 A	40 A	47 A	68 A
6.6	2285	2000	4285	33 A	47 A	57 A	77 A
8.6	2940	2500	5440	40 A	57 A	68 A	90 A
10.6	3185	3000	6185	40 A	57 A	77 A	110 A
12.6	3420	3500	6920	47 A	68 A	90 A	132 A
14.6	3655	4000	7655	47 A	77 A	110 A	-
16.6	4335	4500	8835	57 A	77 A	110 A	-
18.6	4655	5000	9655	57 A	90 A	110 A	-
22.4	5205	6000	11205	68 A	110 A	132 A	-

⁽¹⁾ Car weight considering a height of 2,200 mm. These values may be higher for taller cars, heavier door types, or with certain options.

⁽²⁾ Minimum rated load according to Table 7 of Standard EN 81-20 (for goods passenger lifts). A higher rated load can be selected, if necessary, for use of the lift or to meet the requirements of Table 6 of Standard EN 81-20 (for passenger lifts).

⁽³⁾ For rated loads above the minimum, the rated current will correspond to the P+Q resulting from the sum of the weight of the car with the required floor area and the rated load selected. For example: for an 8.6-m² lift with a rated load of 4,000 kg, the car weight will be 2,940 kg and P+Q = 2,940 + 4,000 = 6,940 kg. Therefore, the maximum current will be approximately the same as for the value in the table corresponding to P+Q = 6,920 kg.

Control circuit (optional)

This is only necessary for the main power supply of 440 V, 460 V, 480 V $\pm 5\%$ 3~60 Hz.

Voltage: 110 V, 120 V, 127 V $\pm 5\%$ ~60 Hz.

Depending on the car dimensions and certain options, the power input may reach 1 kW.

Lighting circuit

Standard voltage: 230 V $\pm 5\%$ ~50 Hz.

Other voltages: 220 V $\pm 5\%$ ~50/60 Hz, 110 V, 120 V, 127 V $\pm 5\%$ ~60 Hz.

Depending on the car dimensions, the type of car light and the travel of the lift, the power input may reach 3 kW.

2. Detailed description

2.1. Drive and guiding

MDH model	Direct acting hydraulic side drive with two facing single-acting cylinders. Supplied for travel up to 4 m, depending on available pit and headroom values.
MIH model	<p>Indirect acting hydraulic 2:1 chain-suspended with two facing single-acting cylinders. Supplied for travel from 3.7 m.</p> <p>Suspension via four 6x6 lifting chains of 1", 1¼" or 1½", depending on the rated load and on the car dimensions; with instantaneous roller safety gear tripped by the overspeed governor.</p>
Cylinders	<p>Cylinders with a diameter of 80 to 200 mm depending on the type of drive, car dimensions, rated load and travel, with hydraulic buffer, head leak collection and interconnected rupture valves for simultaneous actuation.</p> <p>Possibility of double-acting cylinders.</p>
Guide rails	<p>The car sling frame is guided by two facing calibrated lift guide rails. Depending on the rated load and on the car dimensions, these may be T90/B, T125/B, T127-3/B or T140-2/B.</p> <p>In the MIH model, each pulley head is guided by two T45/A calibrated lift guide rails.</p>

2.2. Installation

	<p>Both the car and head guide rails are supplied in 5 m sections and are equipped to be attached to the shaft using brackets at least every 1,500 mm. The cylinder is also equipped to be attached separately to the shaft during installation. All the material required to attach the guide rails, cylinder, etc. using brackets and anchors is supplied.</p> <p>Standard mechanical-type concrete anchors. Possibility of another type of anchor or attachment to another type of support (chemical anchors, "Halfen"-type profiles, etc.).</p>
Installation conditions	<p>The shaft shall be used exclusively by the lift and shall meet the following requirements:</p> <ul style="list-style-type: none">- It shall be fully enclosed with imperforate walls, floor and roof. The finish shall be smooth, with no protrusions and with vertical alignments of less than 1:1000.- The walls of the shaft to which the guide rails are attached shall be made of structural concrete (minimum C20/C25) for mechanical anchors to be used.- It shall be permanently ventilated at the top, with a minimum cross-section area of the shaft of 2.5%.- The pit shall be impervious to infiltration of water and its bottom shall be levelled and smooth. <p>Two hooks or beams shall be provided in the shaft roof that withstand at least 1,500 kg and positioned within the vertical projection of each guide rail for the handling of different parts during installation. These hooks shall be marked with the maximum load.</p>

Small spaces

Solutions are available for lift installation in existing buildings that do not have the permanent upper or lower refuge spaces required by harmonised Standard EN 81-20.

Top of shaft

Small headroom solution with shaft access detection safety system and moving cylinder buffer (for MIH). It has an EU Design Examination certificate issued by AENOR for its conformity with the 2014/33/EU Lifts Directive.

Bottom of shaft

Enquire about possibilities of solutions for small pits.

2.3. Machinery
Installation conditions

Both the hydraulic power unit and the electric board must be installed in an enclosed machine room exclusively for the lift, which must meet the following requirements:

- This room must be easy to access, without having to pass through private property.
- The floor shall not be slippery, and the necessary work areas shall be left clear (see "3.3. Machinery location").
- It shall be of a height of at least 2,100 mm.
- The access door to the machine room shall have a minimum width of 600 mm and a minimum height of 2,000 mm. It shall have a key-operated lock, capable of being opened from inside without the key.
- It shall have a permanent lighting installation. The lighting shall provide 200 lx at floor level. There shall be a switch inside, near the access, and a socket.
- It shall be ventilated or cooled and shall be able to evacuate the heat dissipated by the equipment and the heat from outdoors to ensure the ambient temperature remains between +5°C and +40°C. The heat dissipated from the equipment depends on the frequency of use and on the motor power.

The lift installation envisages the machine room being located at a maximum distance of 10 metres from the oil inlet to the cylinder. Enquire with regard to greater distances.

Hydraulic power unit

Unit with electronic valve group, submersible motor and low-noise screw pump.

Group with ascent and descent valve with electronic speed control, safety valve for uncontrolled movements, pressure relief valve, pressure gauge, shut-off valve, return filter, manual lowering device for rescue operations and hand pump to unlock the safety gear in rescue operations, when necessary (for MIH only).

Double unit

Where the flow rate or the motor power is too high, two interconnected hydraulic power units are installed to run at the same time. Should one become faulty, the other unit can be used, with the same features except for speed, which will be half the rated speed.

Unit with auxiliary unit

For certain options, the operations of which are indicated in later sections, an auxiliary hydraulic unit is included with an external motor and a gear pump, with a safety valve against uncontrolled movements and a pressure relief valve. This second unit only runs during ascent for greater response speed than the main unit in certain operations.

Emergency motor pump unit option	Additional hydraulic unit for QHV car lifts. This enables the lift to operate at an upward and downward speed of 0.1 m/s should the main unit fail. It consists of a one-speed valve group, external motor and gear pump. It includes a pressure gauge, safety valve against uncontrolled movements, pressure relief valve and manual lowering button as an emergency activation system in rescue operations.
Switched double unit option	Option for QHV car lifts that is based on the installation of two interconnected full hydraulic power units. This means that one or another can be used indifferently and, therefore, should one fail, then the other with the same features can be used.
Oil cooler option	Oil/air heat exchanger to cool the oil in cases with a high number of starts/hour. An electric control board and hydraulic piping to connect the power unit and the cooling unit are supplied.

Electric board

Control panel in metal cabinet measuring 800x800x200 mm, 800x1,000x250 mm or 1,000x1,000x300 mm (width x height x depth), depending on the lift options.

Supply of a switch board as optional with padlockable main breaker that cuts off power to all circuits, except for lighting. It also has a breaker for the car lighting circuit and another for the shaft lighting circuit, both next to the main breaker.

2.4. Hydraulic installation

Flexible double metal mesh hydraulic pipes, each one subject to a pressure test with the connectors fitted, the results of which are marked.

One main pipe, one bypass T-connection in the pit and two pipes for cylinder connection are supplied.

In cases with a high flow rate, a main pipe is supplied for each cylinder, connected directly to a bypass T-connection on the outlet of the hydraulic power unit.

Oil inlet to the cylinder at the bottom through the rupture valve.

Supply of an intermediate section of rigid steel pipe as optional on the main pipe in cases of long lengths in order to reduce movements in the car, when its load changes due to piping expansion following an increase in pressure.

2.5. Electrical installation

The electrical car and shaft elements are supplied wired and with pluggable terminals to connect to the electric board and to the connection box located on the car roof.

Supply of shaft lighting with LED strips optional to order. The LED strips, the switches and all the necessary material for their installation and connection to the electric board are included.

2.6. Car

Frame	<p>The car structure is made up of two frames, each suspended from a cylinder and connected by two central support beams, on which the floor rests, and two upper beams. Two support beams are also included on the entrance ends of the lift floor, braced to the top of the slings. Different frame models are supplied depending on the rated load and car weight.</p>
Floor	<p>The car floor is a welded assembly supplied in one or two parts, formed by a base of rolled profiles measuring 80 mm or 100 mm in height, depending on the rated load and the car size, and threaded plate as the load surface. Standard floor surface with RAL7004 grey epoxy-polyester paint.</p> <p>Possibility of other floor finishes and plate types, depending on the use of the lift: aluminium diamond plate, stainless steel diamond plate, black checker stud rubber, vinyl flooring or preparation for stone flooring.</p>
Walls	<p>Steel plate panels painted with RAL7035 grey epoxy polyester paint as standard.</p> <p>Possibility of other colours or materials, depending on the use of the lift: brushed stainless steel, pattern stainless steel, laminate or glazed walls.</p> <p>Ventilation through apertures at the top and bottom of the side panels in QHG goods lifts or QHV car lifts. QHP passenger lifts (commercial sector) are fitted with folded steel plate skirting with the same finish as the walls, with ventilation apertures at the top and bottom of the car.</p>
Roof	<p>Steel plate modules with the same finish as the walls as standard.</p> <p>Possibility of painted steel plate false ceiling painted with RAL7035 grey epoxy polyester paint or brushed stainless steel, associated with some of the lighting options in QHP passenger lifts (commercial sector).</p>
Lighting	<p>LED downlight lamps built into the ceiling as standard.</p> <p>Emergency LED lighting built into the ceiling and backlighting on the button panel. This comes on automatically in the event of a fault in the electricity supply and has a battery to provide 1 hour of lighting.</p> <p>Possibility of false ceiling in QHP passenger lifts (commercial sector) with the following lighting options: translucent glass with fluorescent tubes, LED panels or LED spotlights.</p> <p>Emergency lighting in car ceiling with surface-mounted LED light. This comes on automatically in the event of a fault in the electricity supply and has a battery to provide 1 hour of lighting.</p>
Protections	<p>Possibility of impact protection on the sides of the car. There are different types available, depending on the use of the lift: wooden, folded steel plate with the same finish as the walls, plastic crash rails or high-resistance tubular steel.</p>
Handrails	<p>Possibility of the supply of handrails in QHP passenger lifts (commercial sector). 40 mm diameter stainless steel tube with straight or curved ends as optional.</p>

Button panel

The car has one or two button panels. There are two different types available, depending on the use of the lift:

- Brushed stainless steel plate button panel screwed to one of the side panels of the car in QHG goods lifts or QHV car lifts.
- Button panel on a stainless steel plate column built into one of the side panels of the car in QHP passenger lifts (commercial sector).

Other options

Trap door in the car roof for passenger rescue that can be opened from inside using a triangular key and mechanical lock with electrical control.

Smoke extractor in QHG goods lifts or QHV car lifts.

Forced ventilation in QHP passenger lifts (commercial sector).

Air conditioning in QHP passenger lifts (commercial sector).

Dimensions

Width (A): between 1,500 and 4,500 mm

Depth (B): between 1,600 and 7,000 mm

Height (H): between 2,000 and 2,850 mm

The dimensions indicated are measured from the constructive elements of the car without considering decorative options.

The floor area of the car results in a minimum rated load determined by Table 7 of Standard EN 81-20, when it is to be used for passengers and goods, as is often the case for this product. A higher rated load can be selected, if necessary, for use of the lift or to meet the requirements of Table 6 of Standard EN 81-20, when it is to be used for passengers only:

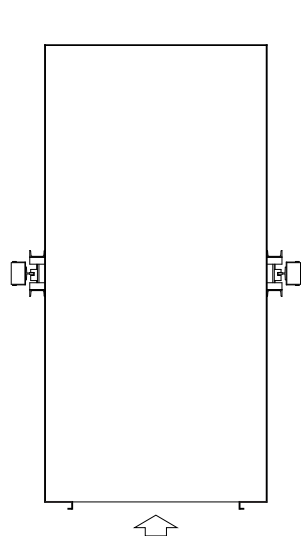
A · B (m ²)	Qmin (kg)	
	Table 7 ⁽¹⁾	Table 6 ⁽²⁾
2.6 ÷ 4.2	-	2000
4.3 ÷ 5.0	2000	2500
5.1 ÷ 5.8		3000
5.9 ÷ 6.6		3500
6.7 ÷ 7.4		4000
7.5 ÷ 8.2	2500	4500
8.3 ÷ 8.6		5000
8.7 ÷ 9.0		
9.1 ÷ 10.6	3000	6000
10.7 ÷ 12.6	3500	-
12.7 ÷ 14.6	4000	-
14.7 ÷ 15.8	4300	-
15.9 ÷ 16.6	4500	-
16.7 ÷ 18.6	5000	-
18.7 ÷ 22.6	6000	-

⁽¹⁾ Minimum rated load according to Table 7 of Standard EN 81-20 (for goods passenger lifts).

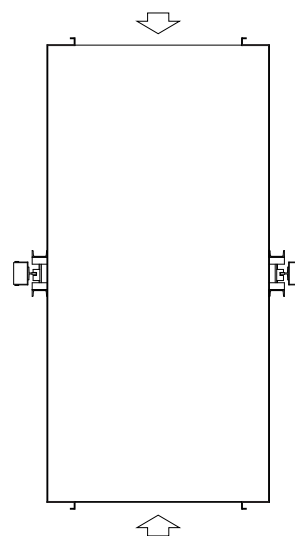
⁽²⁾ Minimum rated load according to Table 6 of Standard EN 81-20 (for passengers only).

Entrances

1 or 2 at 180°



Single entrance



180° double entrance

2.7. Car doors
Types

Automatic telescopic bi-parting doors with 4, 6 or 8 leaves.

Finish

Steel plate painted with RAL7035 grey epoxy paint as standard. Possibility of other colours and finish covered with brushed or patterned stainless steel plate, depending on the use of the lift.

In QHG goods lifts or QHV car lifts, the finish on the car doors is the same as that of the car walls.

In QHP passenger lifts (commercial sector), the finish on the car doors is independent to that of the car walls, except the side of the door (entrances and lintel), the finish of which will be the same as that of the door (normally stainless steel).

Dimensions

Type	HL (mm) ⁽¹⁾	PL (mm) ⁽¹⁾
C4H	2000 ÷ 2800	1000 ÷ 3100
C6H		1200 ÷ 3100
C8H		1400 ÷ 3000

⁽¹⁾ Door dimensions in 100 mm increments.

Other options

Small door operator in cases where the headroom is insufficient to maintain the safety distance between the operator and the top of the shaft.

2.8. Landing doors
Types

Automatic telescopic bi-parting doors with 4, 6 or 8 leaves, operating at the same time as those of the car.

Finish

Steel plate painted with RAL7032 grey epoxy paint as standard. Possibility of other colours and finish covered with brushed stainless steel plate.

Dimensions

The same as the car door.

Fire resistance

Exx class fire-resistant doors according to Standard EN 81-58 as standard.

Elxx class insulation according to EN 81-58 as optional.

The integrity and insulation time depends on the dimensions and the type of door.

Sill

Aluminium profile sills as standard, suitable for car wheels or for entering light loads.

Possibility for the supply of reinforced aluminium sills suitable for rubber wheels with a diameter of over 300 mm with a maximum of 800 kg per wheel.

Possibility for the supply of steel sills of different types for loading using pallet trucks, with wheels that are less than 300 mm in diameter and loads of between 800 kg and 2,000 kg, or fork-lift truck.

Other options

Joint cover. This consists of pieces that cover the space between the door and the wall, avoiding having to resort to brickwork to close off these gaps, once the door has been installed.

Sill complement (for aluminium sills only). This consists of an aluminium profile that is installed in front of the sill in the space of the door frame, avoiding having to resort to brickwork to fill in this gap, once the door has been installed.

Wide frames. The frame covers the entire space taken up by the open door, avoiding having to resort to brickwork to close off the gap in this area.

Reinforced sill fixation brackets.

2.9. Levelling systems

Levelling is performed by a system of magnetic sensors and the electronic speed control through the valve group to guarantee accurate stopping.

The lift has a re-levelling system, when doors are either open or closed, which uses the main hydraulic unit, in cases of level loss due to hydraulic leaks, oil compression, chain extension, etc.

Independent re-levelling option

System that increases the re-levelling speed and accuracy for QHG goods lifts.

Upward re-levelling is performed by an auxiliary motor pump unit with an external motor and gear pump for a higher response speed than the main unit. Downward re-levelling is always performed by the main unit.

Mechanical anti-creep device option

Car support system to guarantee the car stops flush to the landing level at all times, for QHG goods lifts into which the entire load or a large part of it is entered in one go.

Profiles are installed around the entire shaft, to which height-adjustable pieces are screwed. Devices installed under the car floor rest on these pieces, and these devices have a latch that moves outwards to provide the support and moves inwards so that the car can move between floors.

The car ascends a few centimetres so that the latches can move inwards before travelling to the destination floor. The ascent enabling the latches to move inwards is performed using an auxiliary motor pump unit similar to the one used for the independent re-levelling option, for higher upwards response speed than the main unit.

2.10. Control

The lift has a control button panel on each floor level and one or two button panels inside the car.

Possibility to supply the lift with no switches or button panels.

Landing button panel

Button panels to be built into the wall or into the door frame on each floor level. These are recessed button panels with control elements assembled on a stainless steel plate.

The following elements are included in the button panels:

- Call button with call confirmation indicator on outer lit ring. For the selective control in ascent and descent option, two buttons are included on the button panels of the intermediate floors, one to go up and another to go down.
- Call button with key as optional.
- Call confirmation buzzer for the button panel option for people with disabilities, according to EN 81-70 in QHP passenger lifts (commercial sector).
- Light indicating use of lift forbidden for the fire operations option, according to EN 81-73.

Possibility for the supply of vandal-proof button panels according to EN 81-71 (Class 2) as optional for QHP passenger lifts (commercial sector).

Possibility for the supply of remote controls to make the call from one landing or from all (each user will only have access to two of them) as option for QHG goods lifts or QHV car lifts.

Possibility for the supply of position and/or direction indicators on floor for installation on the wall or on the landing door frame, of different types, depending on the use of the lift.

Possibility of the supply of traffic lights in QHV car lifts. Just one traffic light can be installed on the floor accessed from the street or on all floors. The light remains green in cases where the car is not loaded, stopped at the floor of the traffic light, or travelling to it, and red in all other cases.

Car button panel

One button panel is supplied as standard for cars with one entrance and two button panels for cars with two entrances. Two button panels are included as standard in QHV car lifts.

The button panel in QHG goods lifts or QHV car lifts is brushed stainless steel plate and is screwed to one of the panels on the side of the car, with recessed control elements.

The button panel in QHP passenger lifts (commercial sector) is on a stainless steel plate column built into one of the panels on the side of the car, with recessed control elements at a suitable height for use by people in wheelchairs.

The button panel includes the following elements:

- Buttons for each floor, with call confirmation indicator on outer lit ring.
- Buttons with key as optional.
- Open doors button.
- Close doors button (on QHP passenger lifts (commercial sector) only).
- Button to trigger the alarm bell and the emergency alarm device at the same time.
- Emergency telephone or intercom (optional).
- Position indicator.
- Direction indicator as optional (included in QHP passenger lifts (commercial sector)).
- Backlit data plate indicating load, passengers, marking, logo and reference. This plate also includes the overload indicator and a lit field that switches on in the event of a power cut.
- Car priority key switch as optional.
- Call confirmation buzzer for the button panel option for people with disabilities, according to EN 81-70 in QHP passenger lifts (commercial sector).
- Building exit button highlighted by a green ring for the option of button panels for people with disabilities, according to EN 81-70, in QHP passenger lifts (commercial sector).
- Indicators for vehicle centring as optional in QHV car lifts.
- Arrival gong or voice synthesiser, according to EN 81-70, as optional in QHP passenger lifts (commercial sector).

Possibility for the supply of vandal-proof button panels according to EN 81-71 (Class 2) as optional for QHP passenger lifts (commercial sector).

Main operating features

- PLC-based operation.
- Configuration console on the electric control panel to select the type of operation and set other parameters, such as times and functions. PLC input/output statuses can be monitored and the error log memorised.
- The following operating modes can be selected using the console:
 - Individual use: The lift gives priority to car calls and memorises landing calls to serve them one by one in order of arrival. This operating mode is aimed primarily at use by car or goods lifts where a new landing call cannot be served until the car calls have been completed.
 - Collective use: The lift serves intermediate floor calls, while it is serving a car call. In this case, the selective control in ascent and descent option can be configured so that the lift only serves calls from intermediate floors, if it is going up or down. If it moves in the opposite direction, it gives priority to the car without stopping at intermediate floors.

- Landing detection, speed change and re-levelling using magnetic sensors.
- Parking with doors closed.
- Re-levelling with doors open.
- Photoelectric barrier to detect obstacles in the doors. A photocell can be optionally supplied instead of a photoelectric barrier (solution not compliant with 2014/33/EU Lifts Directive).
- Automatic timed switching off of car lighting to save energy.
- YD start.

Operating options

- Duplex or triplex operations to operate two or three lifts parallel to each other. Floor calls for lifts are managed jointly, sending the nearest car that is free.
- Selective control in ascent and descent in QHP passenger lifts (commercial sector). A button is installed on intermediate landings to go down and another to go up. The lift serves intermediate floor calls, if it is moving in the selected direction.
- Operation with different double entrance. On floors with double access, one door or another can be selected independently for the destination, as if they were on different floors. A button for each access is supplied on the car button panel. At least one of the buttons often includes a key switch.
- Fire operation according to EN 81-73. In the event of a fire, the lift travels automatically to the main evacuation floor and remains with the doors open.
- Operation with car priority key switch. When this key is turned, only the car button panel can be used to move the lift and no floor calls are served.
- Operation with door pre-opening on QHP passenger lifts (commercial sector).
- Operation for electric generator set. Only rescue operations are permitted when the input detecting that the power is coming from an electric generator set is triggered.
- Door opening in the event of a power cut. This enables the doors to open automatically on the ground floor in the event of a power cut.
- I/O with potential-free contacts. These must be specified by the client.
- Temperature control relay in the machine room.
- Soft starter instead of YD start. This consists of an electronic motor starter control for a progressive increase in current to avoid peaks in consumption.
- 3D photoelectric barrier to detect obstacles in the doors instead of the standard barrier.
- Presence sensors on landing to detect obstacles or passengers on the corresponding floor.
- Electrical installation ready for surveillance camera in QHP passenger lifts (commercial sector).

2.11. Safety devices

Among all the safety measures included in the lift, the following must be highlighted:

General

- Interconnected rupture valves as a safety measure against free fall in case of hydraulic system failure.
- Instantaneous captive roller-type safety gear acting on descent and tripped by wired overspeed governor as a safety measure against free fall due to breakage of suspension chains or against overspeed in the MIH model.
- Landing doors with electric control of both closure and of the lock.
- Car doors with electric closure control.
- Monitoring of the two valves in series in the hydraulic unit as a safety measure against uncontrolled car movement, when the doors are not closed and locked.
- Re-levelling system with doors open using an electric safety device as a safety measure against creep.
- Automatic car return to the lowest floor in a set time as a safety device against creep.
- Upper limit switch.
- Control of maximum motor feed time and of the ascent and descent solenoid valve.
- Temperature control relay in the machine room as a safety measure against overheating of control panel components (optional).
- Thermistors as a means of protection against motor overheating.
- Temperature probe in the hydraulic power unit as a means of protection against oil overheating.
- Phase absence or reversal detection on the power supply.
- Fault detection on contactors.

Use

- Overload control system using a pressure transducer integrated into the valve group.
- Photoelectric barrier to detect obstacles in the doors.
- Restricted door closing strength and door reopening in the case of obstacles.
- Buzzer triggered by the alarm button on the car button panel to call for external assistance, if trapped in the car due to a fault.
- Remote emergency alarm device, according to Standard EN 81-28, to ensure two-way voice communications in permanent contact with a rescue service via a telephone line or GSM mobile network, triggered using the alarm button on the car button panel. As optional, an intercom can be supplied in its place for its own line, so that the car can communicate with a fixed point (solution not compliant with 2014/33/EU Lifts Directive).
- System for communication with the machinery area via a conventional telephone.
- Non-linear energy accumulation-type car buffers.

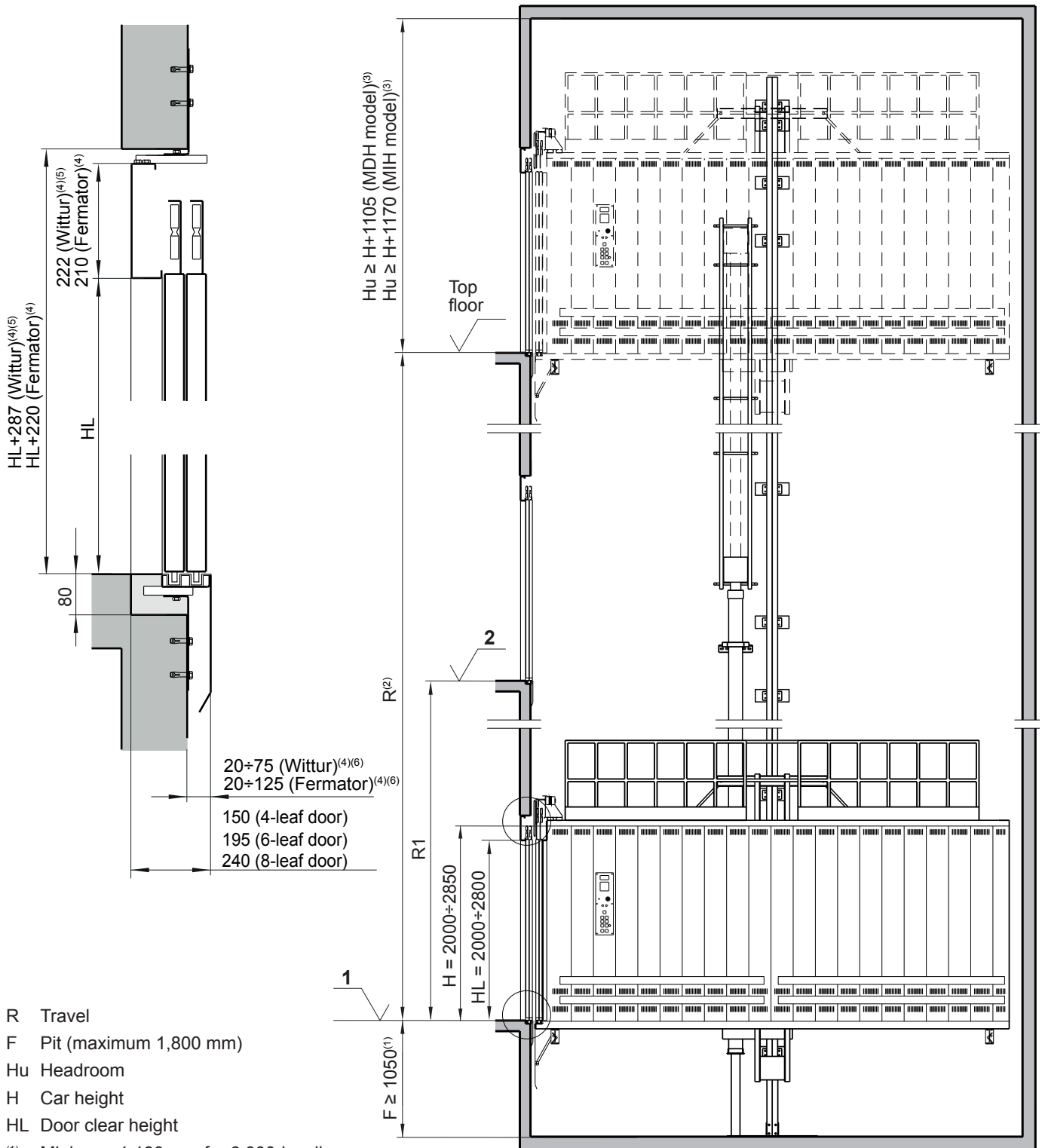
- Automatic descent to the ground floor in the event of a power cut.
- Automatic door opening on the ground floor in the event of a power cut (optional).
- Manual lowering button in the hydraulic power unit for rescue in the event of failure.
- Hand pump in the hydraulic power unit to unlock the safety gear in the MIH model.
- Manual door opening using a triangular safety key for rescue in the event of failure.
- Car doors with between-floors mechanical lock mechanism. The car door may only be opened in the unlock area of each floor level.
- Signalling of the door unlock area for rescue operations in the event of failure.

Maintenance

- Emergency stop button in pit and on roof.
- Car roof access detection system for maintenance on installations in small spaces at the top of the shaft. The system is tripped when opening of the top landing door using the triangular emergency key is detected. Normal lift operations are not allowed, and only inspection mode is permitted. The reset button located on the control panel is used to return to normal operations.
- Moving cylinder buffer on MIH lifts to ensure the necessary safety spaces during maintenance operations on the car roof in installations with small spaces at the top of the shaft. This is a manually activated device with a visual and acoustic warning until it is activated. It has an EU Design Examination certificate issued by AENOR for its conformity with the 2014/33/EU Lifts Directive.
- Possibility for the supply of a pit access ladder for maintenance work.
- Buttons under car and on car roof to trigger the alarm bell and the emergency alarm device as a safety measure in the event of being trapped in the pit or on the car roof.
- Handrails on the sides of the lift guide rails on the car roof. Possibility for the supply of a handrail at the rear of the roof for cars with one entrance for distances to the wall of over 300 mm.
- Folding handrails on the car roof as optional for cases of small spaces at the top of the shaft. It has an EU Design Examination certificate issued by AENOR for its conformity with the 2014/33/EU Lifts Directive.

3. Installation dimensions

3.1. Minimum shaft dimensions, elevation view



⁽¹⁾ Minimum 1,180 mm for 6,000-kg sling

⁽²⁾ For the MDH model, $R \leq F + Hu^* - 1000$ must also apply, where $Hu^* = Hu$ for $Hu \leq 3670$ and $Hu^* = 3670$ for $Hu > 3670$

⁽³⁾ Possibility of smaller Hu with safety system for low headroom

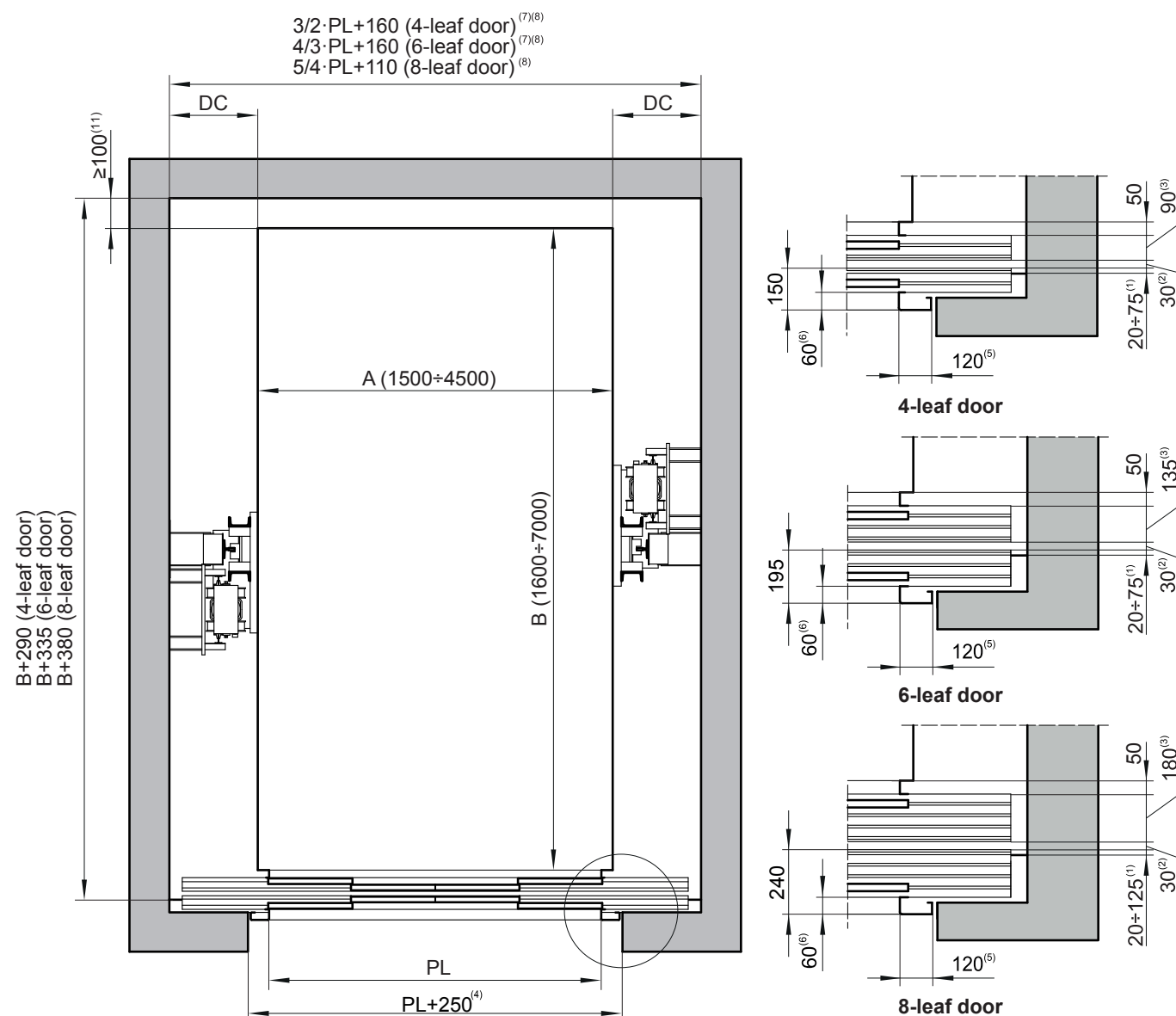
⁽⁴⁾ 4- and 6-leaf Wittur doors. 8-leaf Fermator doors

⁽⁵⁾ Can be greater for doors with small clear width

⁽⁶⁾ Distance from the edge of the sill to the shaft wall with standard brackets; possibility of greater distance with reinforced brackets

3.2. Minimum shaft dimensions, plan view

Single entrance



A Car width

B Car depth

PL Clearance

DC Distance for guide rail housing

(1) Distance from the edge of the sill to the shaft wall with standard brackets; possibility of greater distance with reinforced brackets

(2) Distance between landing door and car

(3) Sill width

(4) Gap in wall for door

(5) Width of door frame

(6) Depth of door frame

(7) Can be different, depending on the size and options of the door

(8) Can be greater to comply with the minimum DC distance

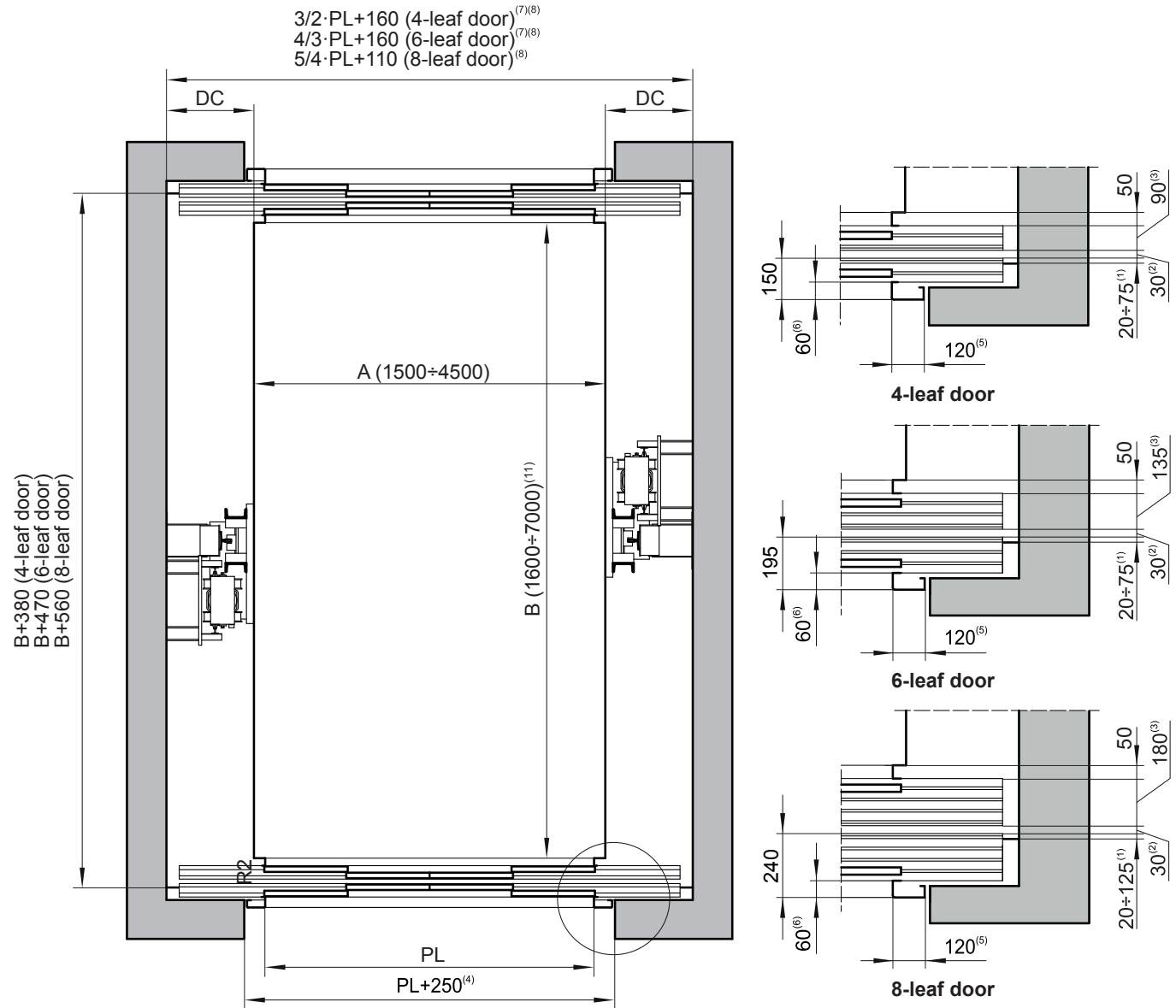
(9) Minimum 500 mm for 6,000-kg sling and 550 mm for Ø200 cylinder

(10) Maximum 710 for T140 guide rails

(11) Car-wall distance

Model	DC (mm)
MDH	350 ÷ 600 ⁽¹⁰⁾
MIH	400 ⁽⁹⁾ ÷ 680 ⁽¹⁰⁾

Double entrance



A Car width

B Car depth

PL Clearance

DC Distance for guide rail housing

(1) Distance from the edge of the sill to the shaft wall with standard brackets; possibility of greater distance with reinforced brackets

(2) Distance between landing door and car

(3) Sill width

(4) Gap in wall for door

(5) Width of door frame

(6) Depth of door frame

(7) Can be different, depending on the size and options of the door

(8) Can be greater to comply with the minimum DC distance

(9) Minimum 500 mm for Ø180 cylinder and 550 mm for Ø200 cylinder

(10) Maximum 710 with T140 guide rails

(11) Minimum 1,690 mm to comply with the minimum roof space according to EN 81-20

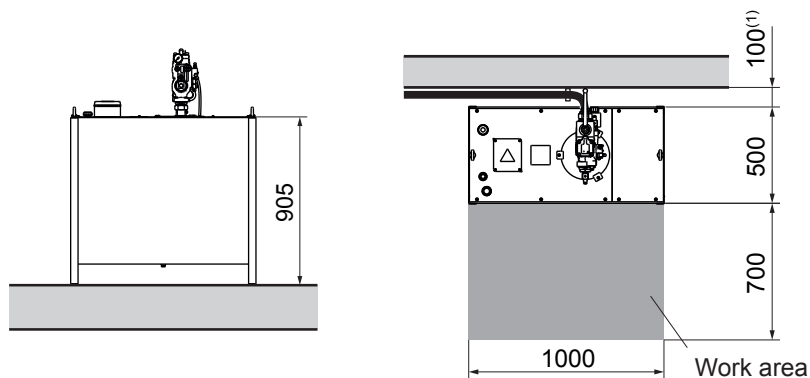
Model	DC (mm)
MDH	350 ÷ 600 ⁽¹⁰⁾
MIH	400 ⁽⁹⁾ ÷ 680 ⁽¹⁰⁾

3.3. Machinery location

Hydraulic power unit

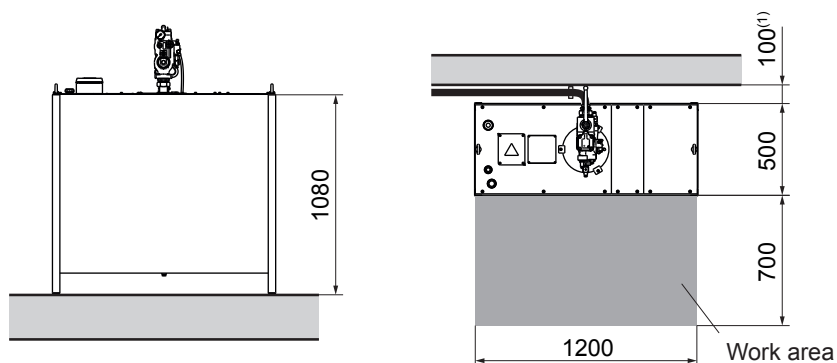
The hydraulic power unit tank can hold 250 l or 400 l, depending on the travel and the load. The 400-l tank is necessary for options in which an auxiliary hydraulic unit is used (independent re-levelling, anti-creep or emergency motor pump unit).

250-l tank



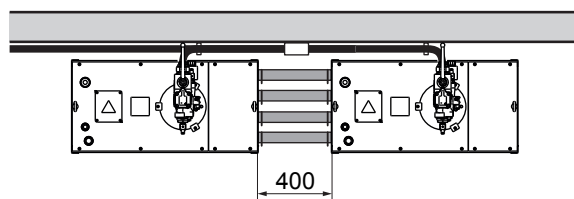
⁽¹⁾ Minimum distance between unit and wall. The piping may run to the left or to the right.

400-l tank

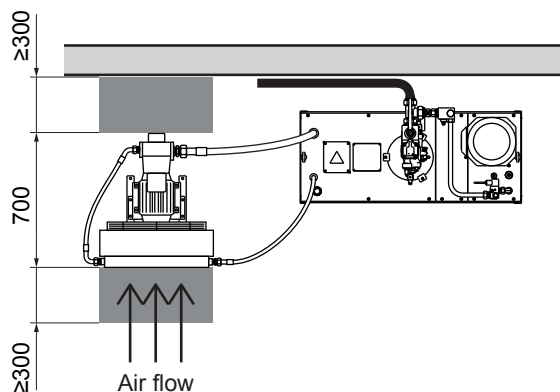


⁽¹⁾ Minimum distance between unit and wall. Minimum 200 mm for unit with auxiliary hydraulic unit. The piping may run to the left or to the right.

Double unit



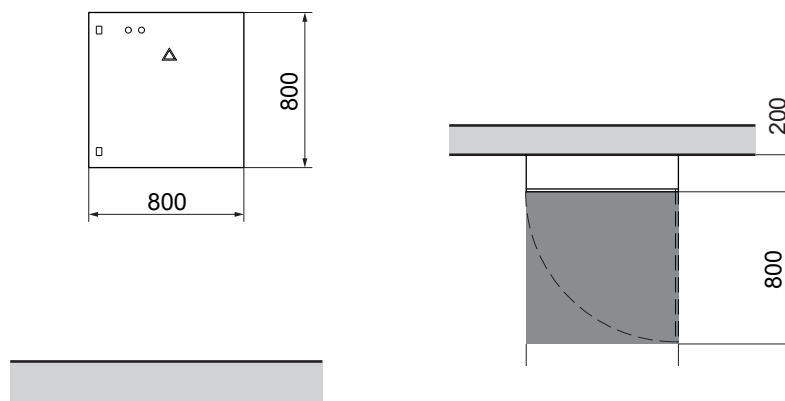
Oil cooler (optional)



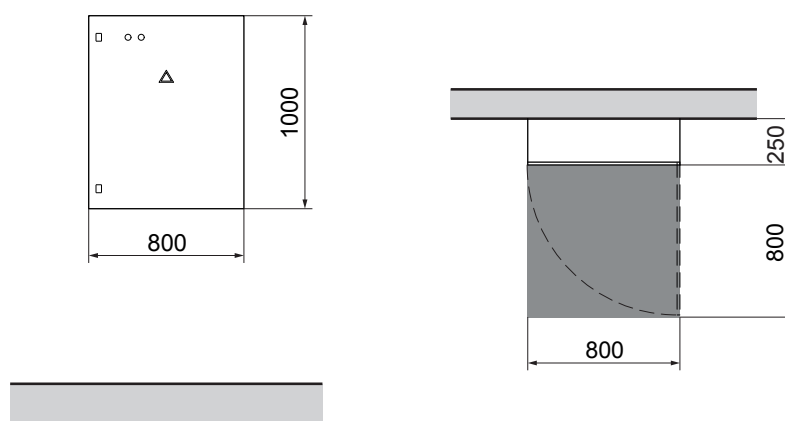
Electric board

Depending on the options, the size of the electric board cabinet will be 800x800x200 mm, 800x1,000x250 mm or 1,000x1,000x300 mm (width x height x depth).

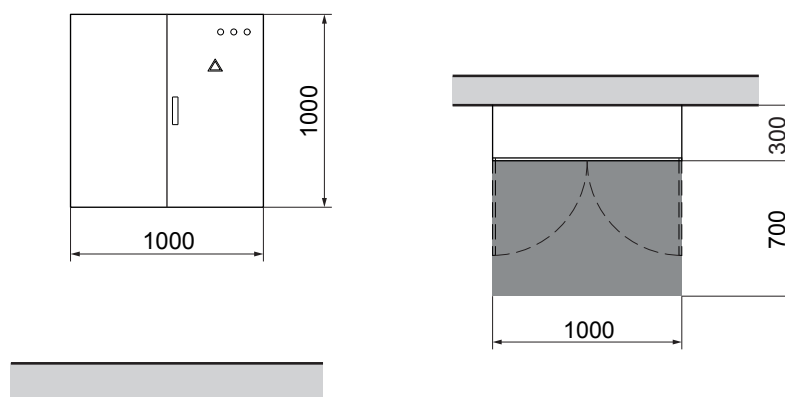
800x800x200 cabinet



800x1,000x250 cabinet



1,000x1,000x300 cabinet





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