car/goods lift

MCH model
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</tr>
</tbody>
</table>
1. Basic description

1.1. Usage

Vertical transport of goods with passengers, very useful as car lift and palletized goods lift within Industry and Service sectors. Some examples of the usages:

- Transport of palletized goods for industrial purposes.
- Trolley lift in Shopping centers.
- Stretcher-lift in hospitals.
- Car-lift in residential buildings or public car parks.

1.2. Regulations

Designed and manufactured in accordance with requirements of Lifts Directive 95/16/CE, throughout the accomplishment of Harmonized Norm EN 81-2 and the Directive of Electromagnetic Compatibility 89/336/CEE. It has the Test Certificate CE Type ATI/LD-VB/M012/99 (institution registered 0053), as MODEL LIFT.
1.3. Characteristics

<table>
<thead>
<tr>
<th>Load</th>
<th>5,000 kg maximum. The nominal load is determined by the cabin surface, following chart 1.1.A within norm EN 81-2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load nominal Q (Kg)</td>
<td>Upper maximum AxB (m²)</td>
</tr>
<tr>
<td>1,000</td>
<td>3.6</td>
</tr>
<tr>
<td>1,500</td>
<td>4.8</td>
</tr>
<tr>
<td>2,000</td>
<td>6.6</td>
</tr>
<tr>
<td>2,500</td>
<td>8.6</td>
</tr>
<tr>
<td>3,000</td>
<td>10.6</td>
</tr>
<tr>
<td>3,500</td>
<td>12.6</td>
</tr>
<tr>
<td>4,000</td>
<td>14.6</td>
</tr>
<tr>
<td>4,500</td>
<td>16.6</td>
</tr>
</tbody>
</table>

For 5,000 kg, the maximum surface specified in the chart can’t be reached. Consult us.

The maximum load admitted in the boarding, during the load and down operations, it won’t overcome 80% of the maximum specified load.

Speed

0.1 m/s, 0.2 m/s, 0.3 m/s, 0.4 m/s and 0.5 m/s (the possibility of two latest speeds depends on cabin dimensions and nominal load).

Stops

Up to 8 stops.

Travel distance

Up to 12 m (maximum). The maximum shaft travel distance, will depend on the dip measures and the headroom height (as it is a direct acting lift). Besides, maximum loads can not be reached for all travel distances. Maximum load levels up to 11 m.

Power supply

400 V ± 5% 3-phases, 50/60 Hz. Ask us for other voltage possibilities. Y-D starting always included within the basic standard equipment.

Fixations and anchorages

This lift is supplied with pre-mounted guides, that is to say, guides are supplied in two parts. The first part is supplied with the cylinder and the sling mounted. These guides are compounded by welding industrial laminated frames (IPE-160). Fixations between guide parts and shaft are made by means of welding fixations. Parts mounted directly on the wall can be fixed by means of industrial anchorages or weldings to the shaft metallic structure. Hidral supplies industrial anchorages for massive concrete walls (basic concrete type H-250). Its main advantage is the mounting speed, if appropriate machinery (with enough load capacity) is available for lifting the parts and introducing them into the shaft (guide parts and floor parts), for example jib trucks operating from the outer level.
2. Detailed description

2.1. Driving type

Description

Hydraulic, direct action, by means of two opposite cylinders in such a way that cabin is not hung by means of chains or cables. Depending on the travel distance, cylinders can be:

- Single (just one expansion).
- Telescopic with hydraulic synchronism.

Cylinders

- Single cylinders for travel distances up to 4.5 m (depending on available pit and headroom, for checking that cylinders fit into the designed slings).
- Telescopic cylinders of two expansions for travel distances up to 7 m;
- For longer travel distances need telescopic cylinders of three expansions.

Every cylinder type have lower hydraulic buffers, with interconnected stop valves for the simultaneous closing of both valves in case of performance.

Oil inlet located in the lower part of the cylinders.

They are supplied already mounted in to the guiding elements.

Hydraulic power unit

Hydraulic unit with motor soaked in oil, screw pump (low noise), valve block with all safety measures specified in EN 81-2, identification and instructions plates included in the unit.

Three available dimensions, depending on pump flow and oil capacity required by the cylinders:

- 500x800x950 (height)
- 500x1,000x1,200 (height)
- 500x1,200x1,400 (height)

Pipes

The standard supply includes 6 meters of main pipe, a diverting joint for the pit and 3 meters of cylinder connection pipes.

- **Rigid**: pipes according to DIN 2391 steel St-37.4 (NBK).
- **Flexible**: hydraulic hoses with double metallic mesh, with fitting nut and metric thread connection.

Fixations for the flexible pipes are included.

![Figure 3. Cylinders in interior shaft.](image-url)
Available options

- An **Oil Cooler** is necessary in case of more than 20 starts/hour of continuous operation. Its sizing depends on the kind of usage given to the unit (moderate or intensive) and the load to be lifted. In the case of an intensive use, the power unit can deal with a higher number of starts per hour. Electric control unit, interconnection hydraulic hoses and cooling unit are supplied.

- **Emergency Motor-Pump Group**: Supplementary hydraulic system, intended for lifts MCH used for car lifting. The objective of this supplementary system is to operate in case of breakdown of the main thrust unit. Unit speed when using this system is 0.1 m/s approx. This system is made of a motor-pump and a valve block of single speed. This is placed in the power unit itself. It does not work as an independent levelling system.

- **Double switched pump unit**: Supplementary hydraulic unit intended for MCH lifts used for car lifting. It is based on fitting two interconnected hydraulic units. They can operate either together (each one on middle power) or only one of them (full power) keeping one for reserve.

- **Oil tank heater**: Resistor with control thermostat, for heating the oil in the oil tank. It is an adequate option when the hydraulic unit suffers extreme low temperatures. Oil temperature should be higher than 15 °C.
2.2. Guide rails assembly

This lift is supplied with pre-mounted guides packed in two parts. The first part is supplied with the cylinder and the sling mounted. These guides are compounded by welding industrial laminated frames (IPE-160). Fixations between guide parts and shaft are made by means of welding fixations.

2.3. Sling

Formed by two frames hanging on one cylinder each. Car floor leans on four structural lower beams, (two central plus two below the boardings). Central beams are screwed directly to the sling frames and so are the braces supporting the boarding beams. The slings have rollers for displacement through the guide rails. They can be of two different types:

- metallic made
- vulkollan made (synthetic material taking polyurethane as a base), recomended from 0.2 m/s. They are used for lowering the guiding noise. **This is an option under request.** For speeds of 0.3 and 0.4 m/s, these rollers are included.

2.4. Shaft and walls characteristics

All necessary materials are supplied for installing the elevator (guide brackets) to massive concrete walls. The guide brackets can be fit to the wall in the following ways:

- Anchorages for structural concrete (reference H-250), type HILTI M16 (supplied).
- Also can be fitted to a shaft metallic structure, by welding the fittings.
- In the case of hollow brick walls, use either built-in metallic frames or consider the use of through-walls.

**Refer to page 18** to calculate reactions in shaft.

2.5. Cabin

Consists on easy-to-assemble modules, made of steel sheets.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Symbol</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width (mm)</td>
<td>A</td>
<td>Minimum: 1,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum: 2,850</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Q ≤ 5,000 Kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,850 ≤ A ≤ 2,900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Q ≤ 4,500 Kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,900 ≤ A ≤ 3,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Q ≤ 4,000 Kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,000 ≤ A ≤ 3,150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Q ≤ 3,500 Kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,150 ≤ A ≤ 3,250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Q ≤ 3,000 Kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,250 ≤ A ≤ 3,450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Q ≤ 2,500 Kg</td>
</tr>
<tr>
<td>Depth (mm)</td>
<td>B</td>
<td>Minimum: 1,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum: 6,000</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>H</td>
<td>Standard: 2,200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum: 2,850</td>
</tr>
</tbody>
</table>
**Entrances**

1 or 2 cabin entrances (refer to pages 16 to 18).

**Protections**

Car side bumpers. **Options:**
- Folded sheets, same finishing as the cabin.
- Wooden protections.
- Stainless steel, when cabin has this finishing.

**Floor**

Steel grooved sheets 4 mm thick, standard primer finish. **Two finishing options:**
- Stainless grooved steel sheets.
- Spotted black gum cover.

**Lighting**

Two roof light units with prismatic diffuser ready to get embedded.
Two fluorescent lines in each unit (2 x 18 W), installed power 72 W.
Optional automatic switch off, for energy saving.

**Other options**

- **Emergency trap door:** Rescue on ceiling on the cabin room intended for passengers rescuing. Its measures are: 350 x 500 mm and would have a mechanical locking activated by electric control. It can be opened from the inside by means of a triangle-shaped key. It accomplishes with EN 81-2 requirements.
- **Usable Door Measures = Cabin Measures (Height and/or Floor Opening Clearance).** This is a constructive solution for avoiding bumping the entrances when downloading the cabin. There are three different possibilities:
  - Door opening clearance equal to cabin width.
  - Door height equal to the cabin one.
  - Both previous possibilities together.
- **Off Centre Car doors:** Cabin prepared for shipments asymmetric with respect to the cabin central axle. There would be to indicate the diversion of the doors and in which direction they are to be corrected.
- **Car Doors with Different Clear Opening at Both Entrances:** Double entrance cabin (180° entrances) in which both doors have different clear opening.
- **Different Clearance between Cabin and Shaft Walls to both sides:** Guide brackets for cabin and cylinder guide brackets are supplied specially for different DH measurements at both sides. Clearance DH is the distance between the shaft wall and the outer wall of the cabin. Refer to attached drawings.
- **Pit Ladder:** Ladder with enough length in order to allow secure access to the pit.
2.6. Car operating panel

Description

- Made of stainless steel
- Anti-vandal push-buttons, with Braille embossing.
- Opening door, emergency and sound alarm push-buttons.
- Emergency light incorporated.
- Position indicator with 7 segment display.
- Sound and cabin light signal indicating overload and loudspeaker with microphone for the inter-communicator.
- Double button panel in the case of double cabin shipment or long cabin distance B.
- Key push buttons; (option under previous order).
- Plate for engraving logotypes, names, CE mark, etc... Stamping service is available, but it is necessary sending data to Hidral.

Two way intercom

There is option for supplying a two way intercom (accomplishing EN 81-2) placed at one of the cabin button panel. Ther is possibility of several emergency phone lines, and other operating options. A shared phone line can be used. Alarm push buttons are supplied, they are located on the roof and under de cabin frame, for rescues in case of someone getting trapped in the shaft.

There is chance for supplying a supplementary intercom for communications with the machine room. There is also chance for supplying a two-way intercom for accomplishing the harmonized regulation EN 81-28. In case of ordering this option, bear in mind that it is required that the emergency call switching board is equipped with the necessary features to get calls from this special intercom.

In addition to the previous, in the standard equipment is included a sound siren that gets activated when pressing the emergency button in the cabin button panel.
2.7. Car doors

We supply doors type Selcom of 4 and 6 panels. The car door of 8 panels, with central opening will be supplied made by Fermator. Cabin can be adapted to doors type Fermator of 4 and 6 panels.

<table>
<thead>
<tr>
<th>Types</th>
<th>Automatic telescopic, 4, 6 and 8 (8 panel type only by Fermator). Central opening with no spy hole. Doors with electronic control and with regulation of opening and closing speed and regulation of acceleration ramps.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finishing</td>
<td>• Epoxy paint (in baked-enamel). • Stainless steel.</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Standard clearance height: 2,000 mm Maximum height: 2,800 mm Standard dimension: Through-wall (maximum 3,200 mm) = Cabin width (A) – 100 mm. Check previous available options referred to “Usable Door Measure = Cabin Measure (Clear opening and/or Height)”</td>
</tr>
<tr>
<td>Sills</td>
<td>A standard door tracking sill made of a hollow aluminum frame, suitable for car wheels or light load shipment, is supplied. Options: • A strengthened aluminium sill can be supplied optionally, suitable for rubber tyres with Ø&gt;300 mm, appropriate for a maximum load of 800 kg per wheel. • A strengthened steel tracking sill can be supplied optionally (even stainless steel tracking sill). This option is recommended for load shipment by means of forklift trucks (wheels Ø&lt;300) and loads between 800 and 2,000 kg per wheel (depending on the kind of step supporting).</td>
</tr>
</tbody>
</table>

2.8. Landing doors

Same description as for the Cabin Doors. We supply doors type Selcom with 4 and 6 panels. There is a central opening door with 8 panels type Fermator.

2.9. Landing operating panels

Detailed description

- Stainless steel.
- Anti-vandal pushing button.
- Presence light (green) and engaged light (red)
- It is a wall mounted push button panel.
- Key push button (option under ordering).
- Check for optional engraving (logotype, name, etc…).

Optional remote controls

They perform a landing call. There are two options for remote controls:

- The one that allows calling the cabin to just one floor (grand floor normal).
- The one that allows calling the cabin to every available floor. Every user would have access to just two of them.
2.10. Control

Description

- Simple universal hydraulic control by means of push-buttons.
- Maneuver controls into metallic closet controlled by means of a PLC (programmable Logic controller).
- Magnetic switches, used for detecting stops and speed changes.
- Re-levelling with doors opened is available
- Stops with doors closed.
- Automatic travel to ground floor after 10 minutes.
- Prepared for coupling to pre-fitted pluggable electric installation.
- Detection of stop level and malfunctions by means f light indication codes.
- Easy maintenance and repair.

Electric installation

Installation can be supplied under two options:

- To be wired up wire by wire, supplying enough length of cable.
- Pre-fitted pluggable installation.

Power

The following chart shows the maximum needed power supplied with the lift, depending on load and speed criteria. It shows the maximum possible value, as they can vary depending on cabin dimensions and the travel length. These are values to 400 V, 50 Hz and 3-phases.

<table>
<thead>
<tr>
<th>Speed (m/s)</th>
<th>1,500 kg</th>
<th>2,000 kg</th>
<th>2,500 kg</th>
<th>3,000 kg</th>
<th>3,500 kg</th>
<th>4,000 kg</th>
<th>4,500 kg</th>
<th>5,000 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 m/s</td>
<td>12 kW/27A</td>
<td>16 kW/35A</td>
<td>16 kW/35A</td>
<td>16 kW/35A</td>
<td>20 kW/42A</td>
<td>24 kW/42A</td>
<td>24 kW/50A</td>
<td>24 kW/50A</td>
</tr>
<tr>
<td>0.3 m/s</td>
<td>16 kW/35A</td>
<td>20 kW/42A</td>
<td>20 kW/42A</td>
<td>24 kW/50A</td>
<td>29 kW/60A</td>
<td>29 kW/50A</td>
<td>33 kW/70A</td>
<td>40 kW/81A</td>
</tr>
<tr>
<td>0.4 m/s</td>
<td>20 kW/42A</td>
<td>20 kW/42A</td>
<td>24 kW/50A</td>
<td>29 kW/60A</td>
<td>40 kW/81A</td>
<td>40 kW/81A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.5 m/s</td>
<td>24 kW/50A</td>
<td>29 kW/60A</td>
<td>33 kW/70A</td>
<td>40 kW/81A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The shown power is given by the motor within its axle (useful power). The motor consumption power is higher and is reflected through the indicated intensity of nominal consumption.

Additional protection

- Against inversion or lack of phases.
- Against motor overheating by means of thermostors.
- Against oil overheating (70 ºC).
- Maximum running time between stops.
- Control blockages due to Contactor (power switch) failures or by the activating of the Top limit switch.
- Landing door unlocking zone indication for rescuing operations.
- Automatic recovery if power supply fails.
- To stop creep: electrical anti-creep system, according to EN 81-2.
- Temperature relay in machine room --option under request--.
3. Control system options

Standard fire alarm control option

The controller is prepared for exclusive use of firefighters in case of fire emergency. This maneuver is designed under the conceptions of normative EN 81-72. This option includes:

- One of the landing operating panel button panels will have a key for exclusive emergency use. This key can be substituted by an entry in the control panel suitable for a signal coming from a unit of automatic detection of fire. When any of these devices gets activated, the cabin will run to the floor designed for evacuation, remaining there with doors open.
- Priority key in the car operating panel. When activated, the movement of the unit is restricted, only the person who is dealing with the car operating panel would have control, even when the condition described in the previous paragraph is still in effect.

Duplex control

This option is available for coordinating two lifts working in parallel. This operation guarantees that the nearest lift attends the call.

Up and down collective control

Lifts are supplied with a selective maneuver for ascends and descends. Such option incorporates call register and memory for incoming calls from cabin and floor, in order to deal with them in a sequenced way. Not indicated for car-lifting use.

Priority key in Cop

Car operating pane is supplied with a priority key. When activated, the lift is exclusively controlled by the car operating panel. It would not attend floor calls.

Gong when arrives at floor level

This option includes acoustic signal at floor levels to warn the arrival of the cabin. It is an indicator of cabin presence.

Direction indicator arrows in car operating panel

Two indicator lights are supplied with every car operating panel. They show both senses of movement. One of both arrows will light on depending on the movement direction.

Selective boarding control

It is only available for cabins with two shipment entrances (180°). This option allows the user to decide which door would get opened when arriving to a floor with two available entrances, for private car parks, etc. In the car operating panel there will be doubled pushing button (key) for every floor with doubled door. Every pushing button would identify one of the floor entrances.

Traffic light system

This system indicates the state of the lift in order to know if you can get into the cabin as soon as it arrives to your floor by means of an external signal (traffic light). It is compounded by a traffic light device with a red and a green light, placed in the chosen floor, normally in the ground floor. Meaning of the lights:

Green light:
- When the cabin is at the service floor, unloaded and with the doors closed
- When cabin is moving towards the floor where the traffic lights are, with no load on it.
- When cabin is unloaded, placed in the floor where traffic lights are and with doors opened.

Red light: All the rest of situations.

Additional traffic lights can be ordered for every floor, not only for the ground floor.

Figure 15: Traffic light.
Car parking helping system

This system is used for vehicle alignment into the cabin in order to avoid hitting the cabin and door panels. For centering the vehicle, photocells at shipment entrances and two light indicators with direction arrows (←, →) in the car operating pane are used. Whilst one of the photocells is operative, with a car standing in the way, the arrow indicates the correct sense in which the car is to move in order to clear the photocell.

Extractor fan

Smoke extractor for the cabin. It starts when cabin is moving in between floors. By using the smoke extractor, a CO₂ detection device becomes unnecessary, as cabin keeps well ventilated.

Machine room temperature relay control

This is an electronic relay, installed into the maneuver control panel that controls temperature into the machine room. In the case of temperatures under -5 °C or above 40 °C, the relay blocks acceptance of lift calls. This accomplishes section 0.3.15 of EN 81-2.

Positional display in landing

This Positional device show the floor where the cabin is. It is supplied with the unit and shows the same value as the cabin positional device.

Light barrier

These optical barriers avoid door closing when an obstacle is detected. One barrier per cabin door is supplied.

Shaft lighting

Shaft system which gives sufficient level of lighting. A switch is included in the machine room and another one is supplied to be installed into the pit; in addition a double line of lights are to be installed at one side of the lift shaft.

Supply without electric material

There is given neither the electric control panel, neither the pre-mounted installation, neither the operating panels. The hole in the operating panels cloth will be the standard of our design (Consult us).
4. Drawings

4.1. Raised view of MCH model with central opening doors of 4 or 6 panels

Figure 18: Example of standard measure, Cabin Height = 2,200 mm. Supplied doors type SELCOM.
4.2. Arrangement with telescopic central opening doors of 4 panels

SINGLE SHIPMENT

DOUBLE SHIPMENT

Figure 19: Minimum dimensions of lift shaft (ground plan). Central automatic actuator of 4 panels in cabin. Automatic doors of 4 panels for central opening in landings.

Nominal load $Q$ (kg) | Maximum area (*) $A \times B$ (m$^2$)
---|---
3,000 | 10.60
3,500 | 12.60
4,000 | 14.60
4,500 | 16.64 (1)
5,000 | 12.00 (1)

(*) Following chart 1.1.A of Normative EN 81-2.

(1) Product design limitation for $R \leq 6,800$ mm. For more travel distance, it is necessary to reduce the area for lowering the unloaded cabin weight ($P$).

[Recommended cabin $H=2,200$ mm].
4.3. Arrangement with telescopic central opening doors of 6 panels

**SINGLE SHIPMENT**

- Minimum clearance: 100 mm
- DH minimum distance (max. recommended 600)
- 3,450 mm max. (Q depends on A, see section 2.5, page 8)

**DOUBLE SHIPMENT**

- DH minimum distance (vertically leveled wall) (max. recommended 600)
- 3,450 mm max. (Q depends on A, see section 2.5, page 8)

---

**Figure 20:** Minimum dimensions of shaft (floor plan). Central automatic actuator of 6 panels in cabin. Automatic doors of 6 panels for central opening in landings.
4.4. Lift reactions in the shaft

\[
\begin{align*}
R_y (N) &= 10 \times \frac{0.6 \times Q \times B / 2}{2 \times L} \\
R_y (N) &= 10 \times \frac{Q \times A / 8}{2 \times L} \\
R_y (N) &= 10 \times \left[ \frac{P + Q_m}{2} \right] \times 2 \times (R + 5) / W_g
\end{align*}
\]

A and B (mm): Cabin dimensions.
Q (kg): Nominal load.
S (m²): Cabin surface.
P (kg): Unloaded cabin weight; see chart.
Q* (kg): Load according to EN 81-2 chart 1.1; see chart.
Qm (kg): Max. (Q, Q*).
L (mm): Distance between rollers (standard 3,500).
R (m): Travel distance.
Ry, Rx, Ra (N): Reactions at guide supports.
Rg (N): Reactions at guide base.
Ry (N): Reactions at damper base.
Wg: Guide linear weight = 40 kg/m.

<table>
<thead>
<tr>
<th>Nominal load Q (Kg)</th>
<th>S (m²)</th>
<th>Q* (Kg)</th>
<th>P (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000</td>
<td>3.6</td>
<td>1,625</td>
<td>1,650</td>
</tr>
<tr>
<td>1,500</td>
<td>4.8</td>
<td>2,375</td>
<td>1,850</td>
</tr>
<tr>
<td>2,000</td>
<td>6.6</td>
<td>3,500</td>
<td>2,200</td>
</tr>
<tr>
<td>2,500</td>
<td>8.6</td>
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Figure 21: Lift shaft reactions