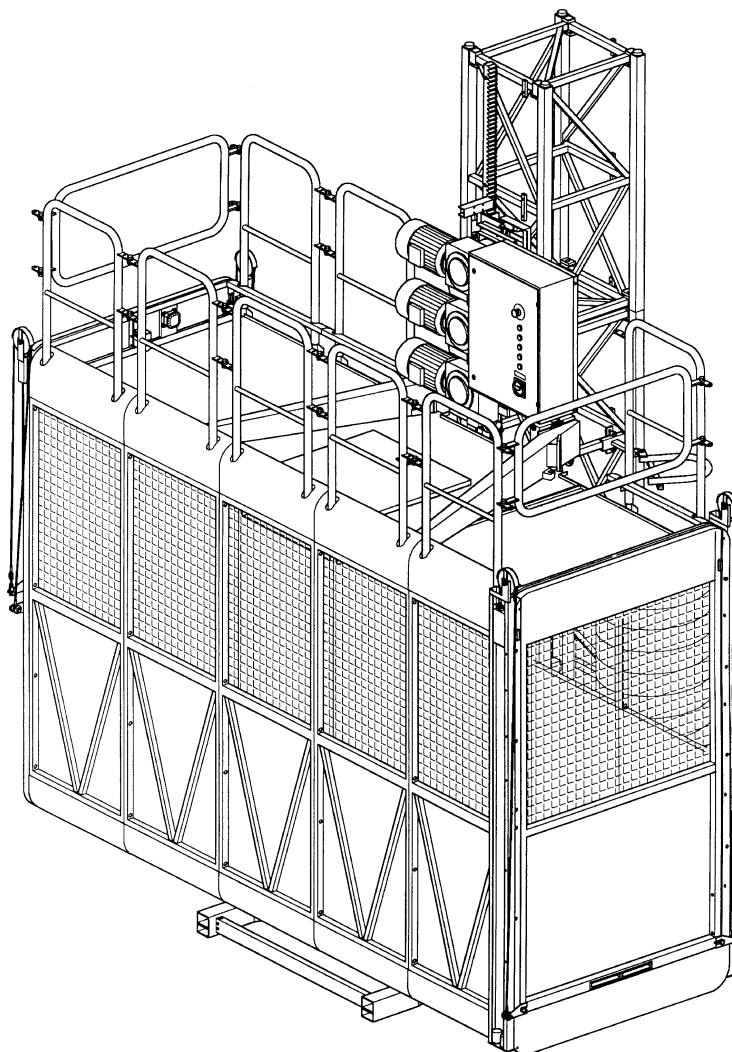


USER'S MANUAL

PASSENGER HOIST

PLM 2574 - 2578



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HEK PASSENGER HOIST

Type number :

Serial number :

Machine number :

Motorcar number :

Year of manufacture :

Owner :

**HEK Manufacturing B.V.**

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FOREWORD

The PLM passenger hoist is equipped with a rack-and-pinion drive. The motion of the car is obtained by a power driven rotating pinion mounted on the car and travelling on a stationary rack mounted on the mast.

The height of the mast, which consists of separate sections, can easily be adjusted to suit the working level.

The mast sections can be assembled and anchored easily and safely from the roof of the cabin.

The control system makes it possible to stop the hoist at any desired height.

Considerable attention has been given to safety aspects in the construction of this hoist.

The hoist can be moved quickly and is easy to transport.

Installation by trained personnel only.
Use by authorised personnel only.

This manual describes only the basic machine, incl. landing protection systems in the standard form in which it is supplied by HEK Manufacturing BV.

<p>Read this manual carefully before using the passenger hoist. Take all safety precautions into account!</p>
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SURVEY OF STANDARDS

The following standards and directions have been considered in the construction:

ANSI A10.4-1990	Safety requirements for personnel hoists and employee elevators for construction and demolition operations
NFPA 70 prEN 12159	National Electrical Code Passenger and material hoists
EN 60204-1	Electrical equipment of machines

MEANING OF THE SYMBOLS USED



WARNING

Failing to (exactly) comply with working or operating instructions may lead to serious injury, fatal accident, severe mechanical damage or operating losses.



During use, the space below the hoistway is a **forbidden** area.



Danger: high voltage.



Danger of falling objects.



Suggestion or advice to ease certain procedures.



Danger of getting jammed.

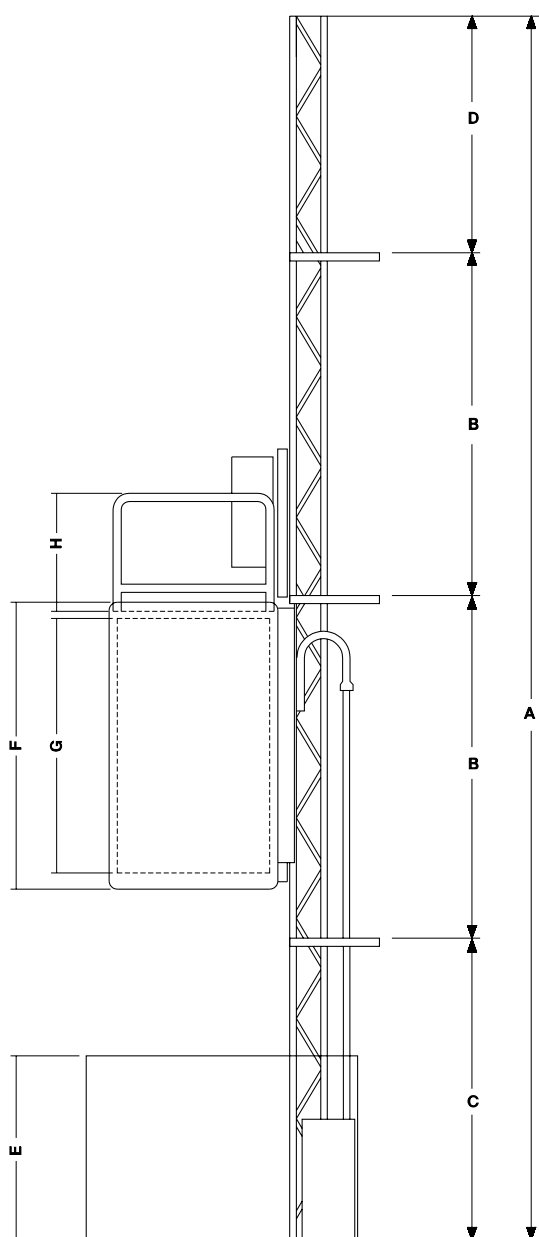


Fig.1-1 Main dimensions PLM 2574

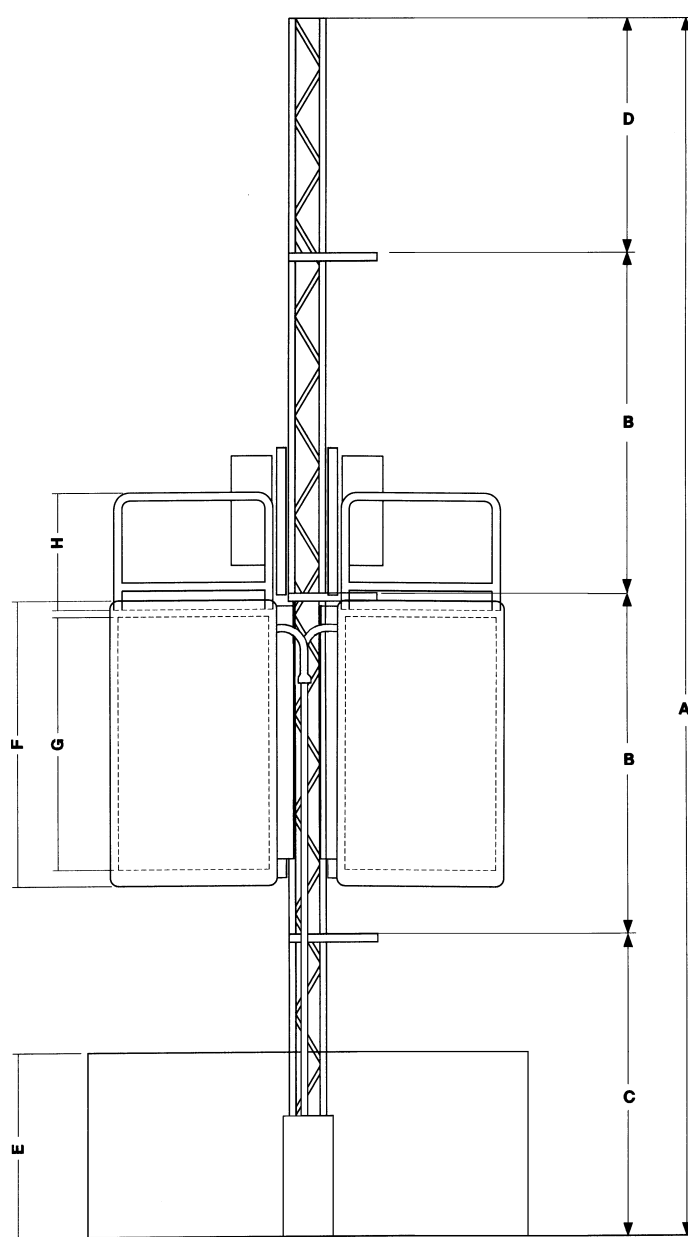


Fig.1-2 Main dimensions PLM 2578 (TWIN)

1. TECHNICAL DETAILS

Note:

The specifications and restrictions below are based on standard applications.

Under certain circumstances, the actual specifications may be amended.

In such cases, written permission of the manufacturer is obligatory.

1.1 General information

Hoist type	PLM 2574		PLM 2578 (TWIN)	
Rated load (incl. persons)	2275 kg	5000 lb	2 x 2275 kg	2 x 5000 lb
Number of persons	25		2 x 25	
Cabin length*	4.0 m	13.1 ft	4.0 m	13.1 ft
Rated speed	40 m/min	131ft/min	40 m/min	131 ft/min
Number of motors	3		2 x 3	
Max. wind force during assembly	28 mph (12.5 m/s, 6 Beaufort)			
Mast type	VRK 700, see section 1.3			
Max. wind force during use	45 mph (20 m/s, 8 Beaufort)			
Sound level	<70 dB			

* Eventually the cabin length can be shortened to 7.9 ft (2.4 m). Please contact your dealer.

1.2 Main dimensions

(See figure 1-1 and 1-2)

Hoist type	PLM 2574		PLM 2578	
Max. mast height A	200 m	656 ft	200 m	656 ft
Min-Max. anchor distance B	7.6-9.14 m	25-30 ft	7.6-9.14 m	25-30 ft
Height of first anchor C	4.5 m	15 ft	4.5 m	15 ft
Max. mast height above last anchor D	3 m	10 ft	3 m	10 ft
Height ground cage E	2.5 m	8.2 ft	2.5 m	8.2 ft
Height cabin F	2.75 m	9 ft	2.75 m	9 ft
Height cabin interior G	2.2 m	7.2 ft	2.2 m	7.2 ft
Height railings H	1.15 m	3.8 ft	1.15 m	3.8 ft
Height ground cage door	3.25 m	10.7 ft	3.25 m	10.7 ft
Height cabin floor to ground	1.42 m	4.67 ft	1.42 m	4.67 ft
Free standing height without anchoring	0 m	0 ft	0 m	0 ft

1.3 Mast sections

Type	VRK 700
Length mast section	59.37 ln (1508 mm)
Width and height mast section	27.56 ln x 27.56 ln (700 x 700 mm)
Weight mast section	240 lb (109 kg) TWIN 295 lb (134 kg)
Module rack drive	8
Lubricant rack and pinion	HEK rack and pinion grease/ Shell Rhodina 2
Mast bolts	M20 x 200 qual. 8.8
Mast bolts, standard	ANSI B18.2.3.1M (DIN 931)
Mast nuts (use only once)	Prevailing torque type hexagon nut with plastic insert.
Mast nuts, standard,	DIN 985
Tightening torque, mast bolts	205 ftlb (280Nm)
Distance between cable guides	19.7 ft (6 m)

1.4 Electrical installation

Hoist type	PLM 2574 PLM 2578*	
Number of motors	3	
Power supply voltage	460 V ± 5%	
Nominal power (25% duty cycle)	10.5 kW	
Nominal power (40% duty cycle)	9.2 kW	
Max. starting current	360 A	
Power consumption during start	200 kVA	
Power consumption	45 kVA	
Phases	3 + Pe	
Frequency of power supply voltage (depending on national conditions with regard to power supply voltage)	60 Hz	
Building site fuse (slow)	80 A	
Control voltage	42 Vac	
Frequency of control voltage	60 Hz	
Power supply cable (building site to machine)	< 50m / 165 ft	4 x 25 mm ² / 4 x 0.039 ln ²
	> 50m / 165 ft	4 x 35 mm ² / 4 x 0.054 ln ²
Machine cable	< 110m / 360 ft	4 x 16 mm ² / 4 x 0.025 ln ²
	> 110m / 360 ft	Use cable trolley
Accessories socket	120 VAC/ 16 A	

* The information is per cabin.

1.5 Dimensions and weights

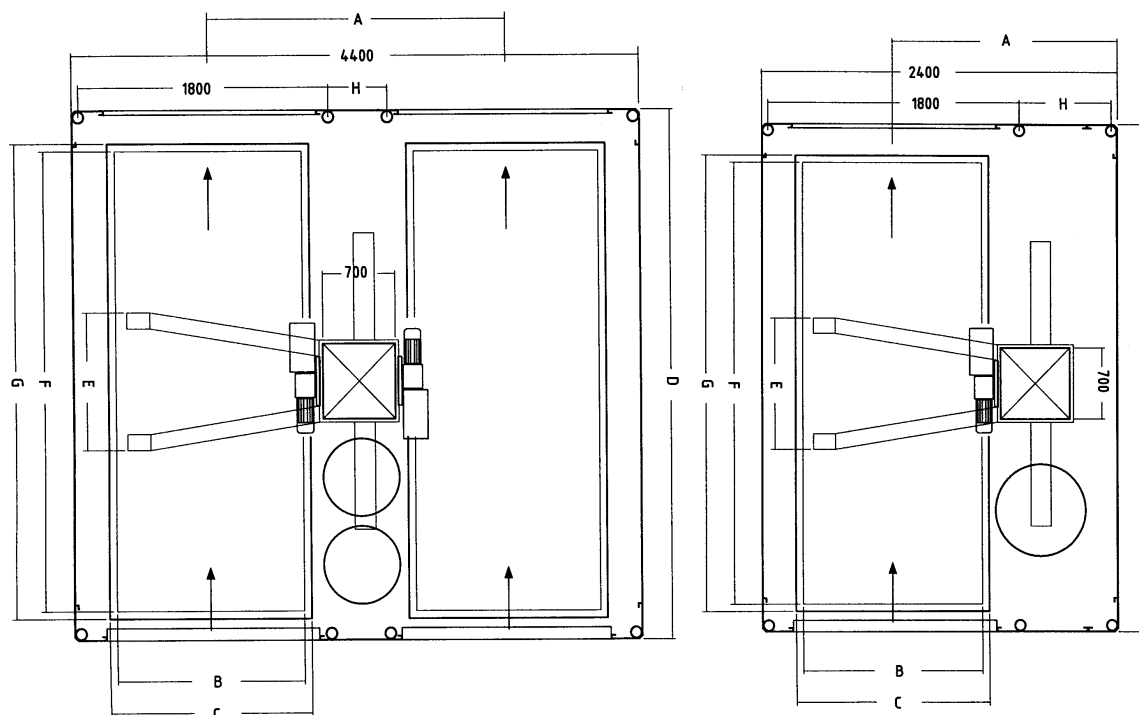


Fig.1-3 PLM view from above

Hoist type	PLM 2574	PLM 2578
Weight basic machine excl. motor carrier incl 2 masts and ground frame	3860 lb (1750 kg)	6900 lb (3130 kg)
Weight motor carrier incl 1 mast	1850 lb (840 kg)	3305 lb (1590 kg)
Dimensions basic machine, incl. ground cage (l x w x h)	14.76 x 8.53 x 10.66 ln (4500 x 2600 x 3250 mm)	14.76 x 14.44 x 10.66 ln (4500 x 2600 x 3250 mm)
Dimensions basic machine, excl. ground cage (l x w)	13.75 x 4.92 ln (4190 x 1500 mm)	13.75 x 4.92 ln (4190 x 1500 mm)
Dimensions motor carriage, incl 1 mast (l x w x h)	3.64 x 3.68 x 4.95 ln (1110 x 1120 x 1508 mm)	4.59 x 5.05 x 4.95 ln (1400 x 1540 x 1508 mm)
Dimension A	64.96 ln (1650 mm)	98.43 ln (2500 mm)
Dimension B, (with cabin floor contraction)	45 ln (1142mm)	45 ln (1142mm)
Dimension C	59.06 ln (1500 mm)	59.06 ln (1500 mm)
Dimension D	177.17 ln (4500 mm)	177.17 ln (4500 mm)
Dimension E	59.06 ln (1500 mm)	59.06 ln (1500 mm)
Dimension F	160.24 ln (4070 mm)	160.24 ln (4070 mm)
Dimension G	164.96 ln (4190 mm)	164.96 ln (4190 mm)
Dimension H	25.98 ln (660 mm)	25.98 ln (660 mm)
Min-max distance between mast centre and object	85.8 - 148 ln (2.18 - 3.76 m)	
Foundation: min. required bearing capacity	30 psi (2 kgf/cm ²)	
Ground supports: min. required bearing capacity	285 psi (20 kgf/cm ²)	

1.6 Anchoring system and anchor forces

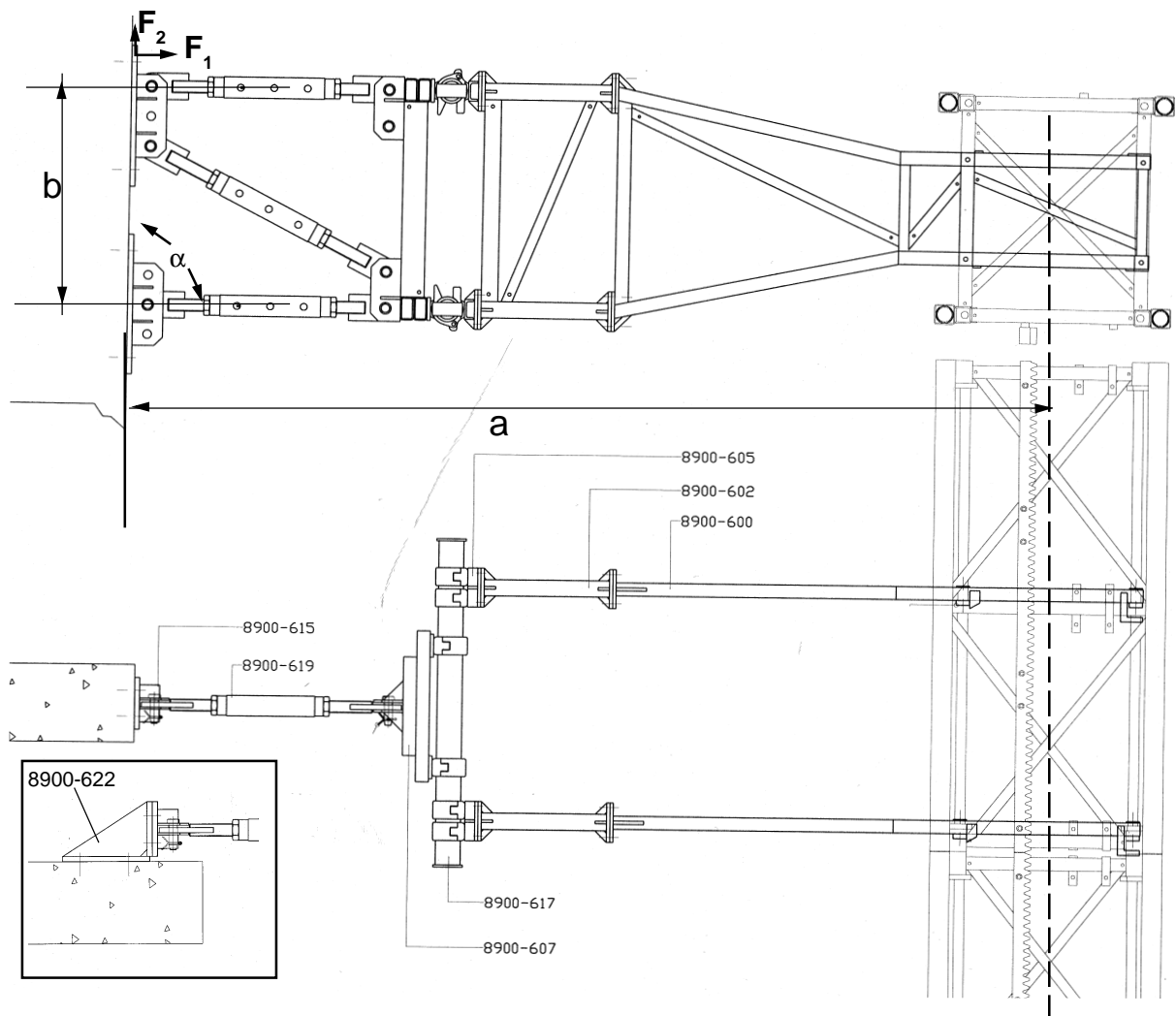


Fig.1-4 Anchoring system, type A

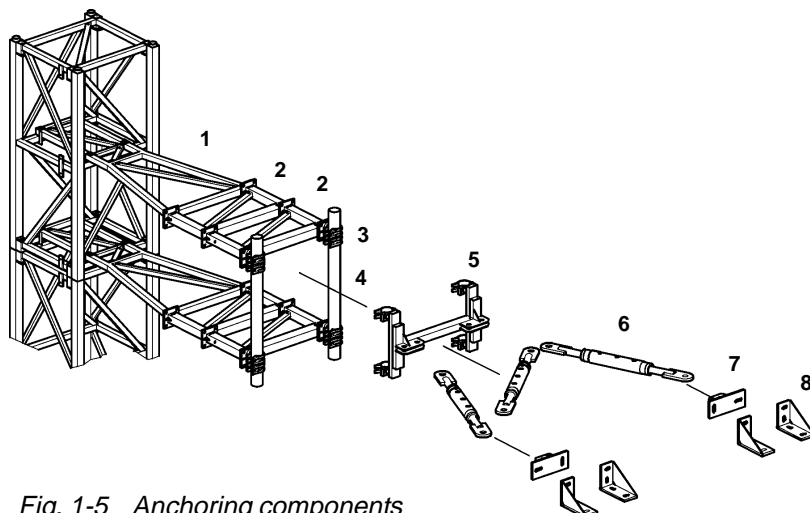


Fig. 1-5 Anchoring components

Parts		Anchoring system			Remarks
Description	P/N	type A P/N 8900-650	type B	type C	
1. Anchor frame	8900-600	2	2	2	Max. permitted vertical distance between both frames 30 In (750mm)
3. End piece	8900-605	4	4	4	
4. Tube	8900-617	2	2	2	L = 3.3 ft (1m) \varnothing = 3 In (76.1mm) t = 0.3 In (8mm)
5. Adapter	8900-607	1	1	1	
6. Adjusting tube	8900-619	3	2	n.a.	L = 23-32 In (600-820mm)
7. Wall plate	8900-615	2	2	2	
2. Extension frame	8900-602	max. 4 (2*2)	max. 4 (2*2)	max. 4 (2*2)	Optional, L= 15.9 In (403mm)
6. Adjusting tube	8900-610	n.a.	1	3	Optional, L = 34-54 In (860-1360mm)
8. Bracket	8900-622	4	4	4	Additional bracket for 8900-615

- Maximal two extension frames (fig. 1-5, 2) shall be mounted behind each other.
- Fasteners included in part numbers.
- Anchoring system type A only, can be ordered as a kit.
- Anchoring systems type B and type C are based on type A with different anchor tubes (fig. 1-5,1).
- When anchoring a PLM 2578 (TWIN) the spread (fig. 1-4, b) is restricted to 26 In (0.66 m), unless extension frames (fig. 1-5, 2) are applied.
- Use table 1-6 when determine which anchor type (A,B or C) shall be used.
- Based on the distance between mastcentre and object (fig. 1-4, a) the possible spread (b) of the wall plates can be determined.
- **Note: $a/b \leq 3.35$!**

Anchoring dimensions

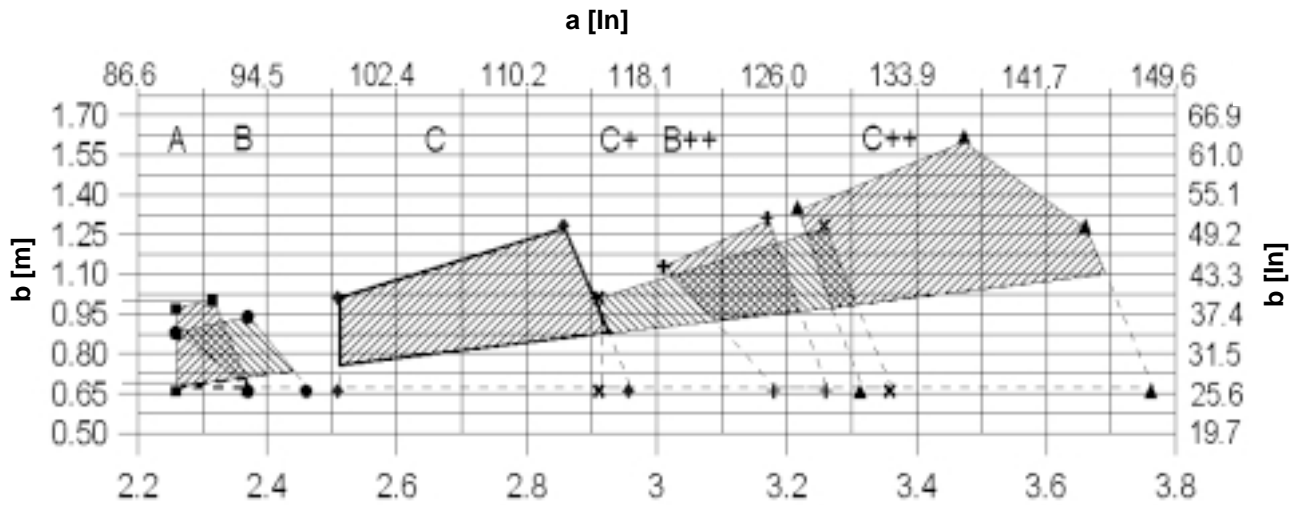


Fig. 1-6 Anchoring overview

- | | |
|-----------------------|-----------------------|
| ▪ type A | • type B |
| + type B + 2*8900-602 | • type C |
| * type C + 8900-602 | ▲ type C + 2*8900-602 |

Calculating anchor forces

Metric units must be used in the following calculations.

PLM 2574

$$F_1 = a/b * 11.5 + 4.1 + 5.1/b \quad [\text{kN}]$$

$$F_2 = \max (11.5; F_1 / \tan \alpha) \quad [\text{kN}]$$

PLM 2578

$$F_1 = a/b * 15.6 + 7.3 + 7.3/b \quad [\text{kN}]$$

$$F_2 = \max (15.6; F_1 / \tan \alpha) \quad [\text{kN}]$$

Example

PLM 2574

$a = 7.5 \text{ ft (2.3m)}$, $b = 2.2 \text{ ft (0.68m)}$, $\alpha = 90^\circ$

Result

$$F_1 = 50.5 \text{ kN}, \quad F_2 = 11.5 \text{ kN}$$

2 DESCRIPTION OF COMPONENTS

2.1 General description

The basic rack-and-pinion passenger hoist set consists of the following components (see fig. 2-1) :

- ground station
(cage, door and frame)
- mast
- cabin carrier
- cabin
- motor carrier
- control system

The cabin carrier

Is guided along the mast by Nylontron rollers.

The cabin is mounted in a C-frame construction.

Control system

During normal use, the hoist can only be controlled with a joystick on the cabin switch box, and during (dis)assembly or maintenance, also via the cabin roof switch box.

To obtain a correct level of the car at every landing place floor level striker plates can be mounted and adjusted.

Plugs are used for all electrical connections which can be disconnected for transport purpose.

The electrical control installation is divided among three boxes:

- the cabin roof switch box
- the cabin switch box
- the ground station switch box.

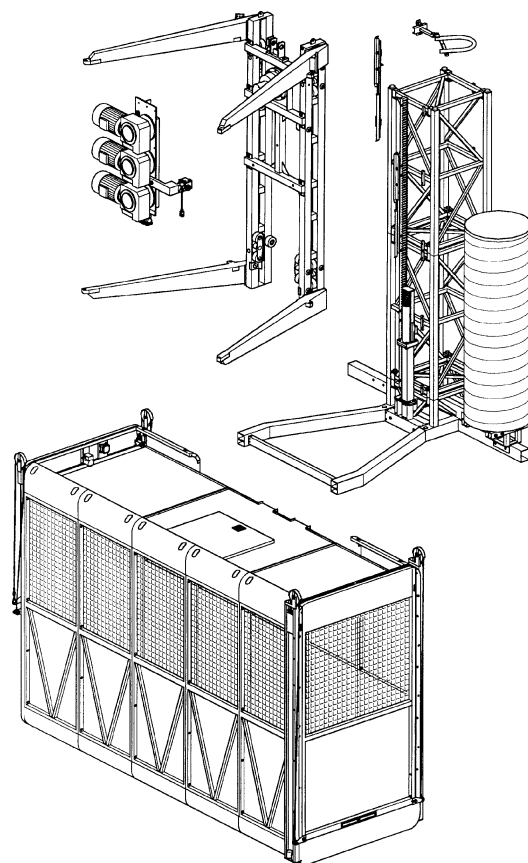


Fig.2-1 Components PLM

The motor carrier (see fig. 2-2)

Is equipped with three electric motors each provided with a pinion which are travelling on a stationary rack mounted on the mast sections.

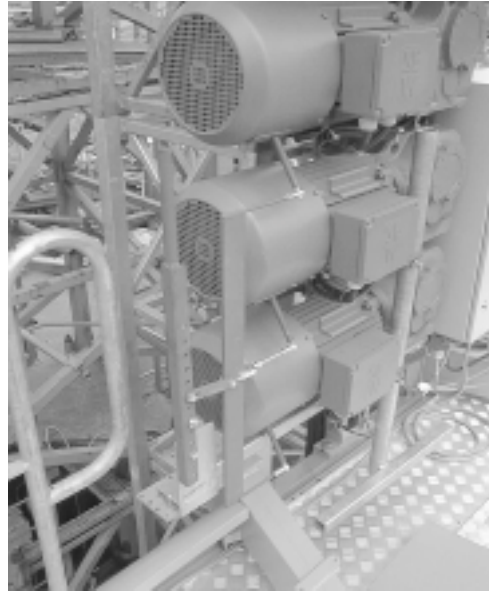


Fig.2-2 Motor carrier

Assembly and disassembly

Extensive consideration has been given to ensuring simple and safe assembly and disassembly.

Every mast section can be quickly and safely assembled to the previous section using an (optional) crane (see fig. 2-3) mounted on the cabin roof.

- See section 6.4 for erecting the mast.
- See section 8 for disassembling the mast.

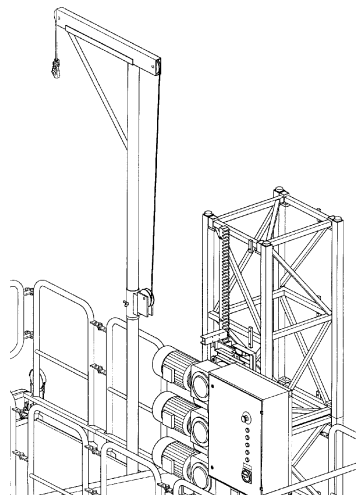


Fig.2-3 Crane on cabin roof

Maintenance

The simple design ensures that only minimum maintenance is required. Except the (weekly) greasing of the rack further greasing is restricted.

The mast sections, the ground support frame, the cabin, the cable guides and various other components are protected against corrosion by an appropriate surface treatment.

- See section 9.1 for the maintenance programme.

2.2 Landing protection

Landing doors can be used for landing protection.

Consult your dealer for detailed information about landing protection.

- See section 6.7 regarding landing protection.

2.3 Failsafe brake

If the predetermined descending speed of the cabin is exceeded, the failsafe brake brings the cabin to a stop, prevents it from descending further and also cuts the power to the drive system.

The failsafe brake is mounted on the cabin carrier (see fig. 2-4).

The failsafe brake is easily accessible in the cabin.

- See section 9.4 for resetting the failsafe brake.

2.4 Motor brakes

Every electric motor has an integrated electromagnetic operated brake.

When there is no power supply the brake is active.

The braking effect is achieved by friction between several discs and the brake must be used 'dry' (not greased).

- See section 9.2 for checking and maintaining the motor brakes.

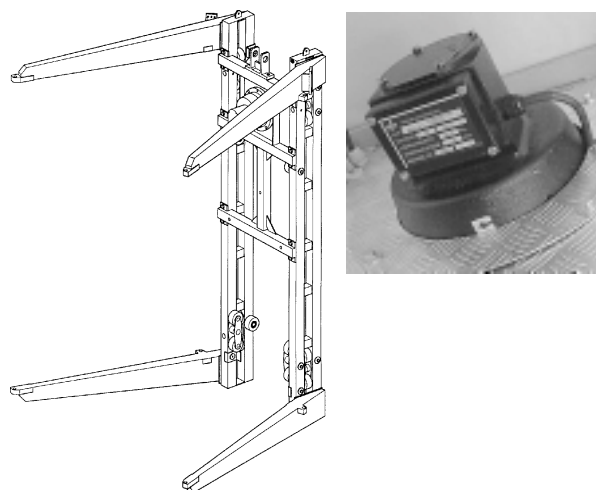


Fig.2-4 Cabin carrier with fail safe brake



3 SAFETY

3.1 General



No changes or modifications shall be made to the hoist, without prior consulting supplier.



The surface on which the machine stands shall be stable enough to support the weight of the machine, the mast and the lifting capacity.
Min. required bearing capacity
30 psi (2 kgf/cm²)



ALWAYS anchor the mast in accordance with the instructions.



In case the fencing provides insufficient protection:
Use a suitable safety harness during assembly and disassembly.



In case of an imminent thunderstorm, place the hoist at the lowest position and switch the power off due to the risk of a lightning strike.
Disconnect the power plug.



Pay attention to the risk of getting jammed when passing anchoring or other obstacles.

3.2 Safety when erecting the hoist

- Never use the hoist free standing, without anchoring.
Anchor the mast as specified.
- Support the ground mounting frame adequately.
- Check if the working area around the hoist is free of obstacles.
- Close the switchbox doors before use.
- Do not assemble or disassemble the machine during winds of 28 m.p.h., (12.5 m/s) or more (6 on the Beaufort scale).
- Always install the red mast section at the top.
- Always adhere to the locally applicable working and safety regulations.
- Install the ground cage around the machine, to prevent persons from unintentionally walking under the machine and protect them against falling objects.

3.3 Safety during use



Wind speeds above 45 m.p.h. (20 m/s, 8 Beaufort): Place the hoist at the lowest position and don't use it any more.



Check if there are no objects in the hoistway.



During use, the space below the hoistway is a **forbidden** area.



Use the emergency push button during assembly of the mast or during maintenance.



Never climb the mast.



Material and / or tools shall never extend beyond the outer limits of the cabin.
Material which can roll shall be properly secured.
Never stack material against the fencing.



The distance between the machine and high-voltage cables shall be at least 33 ft (10 m).

- Use the hoist for the purpose it is designed for:
The vertical transportation of personnel and material not exceeding the maximum permitted weight.
- Never transport persons or materials on the roof of the cabin, during normal use. This is only allowed during the assembly, disassembly and maintenance phase for authorized personnel.
- Illuminate the appropriate area (machine and landings) adequately, if the hoist is used during darkness. This to provide the operator a good view under all conditions.
- Be aware that wind speeds can be reinforced locally by ambient conditions (e.g. high buildings). Operators shall be aware of these factors during use.
- Inspection and maintenance shall be carried out as described in the maintenance programme. See section 9.1.
- During assembly and maintenance the hoist shall not be used for any other purpose.
- Never remove the fences during normal use.
- Take care that the hoist and landings are free of obstacles (building waste, dirt, snow, etc.).

3.4 Safety after use

- Place the hoist at the lowest level.
Secure the main switch with a padlock,
to avoid unauthorised use of the hoist.

3.5 Safety during transport

- Use a transport vehicle, intended for this purpose, to transport the hoist over public roads.
- When transporting the hoist, no load shall be present within the cabin or on the roof.
- When transporting the hoist, the national traffic regulations regarding dimensions, etc., shall be observed.

3.6 Built-in and attached protective devices

This machine is constructed to offer the highest possible safety level, both during assembly and use.

Therefore, it is fitted with the following built-in and attached protective devices:

- Phase sequence relay in the cabin roof switch box which checks the phase sequence of the power supply.
- 'Emergency stop'-buttons on all switch boxes. If one of these buttons is pressed, the hoist will stop.
- In the event of a power failure, the motor brakes will be automatically activated to prevent the hoist descending by itself.
- In case of a power failure, it is possible to lower the cabin by releasing the motor brakes manually.
- If the limit switch 'UP' does not function and the hoist keeps on ascending, the emergency limit switch 'UP' will stop the hoist.
- If the limit switch 'DOWN' does not function and the hoist keeps on descending, the emergency limit switch 'DOWN' will stop the hoist.
- The motor carrier is equipped with a mast detector, to provide a higher level of safety.



During assembly, the upper striker plate is not mounted. When ascending, pay attention that the machine does not run out of the mast.

Never rely on the mast detection switch as end stop!

- The red top mast offers an extra protection to avoid the hoist running out of the mast because, a striker is integrated to operate the limit 'UP' switch, and this mast is not equipped with a rack.

- In case the red top mast is not mounted so far, and a malfunction of the mast detector, the hoist will remain attached by hooks to the uppermost mast section.
- Failsafe brake: if the determined speed of descent is exceeded, the failsafe brake will interfere and stop the cabin. The failsafe brake also cuts the power to the drive system.
- Overload protection: if the hoist is overloaded, further operation is impossible until the overloading is removed.
- Motor protection: if the motor temperature exceeds a determined value, the motors will be switched off.
- Roof hatch: the roof hatch is checked by a limit switch. If the hatch is not closed the hoist cannot be operated.
- Cabin door protection: the cabin doors have both electrical and mechanical protective devices. The cabin doors can only be opened when the hoist is stationary at the ground station or at one of the landings.
- Ground cage door protection: the ground cage door(s) are fitted with electromechanical protection device(s). They can only be opened when the hoist is present at ground level. If the doors are not closed, the hoist cannot be operated.
- Buffer switch. When the cabin has run on the hydraulic buffer, the hoist cannot be operated.

Additional Protective devices

- Inspection buffer: prior to maintenance work to be carried out under the cabin, the inspection buffer shall be mounted.
- Landing protection
- Landing doors (optional, pursuant to national regulations) are electromechanically protected. They shall be installed at every landing.
- Stable and correctly fitted cabin ramp.

3.7 Personnel

Assembly, disassembly and operation of the hoist shall only be carried out by persons who:

- have reached the age of 18 years.
 - have been instructed on the assembly, disassembly and operation of the machine
 - have been appointed by the employer exclusively for assembly, disassembly, operation and/or maintenance of the machine. The authority to operate the machine should be confirmed in writing.
 - are aware of the applicable safety regulations and who are fully conversant with the contents of this instruction manual.
-
- Technical personnel should be able to solve problems occurring during assembly and disassembly of the machine.
 - Operating personnel should be fully conversant with the situations occurring during operation.
 - If operating or technical personnel observes defects or danger or does not agree with the applicable safety regulations, the owner and/or person in charge shall be notified immediately.
 - Repairs on the electrical systems shall be carried out by qualified electricians only.
 - All personnel shall wear protective clothing, like a safety helmet, safety shoes and suitable coverall.
 - If the machine is handed over to a third party, the full name of the person(s) obtaining the machine shall be recorded.



4 TRANSPORT



The national traffic regulations regarding dimensions, etc., shall be observed.



When transporting the hoist, no load shall be present within the cabin or on the roof.

The limited dimensions of the hoist make it possible to transport it with a low boy. During transport, ensure that all the security devices are in position and that the cabin is lowered into the hydraulic buffer.

Transportation weights and dimensions

- See section 1.

Disassembling the hoist

- See section 8.

4.1 Transportation

Prior to transportation, every additional mast section or connecting cable mounted to the machine shall be removed.

A truck-mounted crane or forklift can be used to load or unload the hoist.

Figures 4-1 / 4-2 show the lifting points:

Fig. 4-1: - At the front of the cabin carrier.

- At the top of the second mast section.

- The rear of the ground frame has an admission point for a forklift.

Fig. 4-2: - At the top of the motor carrier mast section.

Always position the machine carefully to prevent damage.

Prior to transporting, thoroughly lash the machine to the loading platform of the truck by means of the supplied brackets.

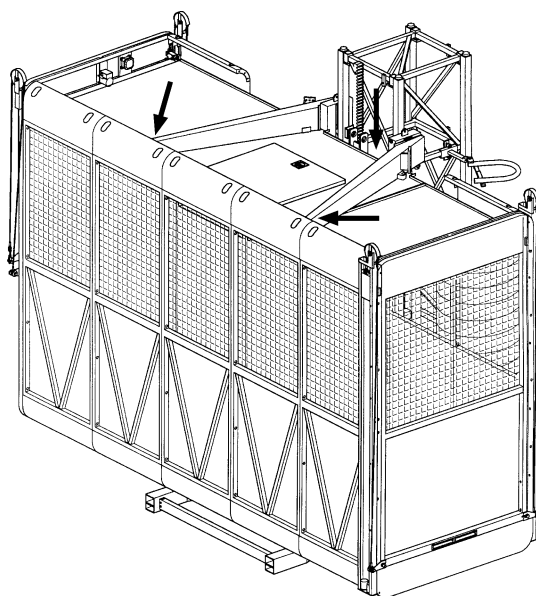


Fig.4-1 Lifting points basic unit

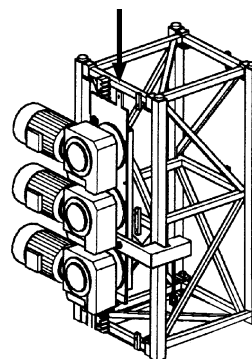


Fig.4-2 Lifting point motor carrier



5 CONTROL UNITS

General

During normal use, the hoist can only be controlled with a joystick on the cabin switch box, and during (dis)assembly or maintenance, also via the cabin roof switch box.

5.1 Power supply to ground station

- For the requirements regarding the power supply, see section 1.

5.2 Ground station switch box

This switch box (Fig.5-1) is equipped with the following features:

1. **EMERGENCY STOP** push button, to stop the hoist in emergency cases. Turn clockwise to release the button.
2. **MAIN SWITCH**, power supply
Never use the main switch to stop the hoist.

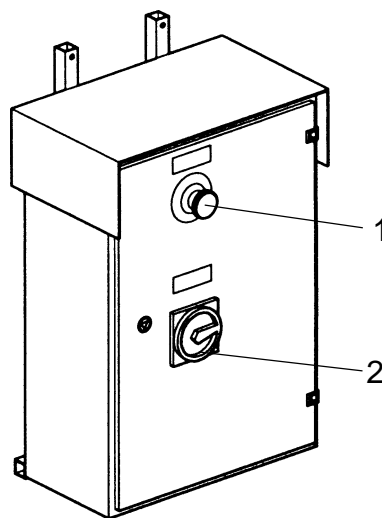


Fig.5-1 Switch box ground station



Secure the main switch with a padlock, to avoid unauthorised use of the hoist.

The following main components are mounted in this switch box:

- safety relay
- control relay
- transformer
- automatic fuses
- cabinet heating (set on 95°F / 35°C, to prevent condensing)

5.3 Cabin switch box

The switch box (Fig.5-2) is equipped with the following features:

1. **OVERLOAD** warning light
2. **POWER** check light
3. **SAFETY CIRCUIT** check light
4. **ALARM** horn push button
5. **CAR CONTROL** joy stick,
- See section 7 for operating.
6. **DOOR OPEN** push button
7. **CAR LIGHTING** switch
8. **EMERGENCY STOP** push button, to
stop the hoist in emergency cases.
Turn clockwise to release the button.
9. **Socket** (110V/AC) for light
electrical appliances.
10. **LOW BATTERY** warning light.

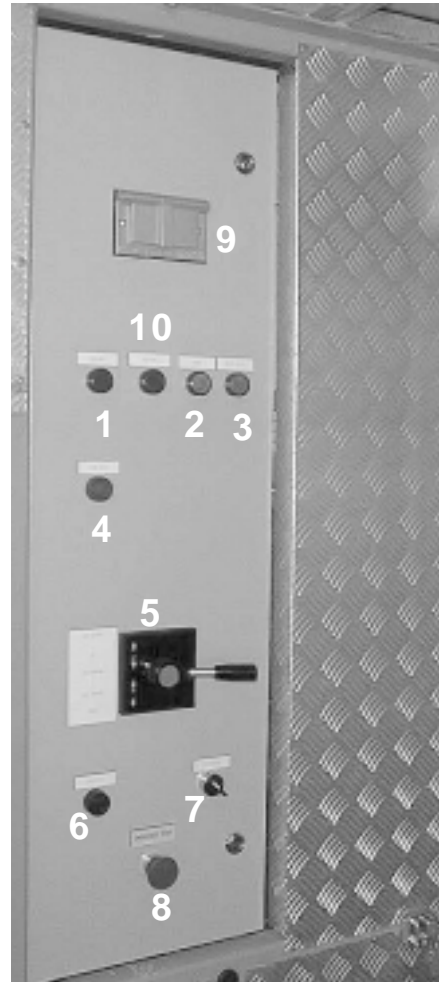


Fig.5-2 Cabin switch box

The door of the switch box is locked with quick fasteners.

5.4 Cabin roof switch box

This switch box (Fig.5-3) is equipped with the following features:

1. Key switch with positions:
 1. **NORMAL** hoist operating
 2. **INSPECTION**, enables operating of the hoist from the roof via the UP (2) and DOWN (3) push buttons during assembly and inspection.
2. **UP** push button, to raise the hoist. ('hold to run' control).
3. **DOWN** push button, to lower the hoist ('hold to run' control).
4. **EMERGENCY STOP** push button, to stop the hoist in emergency cases. Turn clockwise to release the button.
5. **MAIN SWITCH**, power supply
6. **Socket** (110V/AC) for light electrical appliances.

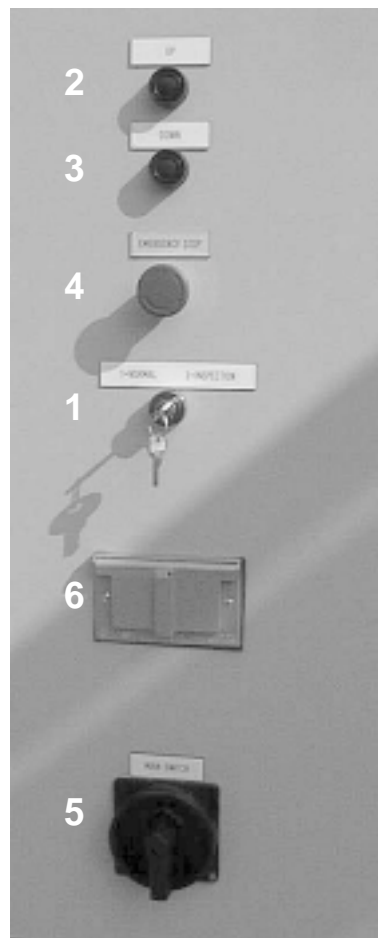


Fig.5-3 Cabin roof switch box

The door of the switch box is locked with quick fasteners.



Secure the main switch with a padlock, to avoid unauthorised use of the hoist.

The following main components are included in this switch box:

- safety relay
- control relay
- transformer
- automatic fuses
- cabinet heating (set on 95°F / 35°C, to prevent condensing)
- Back up battery to bridge power supply when power circuit is interrupted.

5.5 Drop test control box (optional)

A drop test control box (see fig. 5-4) for testing the failsafe brake can be connected to the cabin roof switch box (see fig. 5-4,A).

- See section 7.4 regarding drop test

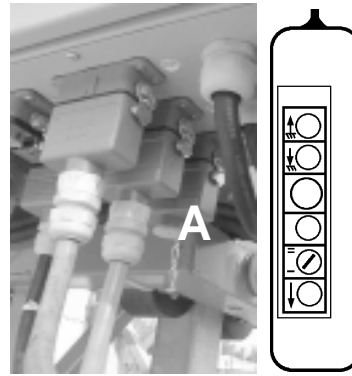


Fig.5-4 Drop test connection and control box.

6. ASSEMBLY AND ANCHORING



Pay attention to the risk of getting jammed when passing anchoring or other obstacles.



FINISH WHAT YOU STARTED!

When the assembly process is interrupted: Be sure that all bolts are tightened. This to avoid overlooking un-tightened bolts when the assembly process is resumed.

Always finish the installation of an anchor position / mast section completely.



Secure the main switch with a padlock, to avoid unauthorised use.



Plan the loading of the cabin (e.g. mast sections) in such a way that a minimum load at the height of the next anchoring is obtained.



During use, the space below the hoistway is a **forbidden** area.



When erecting the mast, no more than two persons shall be on the roof of the cabin, so that no more than 75% of the lifting power is used.

General

During (dis)assembly the hoist shall be operated from the roof only.

During assembly and use, all fences and doors of the hoist shall be installed and closed.

After assembly, always perform a test run.

- See sections 7.2 - 7.3.

Until this test has been performed, the hoist shall not be used for any other purpose than transporting mechanical parts used for the erection process and mechanics.

Seen from the entry side, the hoist can be supplied as a left hand (A) or a right hand (B) configuration. Eventually a left hand configuration (A) can be modified to a right hand one (B) and the other way round. See figure 6-1.

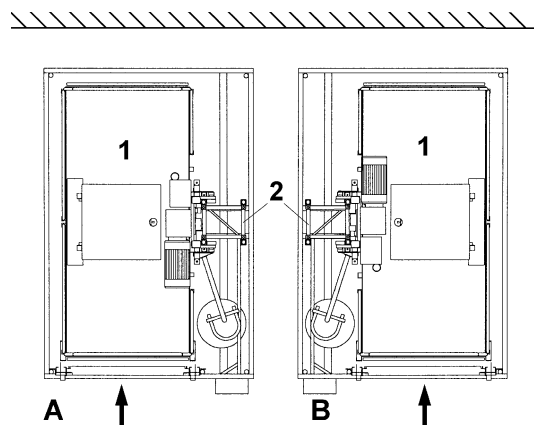


Fig.6-1 Machine positioning

6.1 Prerequisites



The surface on which the machine stands shall be stable enough to support the weight of the machine, the mast and the lifting capacity.



Ensure that the site, where the hoist will be assembled, meets the national requirements and that permission has been obtained from the authorities for the assembly.

Foundation

The foundation shall be level, have a sufficient drainage, and a load bearing capacity, of at least 30 psi (2 kgf/cm²). If this cannot be obtained, measures shall be taken to improve the foundation.

Power supply



Apply a step down transformer if the mains voltage exceeds 460V.

- Ensure that a suitable power supply, good lighting, lifting equipment and tools are available.
- The building site power supply connection shall be placed as close to the hoist as possible to reduce the voltage drop to a minimum. When the voltage drop is too high, the machine will not work.

Assembly

- Ensure that the building site is easily accessible for the trucks which will deliver the hoist.
- Prepare the site with suitable ground support and anchoring facilities.
- Plan the positioning of the hoist next to the building so that where the mast needs to be anchored, this can be done with the standard anchors.
- The components of the hoist should be placed as close as possible to the place where it will be assembled.
- Secure the cabin, using the inspection buffer (fig. 6-2, A), during activities beneath the cabin.

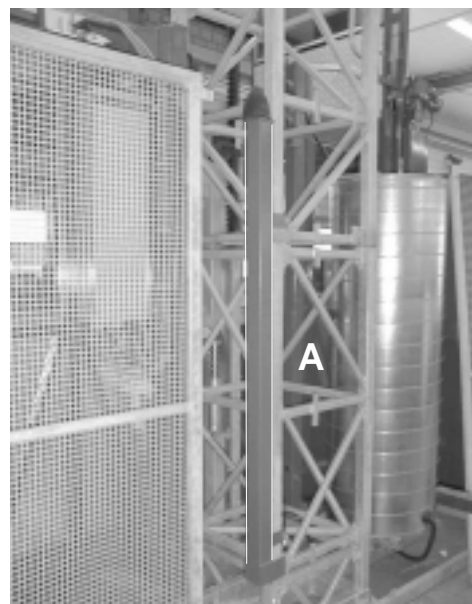


Fig.6-2 Inspection buffer

6.2 Ground supports



Always check if the machine has sufficient ground support.

Ground supports

- The ground supports shall be able to resist a surface pressure of at least 285 psi (20 kg/cm²).
The minimum ground support dimensions are (see fig. 6-3 & 6-4):
A: Min. 0.985 ft x 0.985 ft (0.25 m x 0.25 m)
B: Min. 3.3 ft x 3.3 ft (1.0 m x 1.0 m)
C: Min. total width x 0.985 ft (0.25 m)
The ground supports shall be level and loaded centrally.
- The ground supports shall be durable in order to be able to carry load without being plastically deformed.
- Use wood to prevent the machine from slipping away, when assembling on a concrete foundation or solidified road surface.
- The load shall be spread evenly over the largest possible base.
- The ground cage shall be supported near the ground cage door (C).
- When using anchoring with vertical tubes, the ground cage shall be supported near these tubes.

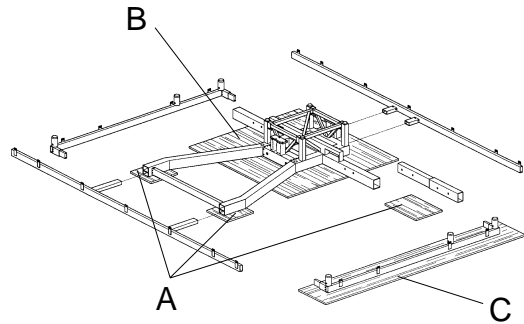


Fig.6-3 Ground support single

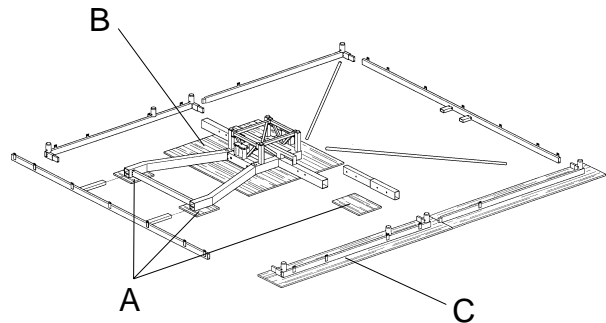


Fig.6-4 Ground support twin

6.3 Installing the basic unit

The basic unit can be placed :

- with ground cage
- without ground cage
- and/or as TWIN configuration

Positioning the basic unit

(see section 4 for lifting points):

1. Position the frame and place the ground supports in the required position (see section 6.1 & 6.2).
2. Adjust the mast upright by adjusting the ground supports.
Check the mast in both directions using a spirit level of at least 3 ft (1 m).
3. Mount the subframe on the ground frame of the basic unit using two M20 bolts (TWIN only).
4. Fill the machine with wedges for optimal carrying.
5. TWIN only:
Place the second cabin on the mast by using a crane.



Before the second cabin is attached to the mast, the first anchor should be placed in order to prevent the machine from falling over due to eccentric loads.

6. Place the fences (fig. 6-7) on top of the cabin, fix them, and mount the motor brake lever control.

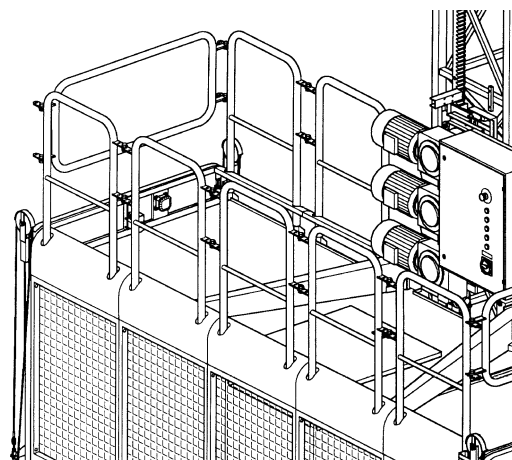


Fig.6-7 Roof fencing

7. Mount the mast section with the motor carrier on top of the basic unit.
Mount the motor bracket with two bolts (fig. 6-6, A) on the cabin.
Use new locking plates.
Specification bolts: M20x50
quality 8.8, standard
ANSI B18.2.3.1M / DIN931
Tightening torque 230 ftlb (315 Nm).
Secure both bolts with the locking plates.



If necessary: Lower the motor carrier by releasing the motor brakes and rotating the motor fans manually.
(The motor fan can be reached by disassembling the cover of the motor). Another possibility is to raise the cabin using a crane.
See section 4 for lifting points.

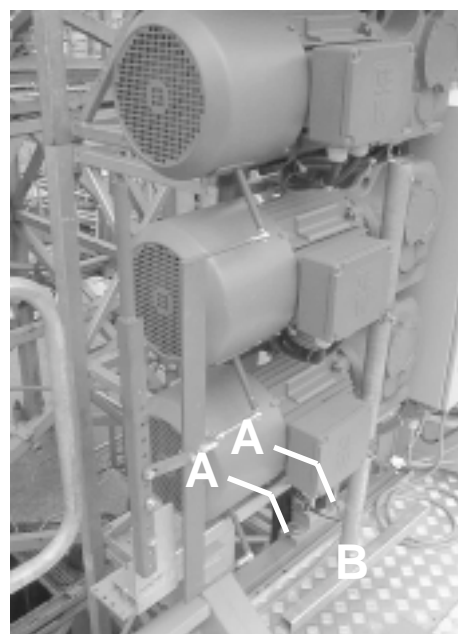


Fig.6-6 Motor bracket

8. Mount the motor carrier support (fig 6-6,B) leaving a space of 0.5 In (1 cm) between the bottom side of the support and the cabin roof.
9. If not mounted already:
Install the lower striker plate and emergency striker plate.
10. Mount a mast section on top of the three mast sections of the ground frame.
11. If required and not mounted already:
Mount the ground cage, see fig. 6-5.
12. Place the ground station switchbox against the fence.
TWIN : Mount the switchbox for the second machine on a separate post.

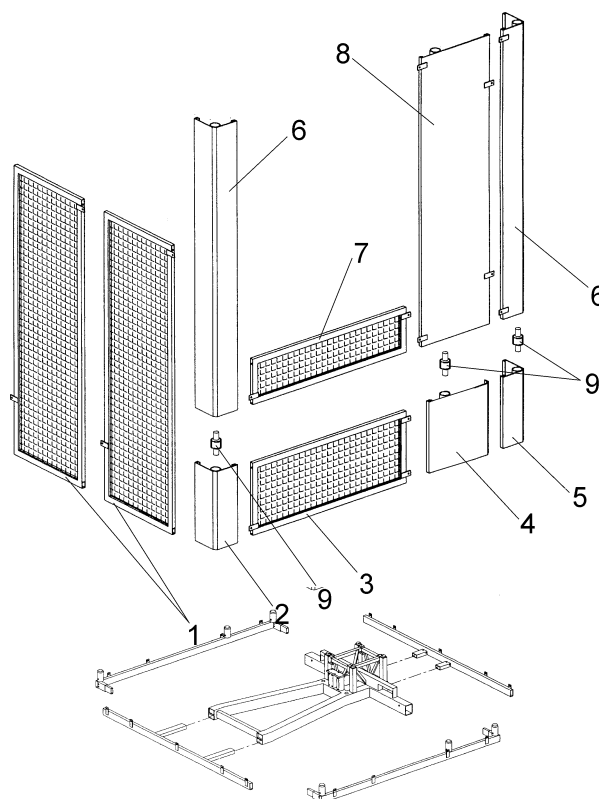


Fig.6-5 Grond frame and ground cage

13. Insert the connectors associated with the doors in the sockets of the switch box in the cabin (one switch box per cabin).
- See section 6.1
14. Connect the cable trolley to the ground station switchbox (one per machine).
15. Connect all connectors and the cable trolley(s) to the switchbox(es) on the top of the cabin(s).
Ensure that the cable passes correctly through the cable carrier and that the cable tensioner is properly secured.



Ensure the power supply at the building side is switched off.



Ensure the building site power supply meets the power supply of the machine.
Apply a step down transformer if the mains voltage exceeds 460V.

16. Connect the building site power supply to the ground station switchbox.
17. Switch on the building power supply.
18. Switch on the power supply to the machine.

19. Check and correct the phase sequence

If correct, the lamp on the phase sequence relay (E203) will lit.

This relay is mounted in the cabin roof switch box.

If the phase sequence is not correct, proceed as follows :

1. Switch off the main switch at the ground station and secure it.
2. Press the red push-button (Q102).
3. Exchange the wiring to the cable connectors L10 and L20.
4. Press the black push-button (Q102).
5. Switch on the main switch.
6. Check the phase sequence.

20. Raising the hoist from the buffer

- Remove the buffer plug.
- Place a bypass connector to bridge pins 2 and 3.
- Set key switch on cabin roof switch box to 2. INSPECTION and press push button UP".
- Lower the hoist using of the joystick.
- Connect the buffer plug.

21. Ensure the mast detection switch is correctly mounted (to each of the cabins).
This switch is mounted on the upper side of the motor carrier.

6.4 Erecting the mast



FINISH WHAT YOU STARTED!

When the assembly process is interrupted: Be sure that all bolts are tightened.

This to avoid overlooking un-tightened bolts when the assembly process is resumed.



Secure the main switch with a padlock, to avoid unauthorised use.



Apply preferably the prescribed anchor tubes, anchors and adjusting tubes.

- See section 1.6.



When erecting the mast, no more than two persons shall be on the roof of the cabin, so that no more than 75% of the lifting power is used.



Never assemble the machine during winds higher than 28 m.p.h. (12.5 m/s, 6 on the Beaufort scale).



Ensure that the building site power supply meets the power supply of the machine.



Always wear a suitable safety harness during assembly.



Press the emergency stop push button when assembling a mast section or an anchor.

1. **Hoist operation during assembly**
Set the key switch on the cabin roof switchbox (fig. 6-8, A) to position 2. INSPECTION.
By pressing the Up and DOWN push buttons, the mechanic can drive the cabin up and down.
When the push-button is released, the hoist stops. ('hold to run')
When the key switch is in position 2. INSPECTION all other operating elements are inhibited, except the EMERGENCY STOP buttons.

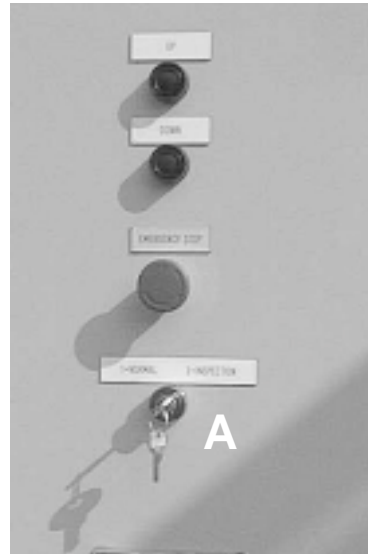


Fig.6-8 Cabin roof switch box



Check if the hoist can be operated safely. Warn all people in the neighbourhood.



During assembly, the upper striker plate is not mounted. When ascending, pay attention that the machine does not run out of the mast.

Never rely on the mast detection switch as end stop!



TWIN:
Never use both hoists at the same time when assembling and disassembling the mast.

2. **Transporting mast sections**
Install the crane jib, fig. 6-9 (optional).
Place the mast sections on top of or within the cabin using a crane or forklift.
Plan this in such a way that, when an anchor shall be put in position, the load of the hoist is at a minimum.
The maximum permissible load for building situations shall not be exceeded.

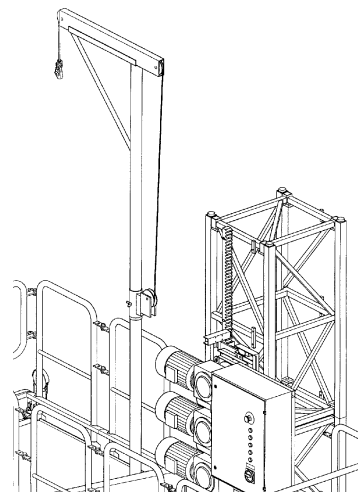


Fig.6-9 Crane on roof

3. **Assembling the mast sections**

Use the crane to mount a mast section on top of the previously assembled section.

Secure the mast section with the specified bolts and nuts.

Always insert the bolt from underneath. (The nut at the top)

Tighten the bolts with the prescribed torque .

- See section 1.3.



If a crane is available at the work site, the mast can be assembled quicker. Up to six mast sections can be assembled on the ground and set in place .

4. **Anchoring the mast**

See section 1.6 and 6.5 for further information about anchoring.

Ensure that anchors are mounted at the prescribed distances.



Note that the first anchor is not to be mounted at the same anchoring distance as the other anchors.

Apply cable guides at the required distances.

For reasons of stability, it is preferable to locate the top anchor as close as possible to the top.



The mast shall not be extended too far above the uppermost anchor.

- See section 1.

5. At the top



The maximum permitted mast height shall not be exceeded.
(See section 1.)

Mount the red mast section at the top.

Mount the upper striker plate.

The minimum distances
(see fig. 6-10) above the cabin:

1 Cabin

2 Landing

A Min. 5.9ft (1.8 m)

B Min. 1 ft (0.3 m)

C Min. 0.5 ft (0.15 m)

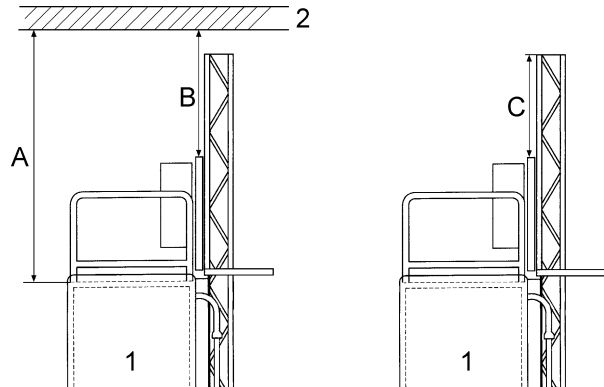


Fig.6-10 Distance above cabin

6 Mount the landing protection

- See section 6.7

7 Install and adjust landing stops

- See section 6.6

8 Remove other assembly parts

(mast sections, crane, etc.) and
tools from the roof.

9 Perform a test run

- See section 7.3

10 Grease the rack and pinion.

- See section 1.3 for grease
specification.

11 Activate normal operating

Turn the key switch in the cabin roof
switch box to 1. NORMAL and
remove the key.

6.5 Mast anchoring



Use a spirit level of at least 3 ft (1 m) to check if the mast is upright before anchoring. Repeat this procedure with every anchoring.



Push the emergency stop push button when anchoring.



The anchor forces shall be approved by the owner or person responsible for the building to which the hoist is anchored.



Lubricate the thread of the adjusting tubes, to improve operating.
Protect the thread against dirt by using tape.

See section 1.6 for anchoring system and anchor forces.

1. Check that the mast is upright.
Use a spirit level with a length of at least 3 ft (1 m).
Re-check when anchor is secured.
Do not wait until the entire mast has been installed to plumb the mast.
2. The mast shall be anchored to the building at the specified distances.
 - See section 1.2.
3. Anchoring systems for various lengths are available
 - See section 1.6.
4. Fixing the anchors:
 - Anchoring is carried out using nut and bolt fasteners and washers.
 - Cemented-in anchors shall be allowed to become fully secure (the cement must have time to harden) before the mast is assembled.
The cement or concrete used shall be in accordance with the Cemented-in anchor specifications.
 - If chemical anchors or expansion bolts are used, these shall be approved and must be able to resist the applied forces.
 - Specifications for these types of bolts are available from the anchor bolt supplier. Permission to use them shall be obtained from the local authorities.

5. Securing the mast

(See fig. 6-11)

- If required: Mount the extension frame(s) (B) to the anchor frame (A). (See section 1.6). (max. 2 to every anchor frame). Tightening torque 65 Nm.
- Mount the end pieces (C). Tightening torque 65 Nm
- Use a crane to mount the upper and lower anchor frame (A) to the mast section. Tightening torque 65 Nm.

- Mount the two tubes (D) in the end pieces. Tightening torque 50 Nm.
- Finger tighten adapter (E) to both tubes.
- Mount wall plate (G) straight to facade, or with brackets (H) to floor/ceiling. Tightening torque bolts wall plate / bracket 225 Nm.
- Install adjusting tubes (F) (See section 1.6).
- Position and tighten adapter (E). Tightening torque 50 Nm.
- Plumb the mast in both directions. Secure the adjusting tubes. Tightening torque securing nuts 500 Nm.

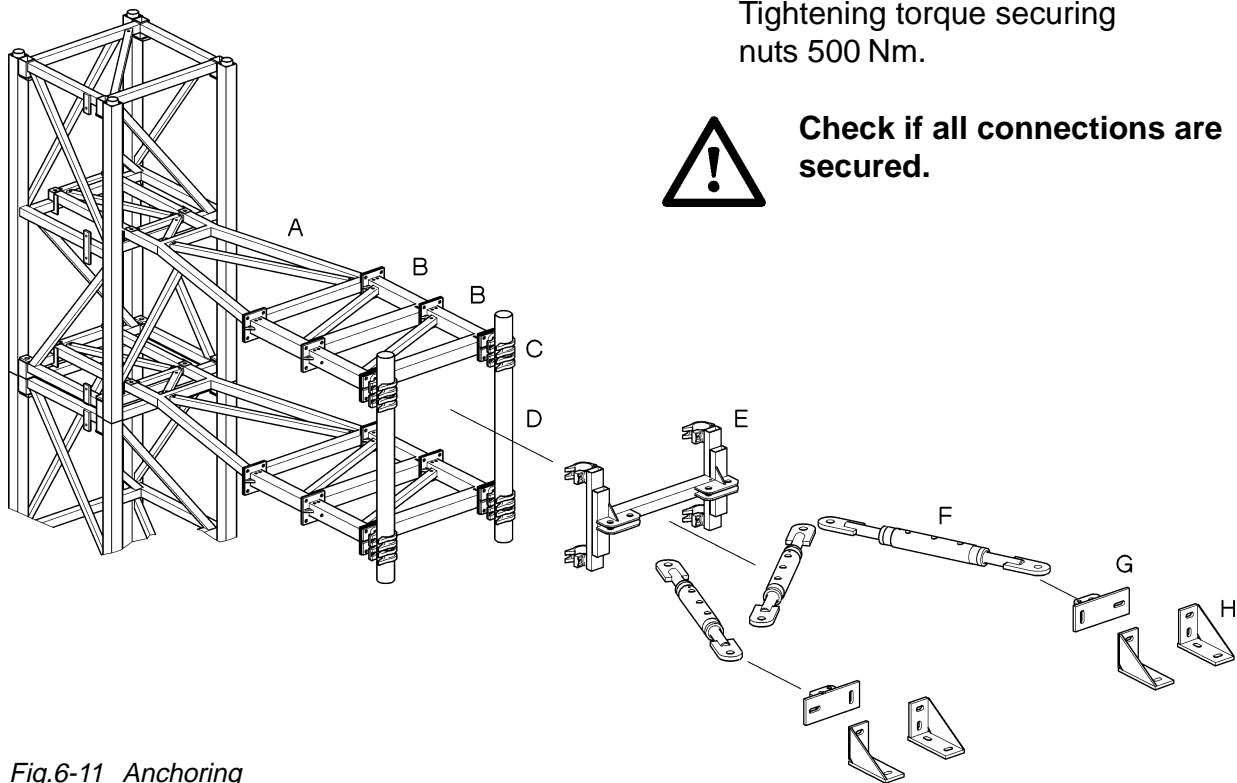


Fig.6-11 Anchoring

6.6 Installing and adjusting landing stops

Striker plates shall be mounted at every landing to ensure that the cabin stops at the right level and also to minimize brake wear.



To ease the mounting of the landing striker plates it can be done with two persons: one in the cabin operating the hoist and one person on the cabin roof, installing and adjusting the landing striker plates.



Bear safety rules in mind.

1. Raise the hoist to the required floor.
2. Position the hoist such that the floor of the cabin is on the same level as the floor level.
3. Mark the approximate position, to fit the striker plates (fig.6-12, 1), onto the mast.
4. Lower the hoist to a comfortable height, and install the strike plate (fig.6-12, 1) with the bracket (fig.6-12, 2).
5. Raise the hoist back up to the required level, to check if the hoist stops on the correct level.
6. If not measure the difference.
 - a. If the hoist is stopping too low, slide the striker plate (fig.6-12, 1) upwards, on its bracket (fig.6-12, 2), by the measured amount.
 - b. If the hoist is stopping too high, slide the striker plate (fig.6-12, 1) downwards, on its bracket (fig.6-12, 1), by the measured amount.
7. Check the final stopping height, and tighten the bolts of the striker plates.

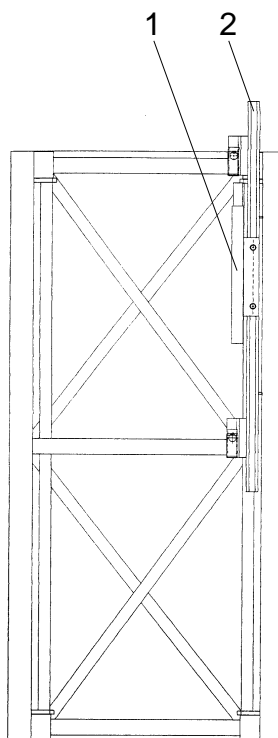


Fig.6-12 Landing stops

6.7 Landing protection



Whenever there is a danger of falling persons and/or objects, fences and kick plates shall be mounted.

Landing protection shall be installed according to the national regulations.

Landing doors shall be placed at every access place. See fig. 6-13.

Enclosures on the building side of the hoistway shall be full height or a minimum of 8 feet (2.44 m) high at each floor landing, and the enclosure shall extend not less than 30 inches (0.76 m) on either side of the cabin. Enclosures at the pit shall not be less than 8 feet (2.44 m) high on all sides of the cabin.

In order to prevent personal injury, the landing doors shall be placed in such a way, that there is a minimum distance of 10 in (0.25 m) between the landing fence/facade and the hoist.

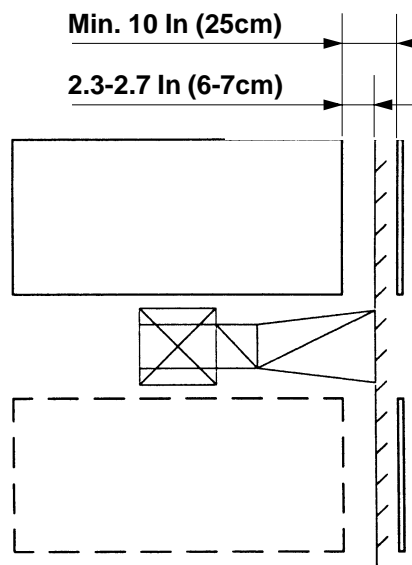


Fig.6-13 Positioning landing barrier



Important for operators:

Before closing the cabin door:
Ensure that the landing door is closed and that there are no persons between a closed landing door and the hoist.

Consult your dealer for detailed information regarding landing protection.

7. OPERATION

7.1 General

During normal use the hoist can be operated from inside the cabin only.

Permits or duplicates, shall be posted in a conspicuous location in the cabin.

The user shall be responsible for insuring that the operators are knowledgeable and capable of performing the duties as specified in this manual and are capable of recording such activity in the log.

When the cabin doors are closed, they are automatically secured against 'unintentional' opening. When arriving at a landing, the doors are released for approximately 5 seconds. After this period, the doors are locked and can be released again by pressing the button on the switchbox.



During use, the space below the hoistway is a **forbidden** area.



Material and/or tools must never extend beyond the outer limits of the cabin. Items which may roll must be properly secured.

Never stack materials against the fencing.



Secure the main switch with a padlock, to avoid unauthorised use of the hoist.



During normal operation, it is prohibited to carry load and/or persons on top of the cabin.



Materials and persons shall not be hoisted at the same time. Exception: not more than two workers may be hoisted with the material they are assigned to load.

7.2 Procedure for daily use

1. Remove the padlock and turn MAIN SWITCH from ground station switch box to position I.
2. Check that all EMERGENCY STOP push buttons (3x) on the control boxes are released.
3. Check the SAFETY CIRCUIT
Green light = OK
(cabin doors locked, etc.).
4. Turn the joy stick to position UP.
If the hoist does not raise:
 - Check and correct the phase sequence.
See section 6.3, step 19).
5. Check the following items:
 - anchoring and cable guiding
 - presence of safety and protective devices
 - mast section connections
 - upright position of masts and level position of cabin
 - any loose parts
 - loose parts on cabin roof
 - ground supports and quality of foundation
 - electrical connections (cable, voltage)
 - safety aspects
 - correct functioning of end switches (upper, lower, emergency upper, emergency lower)
 - obstacles in hoist path
 - oil leakage from motor carrier
 - functioning of motor brake
 - absence of key in key switch

Record the result in the log.
Measures shall be taken to solve eventual faults.

7.3 Extensive test procedure

In order to ensure the safe operation after a new installation, all hoist devices, on their completion of installation and before being placed in service, shall be subjected to an acceptance inspection:

1. Carry out the procedure for daily use, see section 7.2 and check also:
 - all end switches, stops and safety devices and ensure correct adjustment.
 - correct functioning of all buttons on all switch boxes.
 - correct path of the supply cable in the cable drum.
 - correct functioning of the landing doors.
2. Perform a drop test.
 - See section 7.4
3. Test the overload protection.
 - See section 9.5

Record the result in the log.
Measures shall be taken to solve eventual faults.

7.4 Drop test

To ensure functioning of the failsafe brake it has to be tested:

- every 3 months.
- after every new assembly

The drop test shall be controlled remotely, outside the hoist.



During the drop test, no persons shall be within the cabin or on the cabin roof.

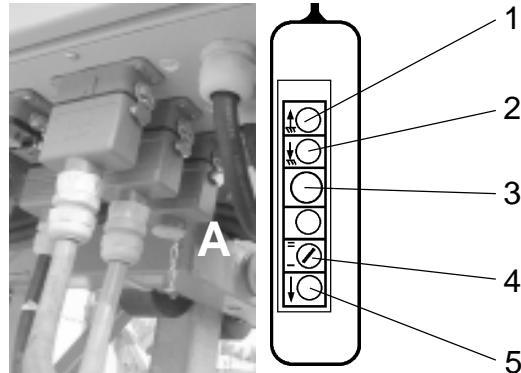


Fig.7-1 Droptest control box

1. Press the emergency stop push button (3).
2. Connect the drop test control box to the connector situated at the bottom of the cabin roof switch box. See fig. 7-1, A.
3. Take the drop test remote control box from the cabin roof.
4. Turn the key switch of the remote control (fig.7-1, No.4) to position I. Release emergency stop push button (3).
5. Send the cabin up to a height of 25 ft (8 m) by pushing the UP button of the remote control (fig.7-1, No.1).
6. Turn the keyswitch of the remote control (fig. 7-1, No.4) to position II. Check if the drop test can be performed safely. Warn all people in the neighbourhood.
7. Release the motor brakes by pushing the DROP button (fig.7-1, No.5) of the remote control. The hoist starts falling down. The failsafe brake must interfere within 10 ft (3 m). (± 2 mast sections).
8. **If the failsafe brake does not interfere the falling motion: Release DROP button (5) immediately.** The lift will stop falling. A emergency push button (fig.7-1, No.3) is mounted on the droptest control box.
9. In case of a failure, a service engineer shall be called to inspect the failsafe brake system.
10. After every drop test the fail safe brake shall be reset.
 - See section 9.4.

7.5 Operator instructions



Transporting passengers or materials on the roof is not permitted.



No one may stand under the cabin.



Secure the main switch with a padlock, to avoid unauthorised use of the hoist.

During normal use, the key switch of the cabin roof switch box (fig. 7-2, A) must be in position: 1. NORMAL.

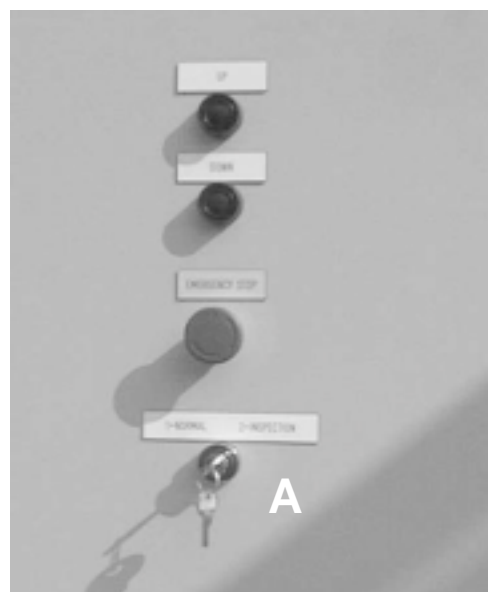


Fig.7-2 Cabin roof switch box

7.5.1 Joy stick car control

- UP / DOWN

Turn the joystick (fig. 7-3) to UP or DOWN position (2).

The cabin raises or goes down without stopping at the landing place(s).

- NEXT LANDING

When turning the joy stick to NEXT LANDING (1), the cabin will stop at the first coming landing.

First turn the joy stick to UP or DOWN (2) before selecting NEXT LANDING (1).

When the joystick is released it jumps back to the middle position (0) and the cabin stops.

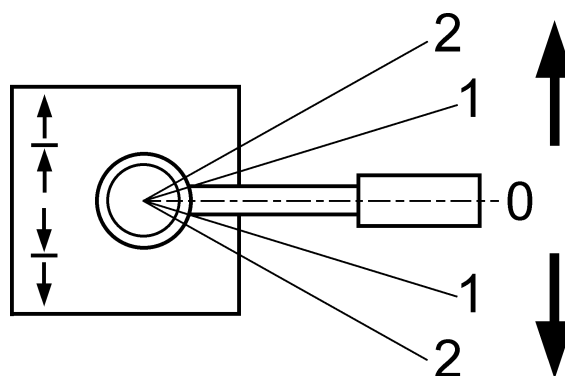


Fig.7-3 Joy stick car control

7.6 Landing doors (optional)



Important for operators:

Before closing the cabin door:
Ensure that the landing door is
closed and that there are no
persons between a closed
landing door and the hoist.

The landing doors can only be opened
when the hoist is present.

When the hoist is at the landing the door
can be opened with the lever (fig.7-4, 2).
This can only be done at the hoist side.

In case of an emergency situation it is
possible to open the door at the lading
side with a triangular key (1, fig.7-4).
This shall only be done by a competent
person.

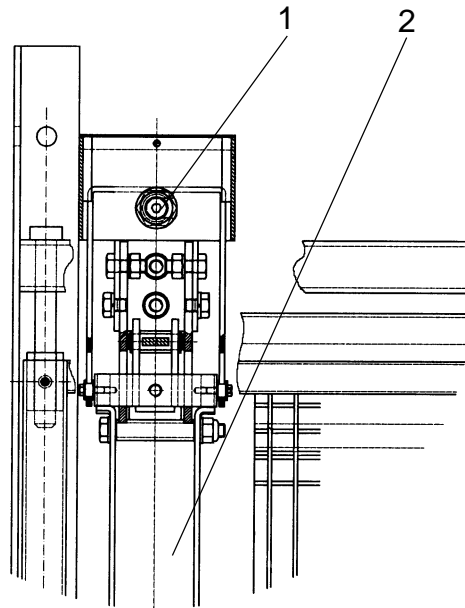


Fig.7-4 Locking device landing door

7.7 Failsafe brake

When the maximum speed is exceeded the failsafe brake (fig. 7-5) stops the cabin.



When the failsafe brake has been operated, the origin of the fault shall be determined first.

The fault shall be corrected before the failsafe brake may be returned to its normal position.

In event of uncertainty the service organisation shall be informed.

Resetting the failsafe brake.

- See section 9.4.



Fig. 7-5 Failsafe brake

7.8 Hoist operation in emergency situations

In emergency situations, for example in the event of a power failure, the cabin can always be lowered.

- Try to solve the failure using the malfunction analysis, section 10. If the failure cannot be solved, it is possible to make an 'emergency landing' to the first lower landing.
1. Position the ladder under the roof hatch.
 2. Unlock the roof hatch using the triangular key.
 3. Open the roof hatch and climb out on the roof.
 4. Switch off the MAIN SWITCH of the cabin roof switch box.
 5. Steady release the motor brakes with the lever. See (fig. 7-6, A). The cabin will start descending.



Pay attention to the risk of getting jammed when passing anchoring or other obstacles.

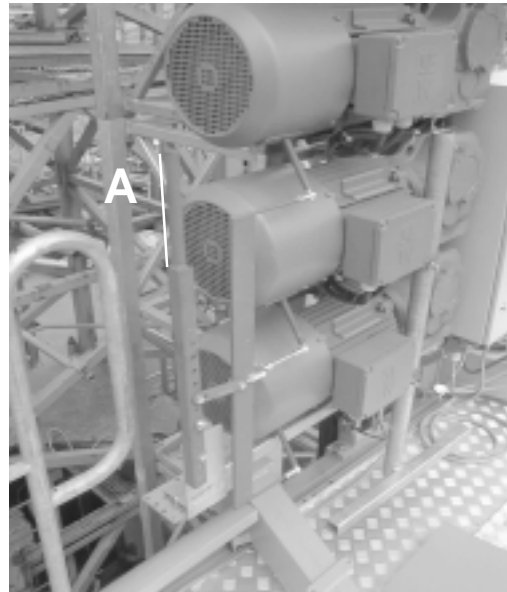


Fig.7-6 Motor brake release lever

The rate of descent may not exceed the rate of descent during normal use (see section 1).



If the rate of descent is too high, the fail safe brake will be activated.

Stop the cabin for 2 minutes after descending 5 metres.

If not, the brake discs may become too hot and therefore work less efficiently.

6. In the event of an emergency, use the horn (ALARM) on the cabin switch box to attract the attention of ground personnel.
7. If present, use the communication system (optional) to consult personnel at the ground station.

8. DISASSEMBLY AND TRANSPORT



When disassembly the mast, no more than two persons may be on the roof of the cabin, so that no more than 75% of the lifting power is used.



Never disassemble the machine during winds higher than 28 mph (12.5 m/s, 6 on the Beaufort scale).



Always wear a suitable safety harness during disassembly.



Press the emergency stop push button when disassembling a mast section or an anchor.



Pay attention to the risk of getting jammed when passing anchoring or other obstacles.

1. Hoist operation during disassembly

Set the key switch on the cabin roof switchbox (fig. 6-8, A) to position 2. INSPECTION.

By pressing the Up and DOWN push buttons, the mechanic can drive the cabin up and down.

When the push-button is released, the hoist stops. ('hold to run')

When the key switch is in position 2. INSPECTION all other operating elements are inhibited, except the EMERGENCY STOP buttons.



Check if the hoist can be operated safely. Warn all people in the neighbourhood.

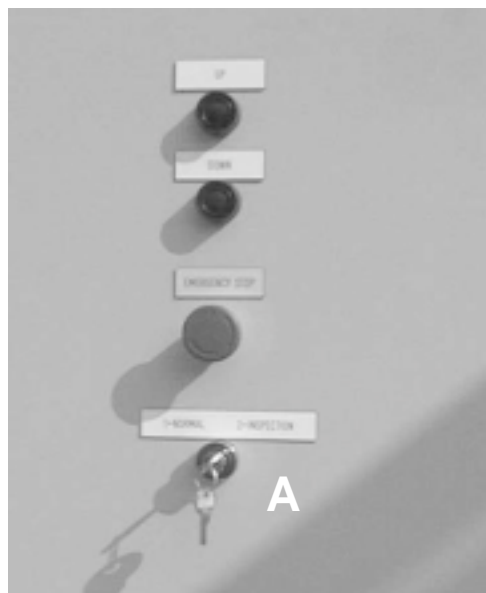


Fig.8-1 Cabin roof switch box

2. Disassemble the landing protection



Ensure that the landing openings are closed.

3. Remove the mast sections one by one from above the uppermost anchor using a crane.

4. Remove uppermost anchor.
First carry down the disassembled mast sections.



The maximum permissible load for building situations must never be exceeded.

5. At the same time the mast is being disassembled, remove the anchor tubes, the anchors and the cable guides.



If a crane is available at the work site, the mast can be disassembled quicker.
Up to six mast sections can be removed in one time and disassembled on the ground.

6. Repeat this procedure until the motor carrier is ready to be disassembled and the cabin is in its lowest position.

7. Steady lower the cabin onto the buffers by releasing the motor brakes (fig. 8-2, A).

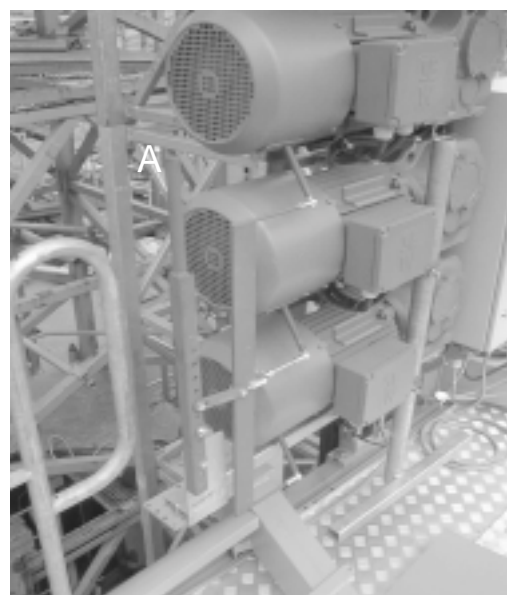


Fig.8-2 Motor brake release lever

8. Uncouple the motor carrier from the cabin by loosening the bolts (fig. 8-3, A) The motor carrier can be raised with the UP pushbutton until the motor bracket with the load pin is above the dividing point of the mast.
9. Disconnect all connectors.
10. Disassemble the mast section including the motor carrier, and lift it.



Avoid damaging of the motor bracket when lowering to the ground or on the truck.

11. Disassemble the roof fencing (fig. 8-4).

The base machine can be transported in two different ways:

- The ground cage still assembled
- The ground cage removed.

The method of transportation depends on the dimensions of the ground cage and the national applicable widths and lengths of the vehicles.

The cabin, including the ground cage, can now be placed on a semilow-loader.

If the basic machine with the ground cage is to be transported as a single unit, the following steps must be followed.

12. Disassemble the ground cage and the ground frame from the hoist.
13. Loosen the ground frame from its position in the event that it has been attached.
14. Transportation
 - See section 4.

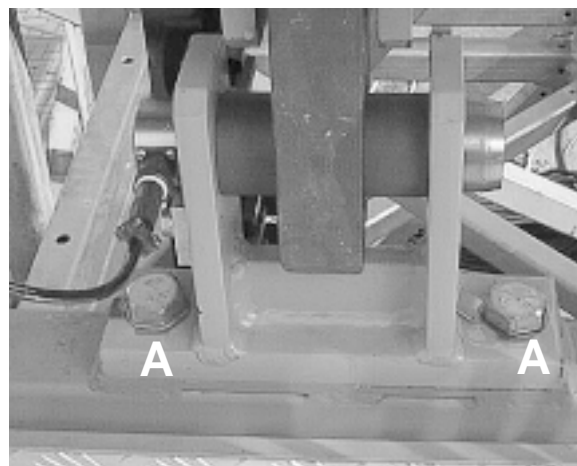


Fig.8-3 Motor bracket

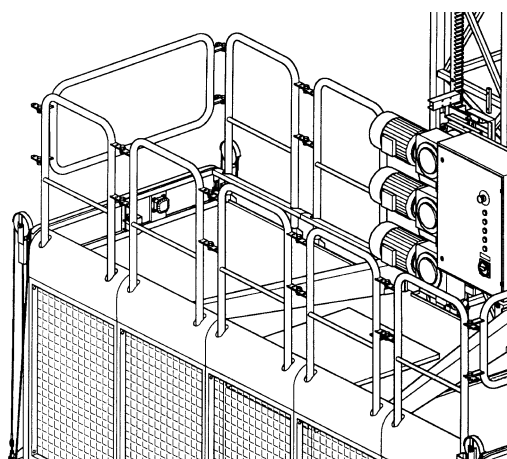


Fig.8-4 Roof fencing



9. MAINTENANCE

General



The maintenance of the hoist shall be performed by qualified mechanics only, preferably from the manufacturer or the dealer.

All parts shall comply with the technical specifications of HEK Manufacturing BV!
Only use original parts from HEK Manufacturing BV!




When maintenance work is carried out **under the cabin**, an inspection buffer (fig. 9-1, A) shall be put in place.
Take away a ground cage element to make the mast accessible.
After placing the inspection buffer, lower the cabin onto the inspection buffer by releasing the motor brakes.



Pay attention to the risk of getting jammed when passing anchoring or other obstacles.



Before starting maintenance activities:

- Switch off the main switch from the ground station switch box. Lock the main switch with a padlock.
After switching off the main switch, parts marked with  may still be live.
- Disconnect the plug from the power supply.
- Lower the hoist onto the buffer.
- During work under the cabin, mount the inspection buffer.

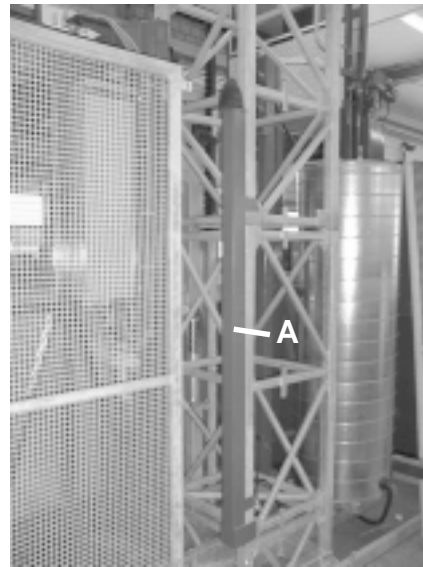


Fig.9-1 Inspection buffer

9.1 Maintenance programme

A. Daily inspection

- See procedure for daily use as described in section 7.2.

B. Weekly inspection

- Carry out all the activities listed under 'A. Daily inspection'.
- Grease the rack-and-pinion drive. Clean first, if the rack and pinion are seriously contaminated with sand or grit.
Grease specification:
 - HEK rack-and-pinion grease
 - Shell Rhodina 2
- Clean the hoist and motor carriage. In particular pay attention to crustation on the cooling ribs of the motors.
- Check all anchor points and tighten any parts which might have become loose.
- Check the racks and pinions (pitting).



If the hoist is used intensively, grease racks and pinions more frequently.

C. Monthly maintenance

- Carry out all the activities listed under 'B'.
- Inspect the rollers and guides (visual inspection of security devices, seals and bearings).
- Check that all the mast bolts are present and tightened with the correct torque (use a torque spanner).
- Check that all other bolts are present and tightened.
- Check the operation of the limit switches.
- Check the motor brake (see section 9.2.3).
- Check function and oil level hydraulic buffer
- Check the oil level in the gearbox.

If necessary, top up with the same type of oil:

- Standard oil: Shell Omala 150

Renew the oil every 3 years.

Lubrication type DIN (ISO): CLP (CC)

ISO viscosity or NLGI class: VG 150

- Check batteries for leakage and oxidation. Replace if necessary.

D. Quarterly maintenance

- Carry out the maintenance listed under 'C'.
- Carry out a drop test, see section 7.4.
- Clean the gear box air-bleed nipples.
- Check the guide rollers for damage, even surface and easy running.

E. Annual maintenance

- Carry out the activities listed under 'D'.
- Inspect for rust, damage to the paint and the condition of welds.
- Check the overload protection as described in section 9.5.
- Grease the fail-safe brake bearing. The nipple is mounted at the pinion side of the fail-safe brake.



One shot only by a grease gun.

Excessive use of grease can have a negative effect on the operation of the fail-safe brake.

F. Maintenance during storage of the hoist

- * Inspect the complete machine.
- * Inspect all vital components and replace any which might have become damaged.
- * Grease the rack-and-pinion drive.
- * Inspect the mast sections (including the racks) and check that all removable connections are in good condition.
- * Inspect the lower mast bolts for corrosion and replace them if necessary.
- * Cover the basic machine with a tarpaulin; in any event, cover the switch boxes and the limit switches.
- * For storage over a long period, consult your dealer.

9.2 Motor brake

9.2.1 General

Every motor has an integrated electromagnetic operated brake. When there is no power supply the brake is active.

The braking effect is achieved by friction between several discs and the brake must be used 'dry' (not greased).

9.2.2 Operation

The brake mechanism has a brake disc (3) with friction material at both sides. Six pressure springs (5) in the coil body (9) exert an axial force on an pressure plate (2). This pressure plate is pressed by the spring force against the brake disc. The brake disc is mounted on the motor shaft in such a way that it can slide in an axial direction along the shaft. Because the pressure plate presses against the brake disc, the brake disc is pressed against the end shield (6). The contact between the friction material on either side of the brake disc, the pressure plate and the end shield results in the required braking effect.

The stator has a built-in braking coil (1) which produces a strong magnetic field when a DC current is applied to it.

When the brake is to be released, a current is made to flow through the braking coil. The resulting magnetic field "pulls" the pressure disc toward the coil body, thus releasing the brake.

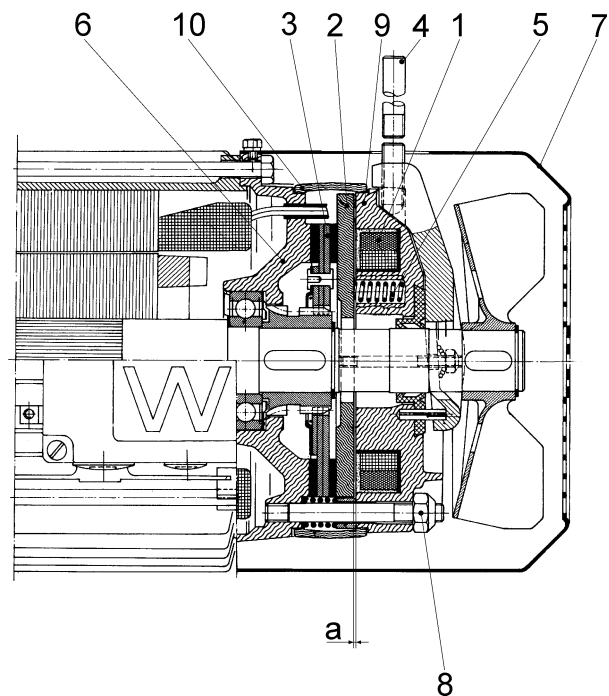


Fig.9-2 Motor brake

Manual operation of the motor brake

It is also possible to release the brake manually. If the manual release lever (4) is pressed in the direction indicated by the arrow on the cover, the pressure plate is moved against the spring pressure, so that it is pressed towards the coil body, releasing the brake.

9.2.3 Maintenance of motor brake

In normal use the motor brake is more or less maintenance free.

However, after frequent raising and lowering of the hoist it may be necessary to adjust the air gap between the pressure plate and the coil body, and if necessary, to replace the brake disc.

In order to check the condition of the brake, the width of the air gap "a" and the thickness of the friction material on the brake disc shall be measured every month.

The air gap "a" is adjusted by the manufacturer to 0.012 In (0.3 mm) and shall never be more than 0.04 In (1.0 mm).

The total thickness of the rotor (including the friction material) must not be less than 0.4 In (10 mm).

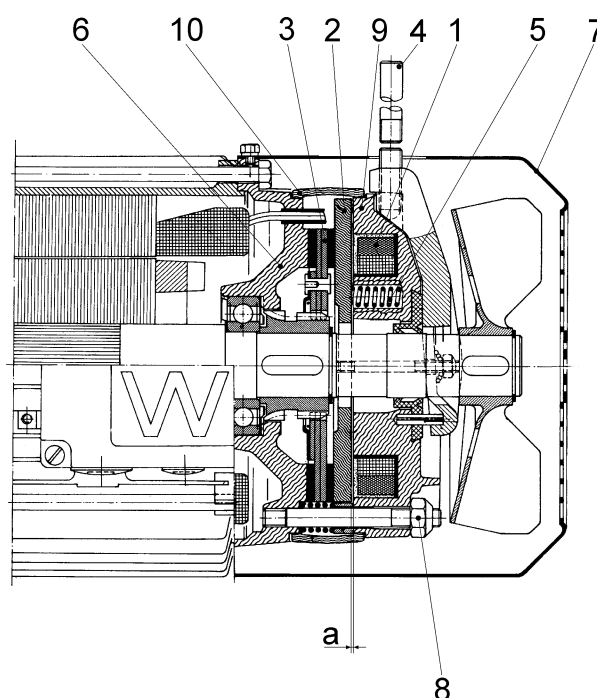


Fig.9-3 Motor brake

Checking condition of motor brakes:



Allways check in a grease-free environment, to avoid a decreased function of the motor brakes.

1. Lower the cabin on the hydraulic buffer by means of the brake release lever.
2. Switch off the hoist at the main switch and secure the switch with a padlock.
3. Remove the brake release mechanism.
4. Remove the fan covers (7) from the motors.
5. Remove the rubber sealing collar (10). If necessary loosen the clamp.
6. Extract the abraded material.
7. Measure the thickness of the brake discs. If a brake disc is less than 0.4 In (10 mm), it must be replaced.
8. Use a feeler gauge (F) to measure the width of the air gap "a" as shown in figure 9-2 and 9-3.
 - at three points (120° intervals)
 - between the pressure plate (2) and the coil body (9).
9. Tighten the hexagonal nuts (8) until the air gap is set to 0.012 In (0.3 mm)
10. Fit the rubber sealing collar.
11. Mount the fan covers and the manual release lever.

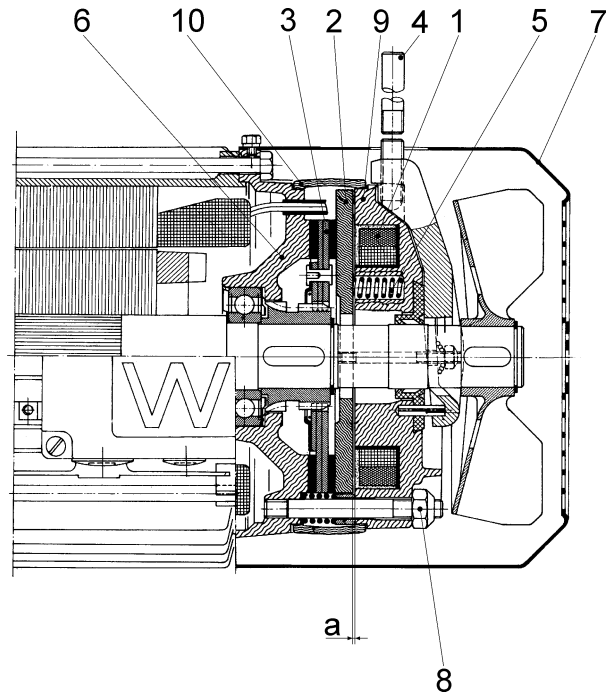


Fig.9-3 Motor brake

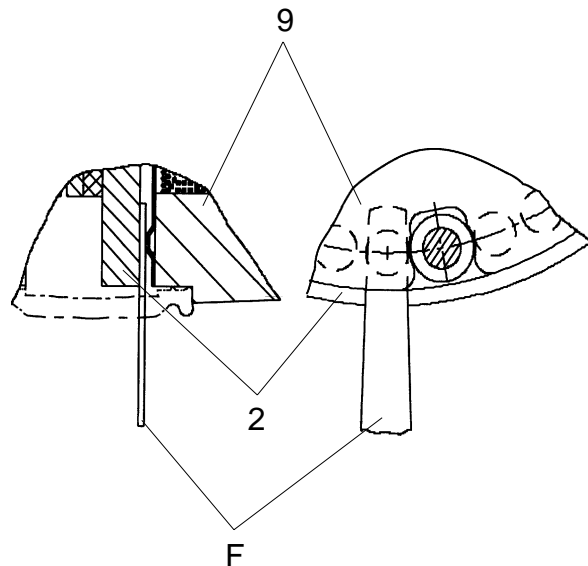


Fig.9-4 Positioning of feeler gauge

9.3 Oil check/change reductor

Be careful not to mix different synthetic lubricants and do not mix synthetic and mineral lubricants either.

Oil check

1. Wait until the gear unit is cooled down.



Burn hazard!

2. Remove the oil level plug.
3. Check oil level and correct if necessary.
4. Replace the oil level plug.

Oil change

Make sure the gear unit is at operating temperature when changing the oil, as the oil's reduced viscosity when cold will make draining more difficult



Burn hazard!

The outside of the reductor should be luke warm.

- | | |
|---|---|
| 1. Place receptacle under the drain plug. | 4. Screw in the oil drain plug. |
| 2. Remove the oil level plug, the breather plug and the oil drain plug. | 5. Fill in the new oil through the breather hole. |
| 3. Drain the oil completely.
Dispose the oil via an authorised facility. | 6. Check oil level at level plug. |
| | 7. Screw in the oil level plug and the breather plug. |

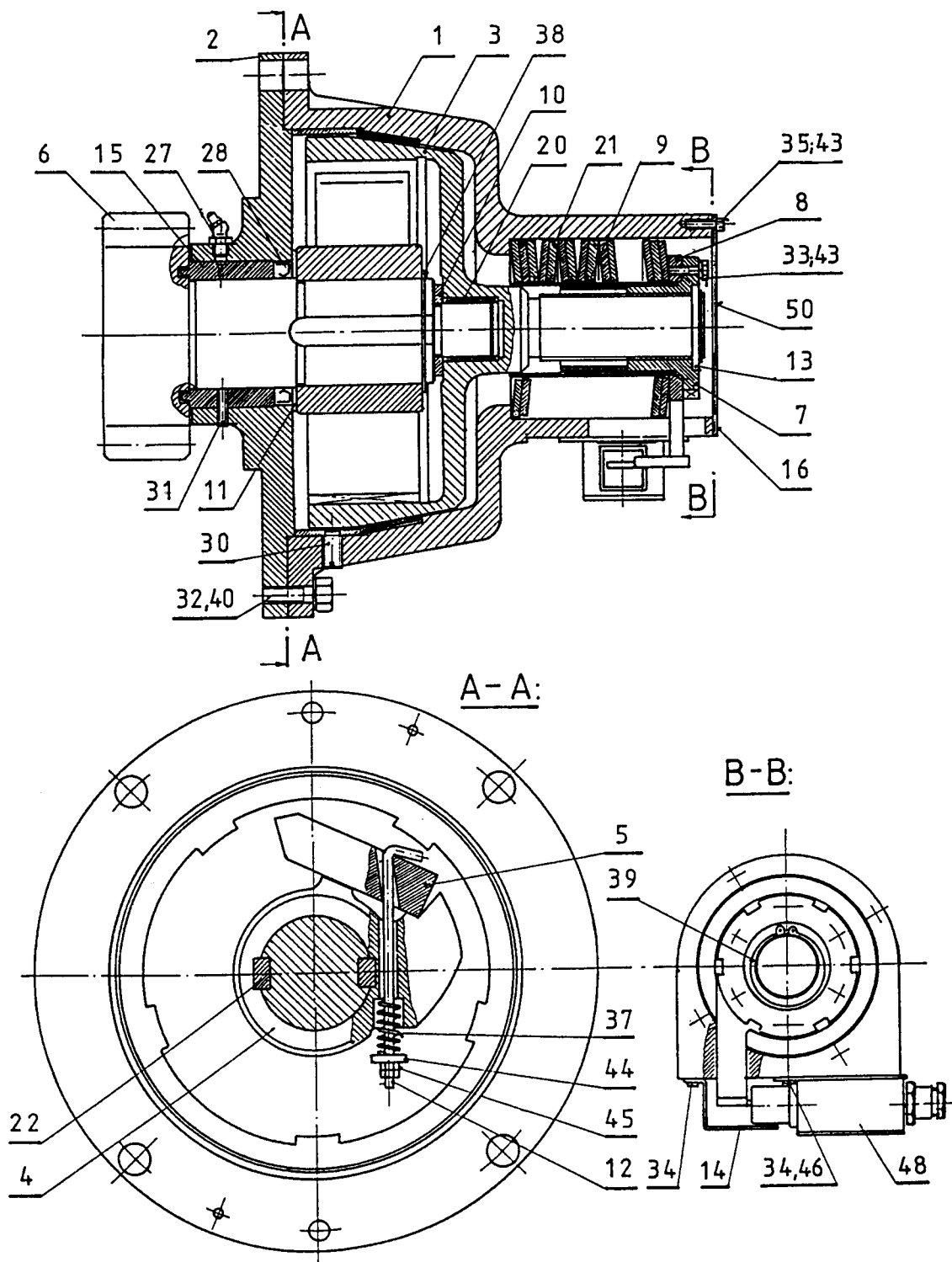


Fig.9-5 Fail safe brake

9.4 The failsafe brake

Function of the failsafe brake

(see figure 9-5).

If the predetermined descending speed of the cabin is exceeded, the failsafe brake brings the cabin to a stop, prevents it from descending further and also cuts the power to the drive system.

The centrifugal weight (5) will fly out and get caught by the stop bosses.

The brake drum (3) begins to rotate and will be slowed down by the brake pads in the housing, until the lift cabin has been brought to a halt.



When the failsafe brake has been operated, the origin of the fault shall be determined first.

The fault shall be corrected before the failsafe brake may be returned to its normal position.

In event of uncertainty the service organisation shall be informed.

The fail safe brake has been set to the correct maximum speed by the manufacturer.

This setting is not to be changed!!

The fail safe brake shall be reset by an competent person.

The fail safe brake shall be inspected by HEK Manufacturing BV every three years. The initial date of use is indicated on the identification plate.

Please refer to your HEK dealer for inspection of the fail safe brake.

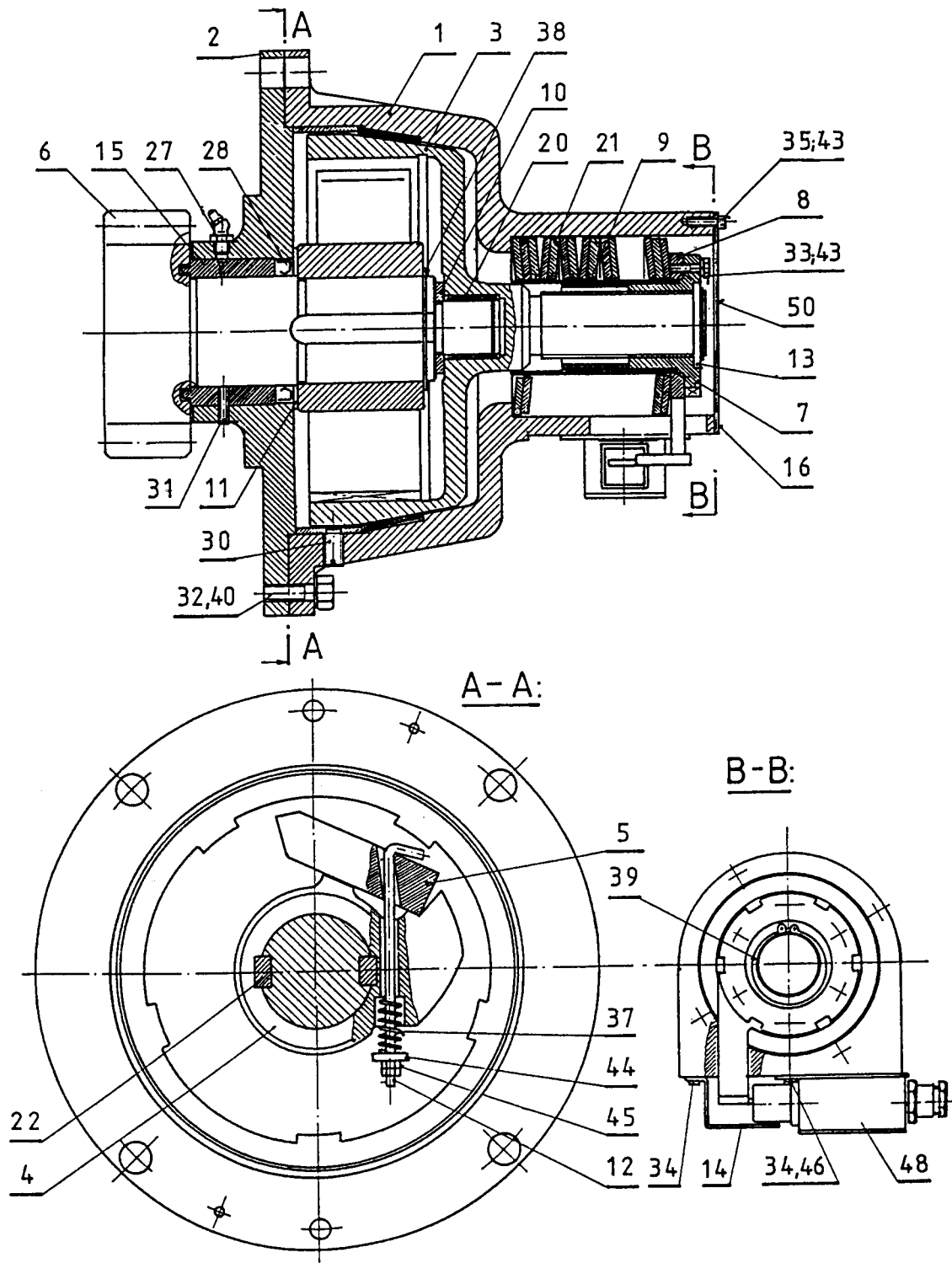


Fig.9-6 Fail safe brake

9.4.1 Resetting the fail safe brake

1. First the cause shall be determined and remedied!
2. Put the key switch on the cabin roof switch box to 2. INSPECTION.
3. Press the "UP" button to raise the hoist 2 ft (50 cm).
4. Press EMERGENCY STOP push button.
5. Remove the cover (50), after the bolts (35) have been loosened. Remove the two bolts (33). Use the special nut spanner, turn the adjusting nut (7) clockwise until the adjusting nut is pressing slightly against the washer (39).
6. Turn the adjusting nut (7) slightly clockwise until the threaded holes of the bush (8) are situated exactly opposite of the threaded holes of the adjusting nut (7).
7. Fasten the bolts (33) with the washers again.
8. Check if the SAFETY CIRCUIT check light lights up (The doors must be closed). If this is not the case the switch must be adjusted. This may only be done by the service department.
9. Install the covers.
10. Lock and seal the threaded bolts of the covers with sealing wire and a sealing.
11. Put the key switch on the cabin roof switch box to 1. NORMAL
12. Release the EMERGENCY STOP push button by turning it.

Now the hoist is ready for normal use again.

9.5 Testing the overload protection

Adjusting of the overload device shall only be carried out by persons who are qualified by HEK Manufacturing BV.

Follow the next steps for **testing** the overload protection:

The hoist must be at ground level or on a landing.

1. Place the rated load in the hoist.
The rated load is given in section 1.
For example:
Rated load is 5000 lb (2275 kg).
2. The OVERLOAD warning light (fig.9-7, A) on the cabin switch box may not burn.
3. Place the rated load + 10% in the hoist.
The rated load is given in section 1.
For example:
Rated load is 5000 lb (2275 kg).
Test load: $5000 + 500 = 5500$ lb
4. Close the ground cage door.
The OVERLOAD warning light on the cabin switch box must burn.

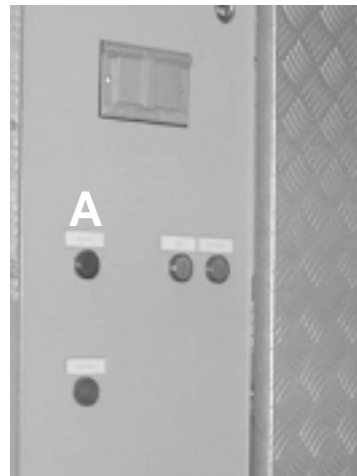


Fig.9-7 Overload warning light



If the overload device does not function correctly, the hoist shall not be used!
Consult your service engineer.

10. MALFUNCTION ANALYSIS

Symptom	Probable cause	Probable fault location
Motor not running	No power supply	- Faulty fuses at the construction site - Cable damaged - Motor protection relay Q102 deactivated
	Phase connection not correct	- Adjust the phase connections, see section 6.
	Voltage too low	- Type cable type not correct - Cable is too long
	42 VAC control voltage not present	- Automatic fuse deactivated F102, F103, F202 and F203
	42 VAC not switched - Safety switches operated or loose wire - Emergency stop button pushed	- Check switches - Check the emergency stops
Voltage present, but lift does not move up or down	Relays K201, K202 or K203 are activated but hoist does not move up or down	- Motor brake blocked, adjust motorbrake - Power supply cable too long or diameter too small (voltage reduction too great).
Other complaints	- Cabin light does not work	- Check if X100L3.1 in the groundcage switch box is connected to X200.3 in the cabin control box
	- Excessive braking distance	- Check / adjust the motor brake, see section 9
	- Lift lowers in juddering movements	- Call your technical service department of the dealer
	- Not enough performance	- Call your technical service department of the dealer
	- In all circumstances not covered by fault analysis	- Call your technical service department of the dealer



Each time the hoist is assembled and a different power supply unit is used, the phase sequence shall be checked and, if necessary, changed.
See section 6.



In all cases that have not been included in the malfunction analysis table above, please inform your importer's technical service or your local HEK dealer.



11. MACHINE DISPOSAL

General

After a number of years of reliable service, the life of every machine inevitably comes to an end. The hoist must then be disposed of in the environmentally friendliest manner possible.

Amongst others, disposal options are:

- Part exchange for a new hoist.
- Disposal by a recycling facility.
- Destruction.

Discarding the hoist

- Drain the oil out of the reduction gearbox and dispose of this via an authorised facility.
- Remove any usable parts.
- Dispose of the remainder via a waste disposal facility.



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Inspection sheet

Name of company	Hek hoist type	Serial no.
Site	Inspector	Month/year

Inspection*	Date of inspection	Remarks	Date taken care of
B Weekly			
C Monthly			
D Quarterly			
E Annual			
* INSPECTIONS B,C,D,E TO BE CARRIED OUT ACCORDING OWNER'S MANUAL SECTION 9.1 MAINTENANCE PROGRAMME			

