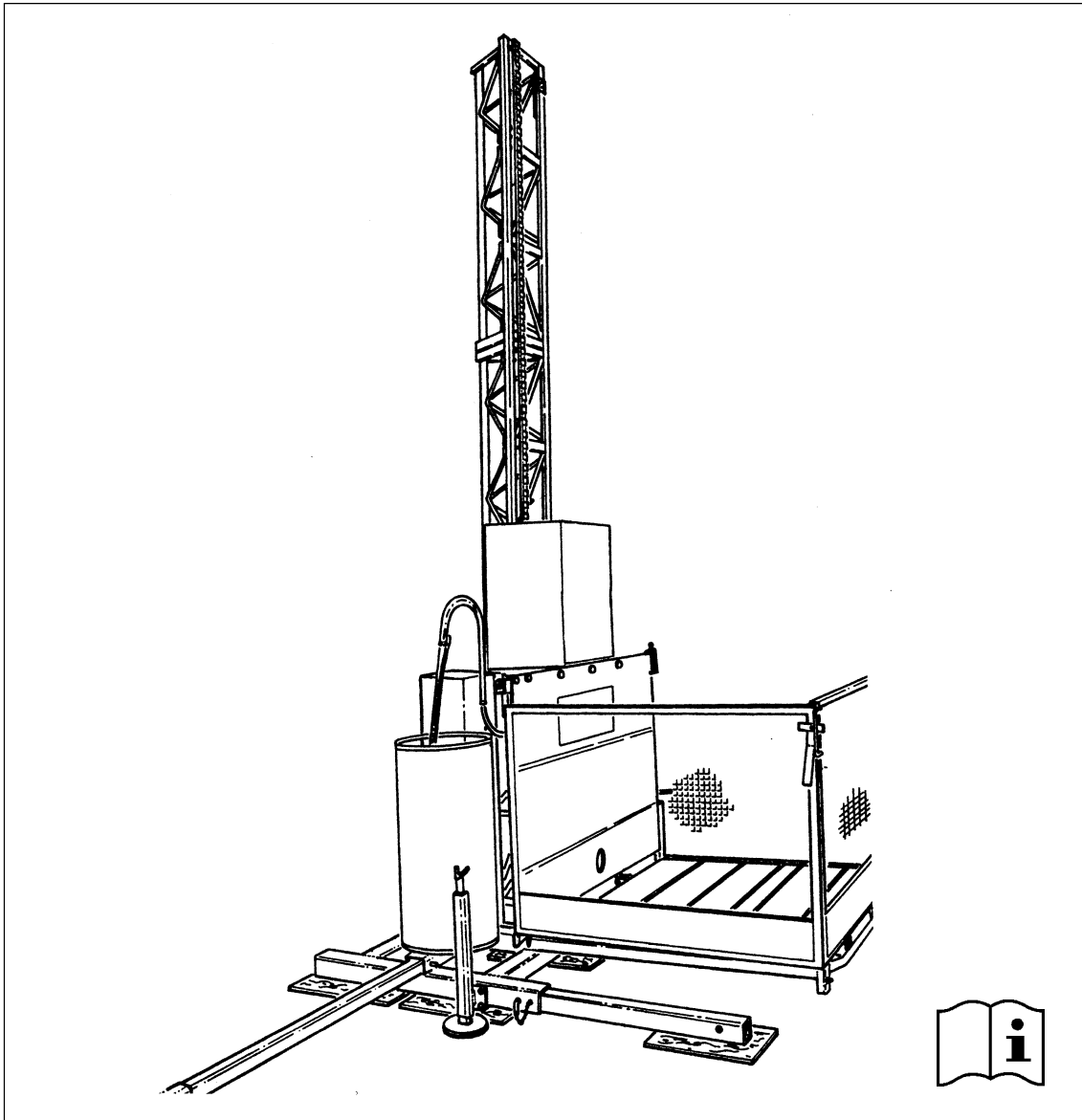




MANUAL

MATERIAL HOIST GL 500



This manual is assigned to:

**MIDDELBEERS HOLLAND
MANUFACTURING B.V.**

TYPE	<input type="text"/>	MACHINE NR. / MASCHINE NR.	<input type="text"/>
MOTOR NR./ MOTEUR NR.	<input type="text"/>		<input type="text"/>
BOUWJAAR / BAUJAHR / YEAR OF MANUFACTURE / L'ANNEE DE CONSTRUCTION			19 <input type="text"/>
MAX. BELASTING / MAX. NUTZLAST / MAX. LOAD / CHARGE MAXIMUM	PERS <input type="text"/>	<input type="text"/>	KG
MAX. HOOGTE ONGETUID / MAX. HOHE FREISTEHEND / MAX. FREESTANDING HEIGHT / MAX. HAUTEUR SANS ANCRAGE		<input type="text"/>	M
MAX. HEFSNELHEID / HUBGESCHWINDIGHEIT / LIFTING SPEED / VITESSE DE LEVAGE		<input type="text"/>	M / MIN
VERANKERINGSAFSTAND / VERANKERUNGSABSTAND / ANCHORING DISTANCE / INTERVALLE DE L'ANCRAGE			M
MOTORVERMOGEN / MOTORLEISTUNG / MOTOR OUTPUT / DEBIT DU MONTEUR	<input type="text"/> x	<input type="text"/>	KW
AANSLUITSPANNING / STROMANSCHLUSS / VOLTAGE / TENSION		<input type="text"/>	V
KABEL / CABLE		<input type="text"/>	MM ²
BANDENSPANNING / REIFENDRUCK / TYRE PRESSURE / PRESSION DE PNEU		<input type="text"/>	ATM
PLATFORM-LENGTE / LANGE / LENGTH / LONGUEUR		<input type="text"/>	MM
PLATFORM-BREEDTE / BREITE / WIDTH/ LARCEUR		<input type="text"/>	MM
KABELDIAM. / SEILDURCHM. / WIRE ROPE DIAM. / DIAM. DE CABLE		<input type="text"/>	MM
BREUKBELASTING / BRUCHBELASTING / TENSILE STRENGTH / CHARGE DE RUPTURE		<input type="text"/>	kN

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FOREWORD

The material hoist is provided with a rack and pinion drive.

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

The mast, which consists of separate elements, is quick and easy to assemble. The mast elements have a standard length of 1.5 metres, with which it is possible to reach a useful height of 80 metres.

During building operations the height of the mast can be continually adapted to the height of the building. The mast can be easily and safely extended from the hoist platform.

The GL 500 control system makes it possible to stop at any floor level.

For heights exceeding 5 metres, the mast must always be securely anchored.

Special attention has been paid to every aspect of safety in the construction of this hoist.

The type GL 500 hoist is suitable for a maximum loading of 500 kg.

**Read this instruction manual carefully before using the material hoist.
Take all safety precautions as described in chapter 3 into account.**

The transport of persons is strictly forbidden!

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EC Declaration of Conformity

EC Declaration of Conformity
pursuant to Annex IIa of the Machine Directives 89/392/EEC

We, **HEK MANUFACTURING B.V.**
Westelbeersedijk 18
5091 SM Middelbeers
The Netherlands

hereby declare that, on the basis of its design and construction, the hoist named below as well as the model brought into circulation by us conform to the relevant basic safety and health requirements contained in the EC directives.

Changes made to the machine without our consent invalidate this declaration.

Designation: **Material hoist**

Machine Type:

HEK GL500

Relevant EC Directives: **EC Machine Directives 89/392/EEC as amended 91/368/EEC and 93/44/EEC**

Applicable harmonised standards: **e.g. EN 292-1 and EN 292-2; EN 60 204-1**

Applicable national standards and safety regulations: **e.g. NEN1080, VBG 35**

Date/Manufacturer's Signature: **Middelbeers, The Netherlands, 1st November 1999**

Authorised Signature:



E.M.A. van Hek
Chairman of the Board
HEK INTERNATIONAL GROUP B.V.

MEANING OF THE SYMBOLS USED

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



During use, no person may stand **under** the machine.



Danger: High voltage.



Danger of falling objects.

1. TECHNICAL DATA

General	type	GL 500
	lifting capacity	500 kg
	hoist speed	24 m/min
	dimensions for transport (lxwxh)	2100 x 1230 x 2180 mm
	weight of basic machine	740 kg
Ground frame	dimensions of ground frame (lxw)	1800 x 1230 mm
	transport wheels tyre pressure	2 tyres 500 x 8/4 2 bar.
Mast	length of mast element weight of mast element	1508 mm 45 kg
	freestanding height on standard ground frame	5 m
	maximum mast height when anchored	80 m
	mast bolts	M14 x 90 qual. 8.8 Torque 65 Nm.
	anchoring: - required - first anchor point at - distance between anchor points - free mast top	when the mast is higher than 5 m 5 m 6 m 3 m
	distance between cable guides	6 m
Load-carrying platform	dimensions (length x width) (external dimensions)	1260 x 1510 mm
	height of platform fencing	1000 mm
Electrical installation	supply voltage building site fuse power supply cable (to the machine) machine cable (drum cable) electric motor	400 V - 3-phase - 50 Hz 3 x 25 A maximum 5 x 4 mm ⁵ (up to max. 50 m) 5 x 6 mm ⁵ (from 50 m) 5 x 4 mm ⁵ 4,8 kW
Operation	switchbox	main switch with phase selection
	control box	pushbuttons for UP - DOWN - LANDING - EMERGENCY STOP
Oil	see page. 9-1	
Provision	standard	<ul style="list-style-type: none"> - ramp on the load carrying platform - fold-up load-carrying platform - phaseguard relay - all constructional parts galvanized or painted

- Option:**
- Variable landing stops
 - Landing position safety devices
 - Ground cage for ground station
 - Descent pushbuttons at each landing level
 - Automatic control by PLC

Note: The details are based on standard applications. In special situations it may be desirable to deviate from these. This may only be done with the prior written approval of the manufacturer.

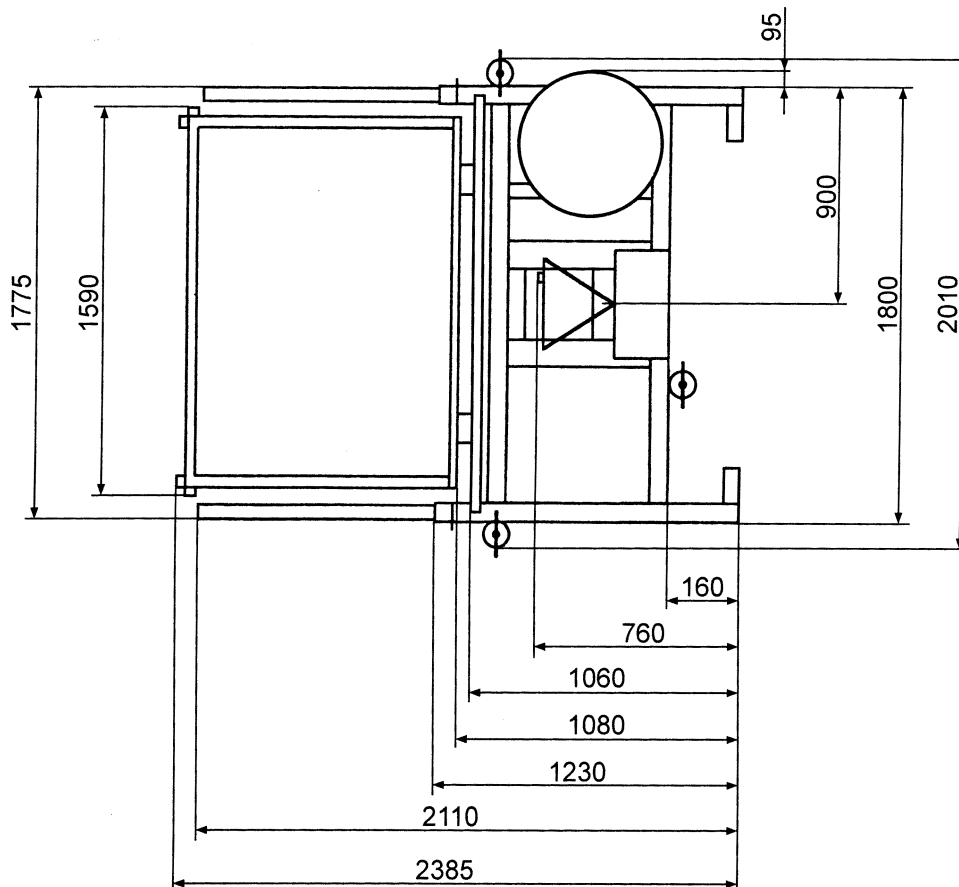


Fig. 01 Transport dimensions

2. COMPONENT DESCRIPTION

2.1 General description

The rack and pinion hoist consists of the following four main parts:

- ground frame (1)
- mast (14)
- drive unit with platform (31+15)
- control system (39/40/50)

The ground frame provides the machine with sufficient stability. The lowest mast element and the cable drum (9, fig. 03) are attached to the ground frame. The dimensions of the ground frame are such that the hoist will fit on a normal transport trailer.

The load-carrying platform is driven up and down the mast by a 4.8 kW electric motor (33) by means of a rack and pinion drive.

The rear wall with mast guard (17), the fixed front wall (20, fig. 05) and the two electrically protected access gates (19, fig. 05) with a safety barrier (21, fig. 05) form the protection around the platform.

The fail safe brake (35) is mounted on the drive unit (31); this brake operates automatically if the pre-determined speed of descent is exceeded, stops the hoist platform and prevents further movement, and also switches off the drive motor. The electrical installation is divided between the switchbox on the hoist platform (40) and the switchbox which is part of the ground station.

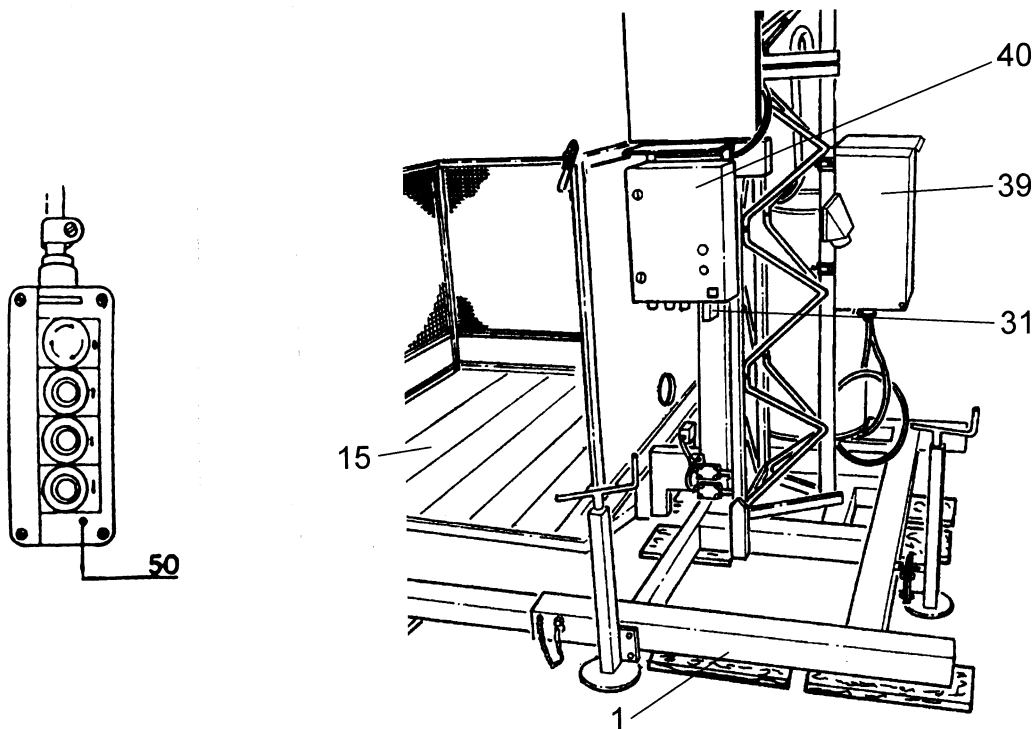


Fig. 02 Construction

The hoist is provided as standard with an override control which provides a dead-man's function for the first 2.5 metres of movement. The facility to adjust the height of the landing stops ensures that the hoist can always be made to stop at the correct landing height.

The simple construction ensures that the minimum of maintenance is required

2.2 Component parts

Ground frame

1. Ground frame
2. Outrigger
3. Securing pin
4. Jack
5. Tow bar
6. Tow bar coupling
7. Transport wheel
8. Securing spring
9. Cable drum
10. LOWER striker plate

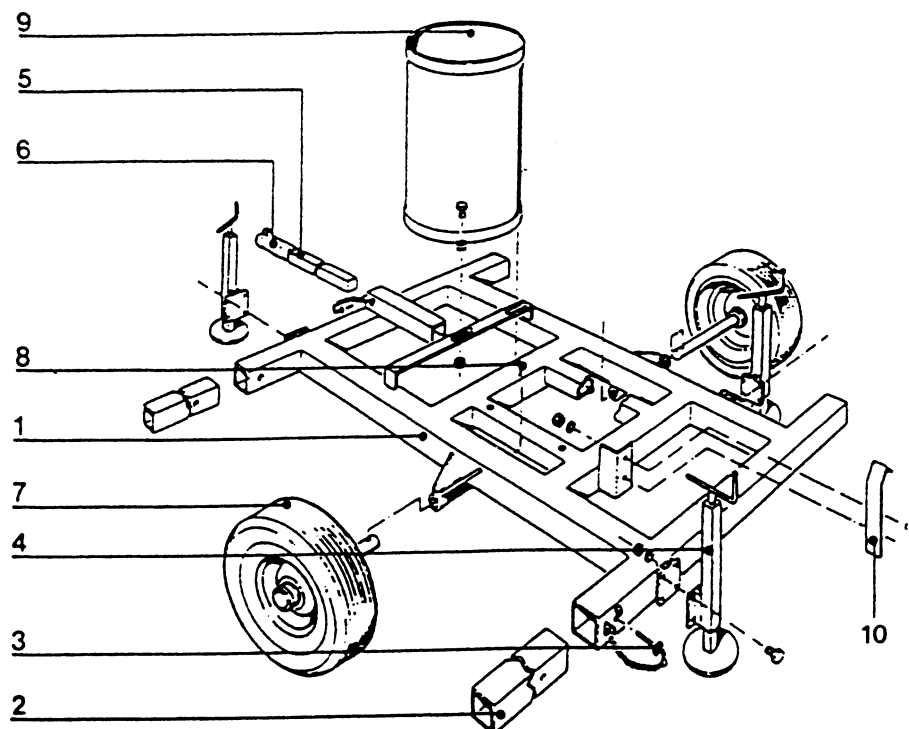


Fig. 03 Ground frame

Mast element

- 11. Mast element
- 12. UPPER striker plate
- 13. Landing level striker plate

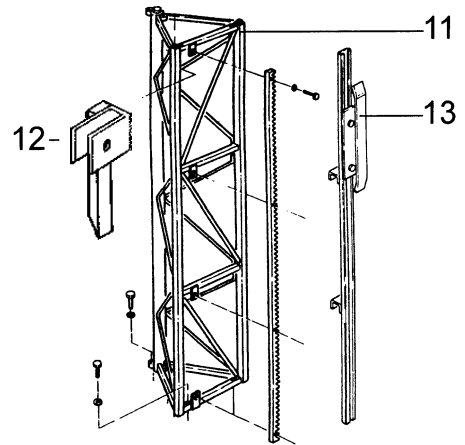


Fig. 04 Mast element

Mast

- 14. Mast
- 15. Hoist platform
- 16. Rack and pinion
- 17. Mast guard
- 18. Cable support arm
- 19. Access gate
- 20. Fixed front wall
- 21. Platform lock
- 22. Locking bolt
- 23. Machine cable (drum cable)
- 24. Outrigger
- 25. Ground support

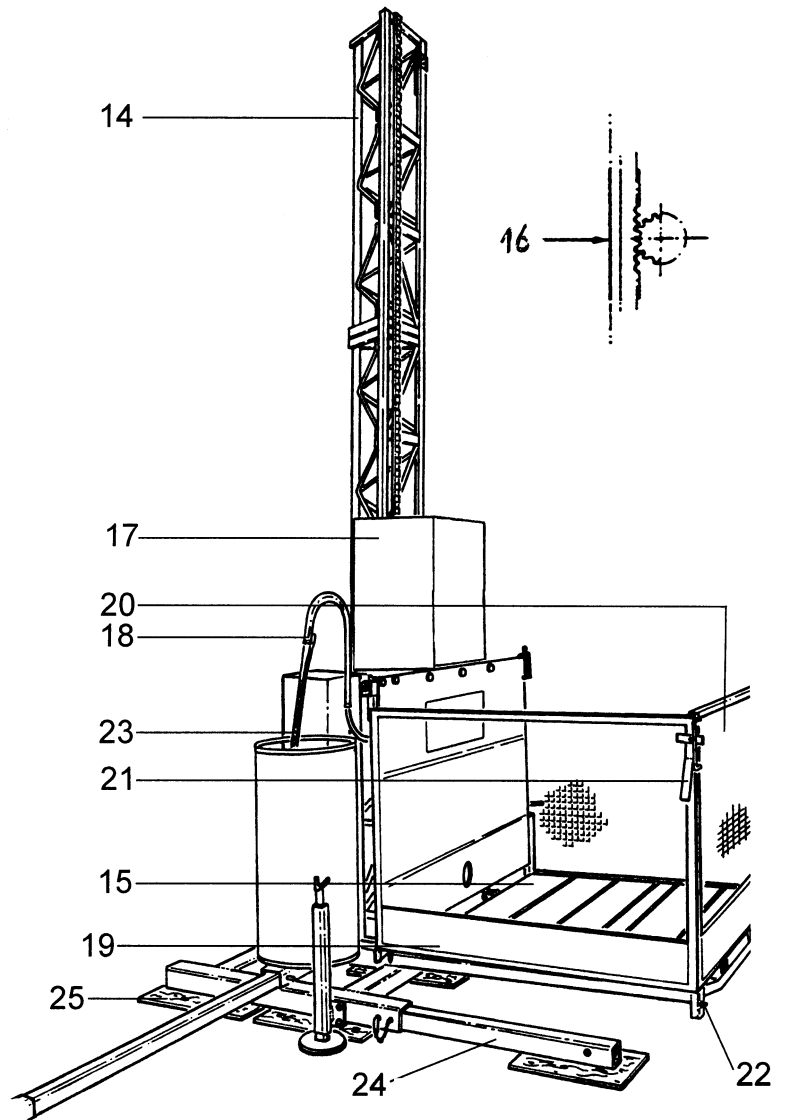


Fig. 05 Assembly

Mast anchor

For anchoring specifications see Part 6.2, point 28

- a. Mast adaptor
- b. Wall anchor
- c. Coupling piece
- d. 1.5 Ø inch diameter tube
- e. 1.5 inch double scaffold coupling

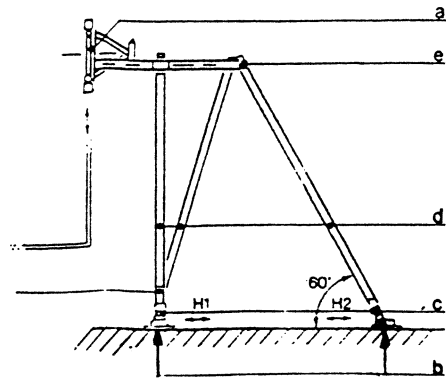


Fig. 06 Mast anchor

Cable guide

27. Cable guide

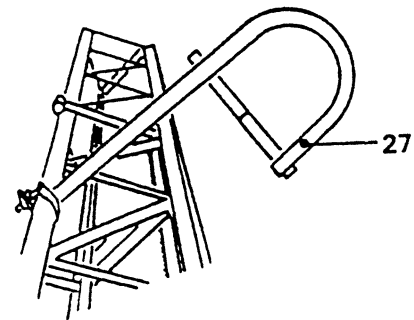


Fig. 07 Cable guide

Detail of platform door

- 28. Hinge with switch pawl
- 29. Gate switch (S1)
- 30. Connection rod

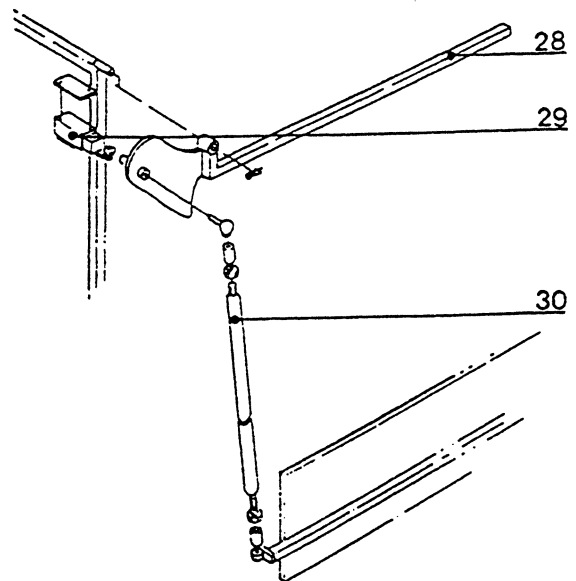


Fig. 08 Platform access detail

Drive unit

- 31. Drive unit
- 32. Tilting mechanism for mast assembly
- 33. Electric motor
- 34. Brake release lever
- 35. Motor mounting plate
- 36. Buffer spring

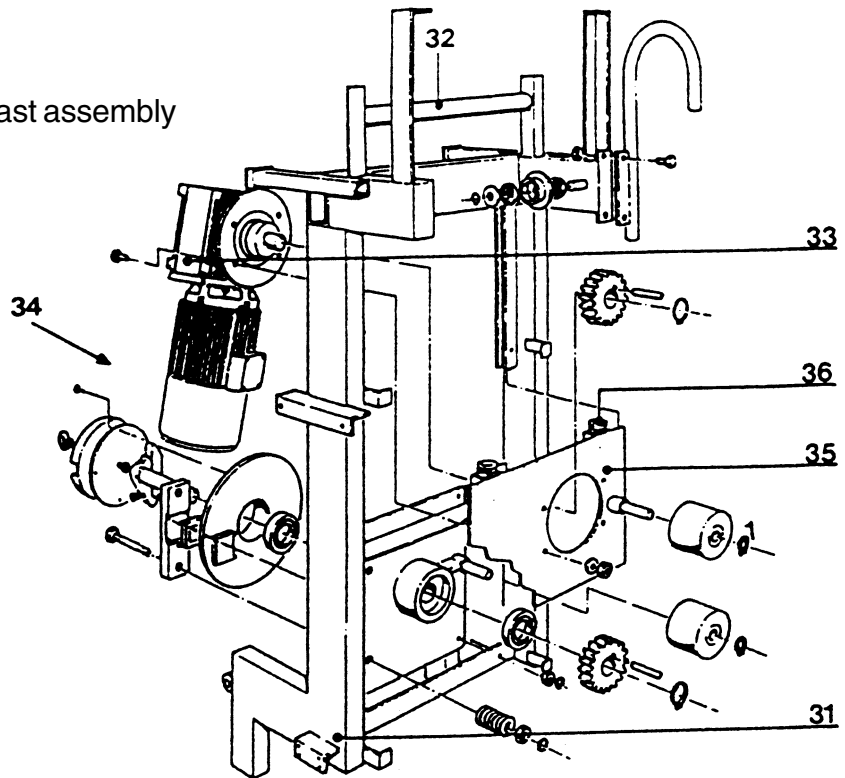


Fig. 09 Drive unit

Fail safe brake

- 37. Fail safe brake
- 37a. Eye nut
- 37b. Disc
- 37c. Recess
- 37d. Centrifugal weight
- 37e. Cam
- 37f. Brake disc
- 37g. Brake pad

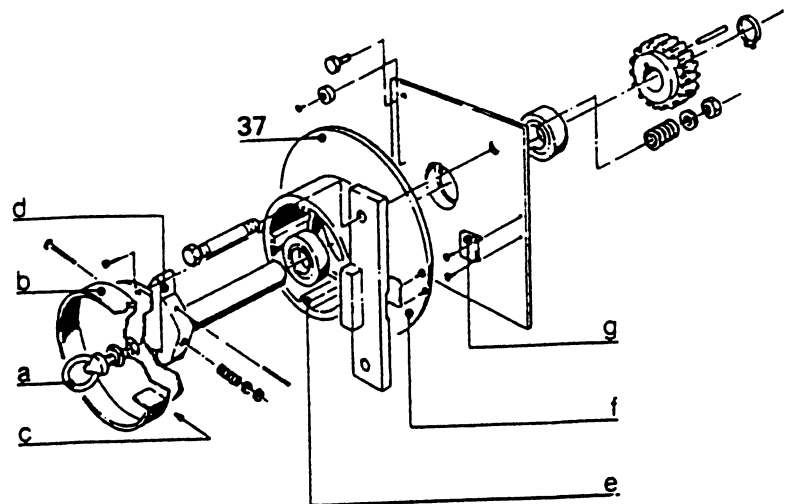


Fig. 10 Fail safe brake

Electrical components

See Part 5



2.5 metre stop:

When descending the hoist will stop at a height of 2.5 metres, following which the lowering push button has to be pressed for further operation.

Overload measurement:

A switch is fitted to the lift that is operated by the motor panel. If the machine is overloaded the motor panel will operate the switch. The power supply to the motor will be switched off until the overload has been removed. As an indicator a red lamp is fitted to the switch box that will illuminate if the lift is overloaded.

Lower emergency switch:

If the lower limit switch fails to operate, causing lift travel to continue, the lower emergency switch will operate.

3. SAFETY



No changes or modifications may be made to the machine.



The ground surface must be sufficiently stable to support the weight of the machine, the mast and the load.



The mast must ALWAYS be anchored in accordance with the instructions.



If during assembly and disassembly the fences do not provide sufficient protection, suitable climbing material must be used at heights above 2 meters.

3.1 General

The machine is designed to be safe both during assembly and use. For this reason the machine is provided with the following built-in and additional safety features:

- The motor brake works automatically in the event of a power supply failure.
- If the UPPER limit switch fails to operate, so that the hoist platform continues to rise, the UPPER emergency limit switch will be operated.
- If the speed of descent is too high, the fail safe brake is operated.
- The proximity switch protects the hoist against ascending too far during the assembly of the mast element.

3.2 Safety before use

- The outriggers and the frame must be effectively supported.
- The working area around the hoist must be free from obstacles.

3.3 Safety during use



The transport of persons is strictly forbidden!



In conditions where wind speeds exceed 8 on the Beaufort scale, the machine must be put out of use with the platform in the lowest position.



There must be no obstructions in the path of the machine.



When the hoist is in use, no one may be in the area **under** the hoist platform.



Materials must never extend beyond the edges of the platform. Items which can roll must be properly secured. Materials must never stacked against the fencing.

- If the machine is used during the hours of darkness, the area must be adequately lit so that the users have a good view in all conditions.
- The machine may only be used for the purpose for which it was designed.
- Operations on the hoist may only be carried out by persons who are fully conversant with the contents of this manual.
- Inspections and maintenance must be carried out as prescribed in this manual.
- The professional skill and the sense of responsibility of the operating and technical personnel contribute greatly to the safe and efficient use of the hoist.
- Locally applicable working and safety regulations must always be followed.
- Technical personnel must always be in a position to deal with any situation arising during assembly and disassembly.
Operating personnel must be fully familiar with all situation which may arise during normal operation.
- If the operating or technical personnel report a malfunction or a danger, or are not in agreement with the safety measures in force, they must inform the owner or the person directly responsible of the situation.

3.4 Safety after use



When work is stopped or ended the main switch must be set to OFF and secured with a padlock.

- The hoist may be moved over public roads using a normal transport vehicle.

4. TRANSPORT

4.1 Transport to and from the building site



Transport over the public road system may only be carried out with a normal freight vehicle.



Ensure that the folded hoist platform is adequately secured.

Before transporting it, disassemble the hoist in accordance with Part 8.

For transportation, ensure that the machine is properly secured to the floor of the freight vehicle.

The hoist can be loaded and unloaded using a crane mounted on the freight vehicle, a crane which is available on the building site or with a fork lift truck.

Because of its limited dimensions the basic model of the hoist can be transported with a normal freight vehicle. Loose components, such as the control box, the fencing, etc., can be attached to the machine or stored in the cable drum. Ensure that, during transport, all locks and bolts are operated and that the jacks are screwed fully in.

A = Lifting point on the hoist.

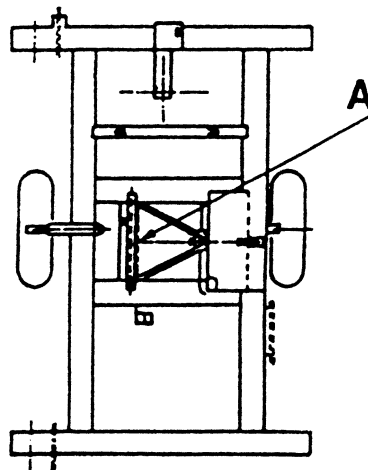


Fig. 11 Lifting eye

4.2 Moving the lift with the tow-bar coupling

On the building site the hoist can be moved using the "transport set" supplied as optional with the hoist.

The transport set consists of two wheels (7) and a tow-bar (5). the tow-bar can be attached to the towing coupling (6) of the towing vehicle.

1. Raise the machine with the jacks.
2. Slide in the outriggers.
3. Mount the transport wheels and the tow-bar (mount the locking mechanism).
4. Retract the jacks.



The maximum speed may not exceed 16 km/hour.



The transport set may not be used to move the hoist over public roads.



If the above mentioned instructions are not followed, the hoist may be damaged or overturned because of the limited ground clearance.

Separate components, such as the control box, the fencing, etc., can be attached to the machine or stored in the cable box. During transport, ensure that all locks and bolts are in place and that the jacks are screwed up.

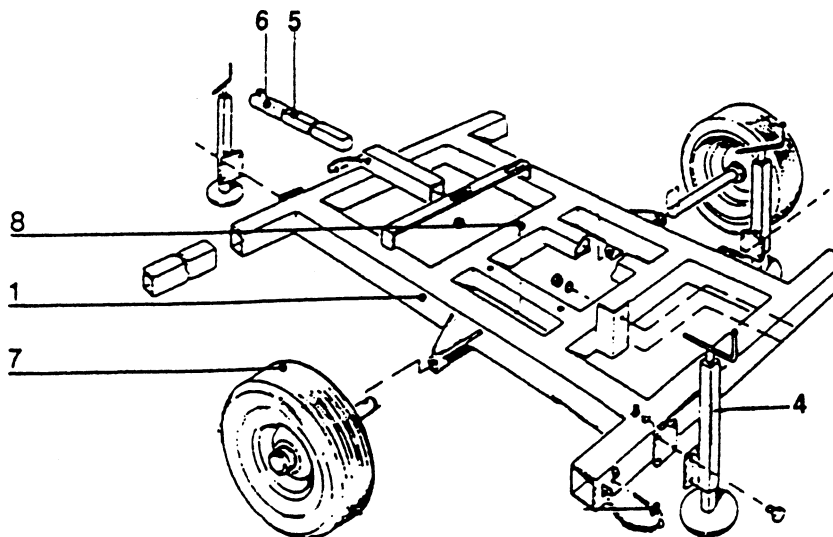


Fig. 12 Ground frame

5. OPERATIONAL ELEMENTS

5.1 Electrical components

- 38. Hoist platform locking
- 39. Switchbox on ground frame
- 40. Switchbox on drive unit
- 41. Connection box for building site power supply (X15) (CEE-standard)
- 42. Lower limit switch
- 43. Fail safe brake switch
- 44. Upper emergency limit switch
- 45. Upper limit switch
- 46. Lower emergency limit switch

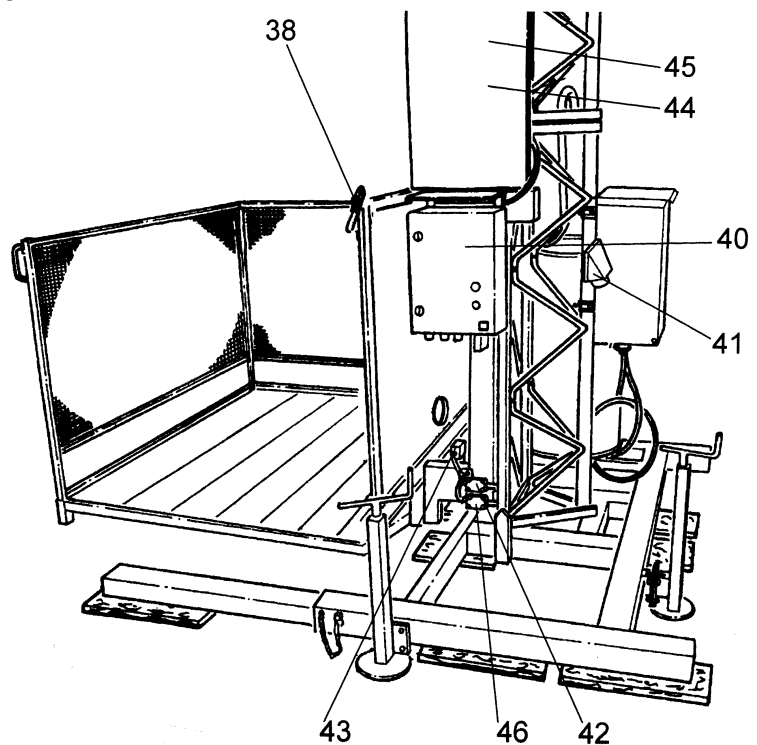


Fig. 13 Electrical components

5.2 Switchbox on ground frame

The switchbox attached to the ground frame is closed by means of two quick-release fasteners.

The switchbox contains:

- Main switch (Q)
- Ground frame connection box socket (X101) with plug (X106)
- Connection box (X104) for the safety barrier (CEE-norm)
- Plug (X9) for the safety barrier (CEE-norm)
- Connection box (X102) for the descent pushbuttons (CEE-norm)
- 12-pole landing/auto plug (X103).

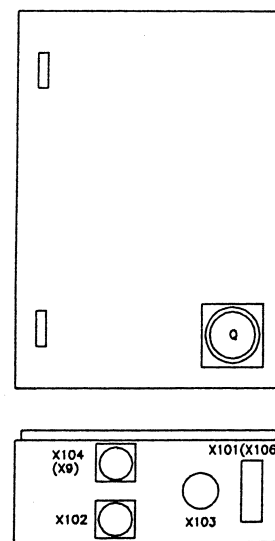


Fig. 14 Switchbox on the ground frame

The main switch can be secured with a padlock to prevent unauthorized use of the hoist.

5.3 Switchbox on the drive unit

- Platform box socket (X201) with plug (X202)
- Selector switch (S15) for Inspection/ Auto-PLC/Normal
- Reset switch with key.

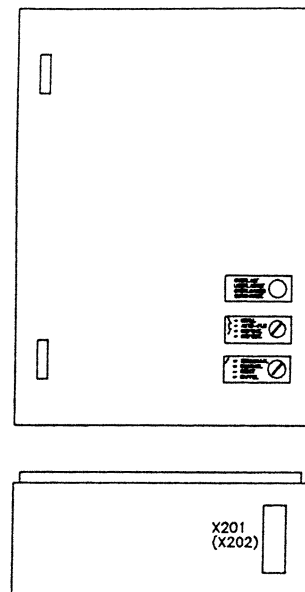


Fig. 15 Switchbox on the drive unit

5.4 Control box

The hoist is operated with four pushbuttons on the control box.

50a UP (S10):

The hoist platform ascends

50b LANDING (S11):

The hoist platform stops at the landing

50c DOWN (S12):

The hoist platform descends

50d EMERGENCY STOP (S9):

The hoist platform stops immediately

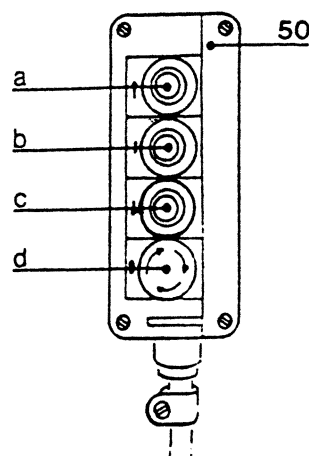


Fig. 16 Control box

Once the EMERGENCY STOP pushbutton has been pressed it remains locked in the operated position. It can be released by rotating it.

5.5 Switching components on the drive unit

- 51. Proximity switch for mast detection (S7)
- 52. Limit switch UPPER (S8)
- 53. Limit switch LOWER (S5)
- 54. Limit switch EMERGENCY UPPER (S2)
- 55. Landing limit switch (S6)
- 56. Limit switch (S4) for the motor mounting plate
- 58. Fail safe brake limit switch (S3)
- 59. Limit switch EMERGENCY LOWER

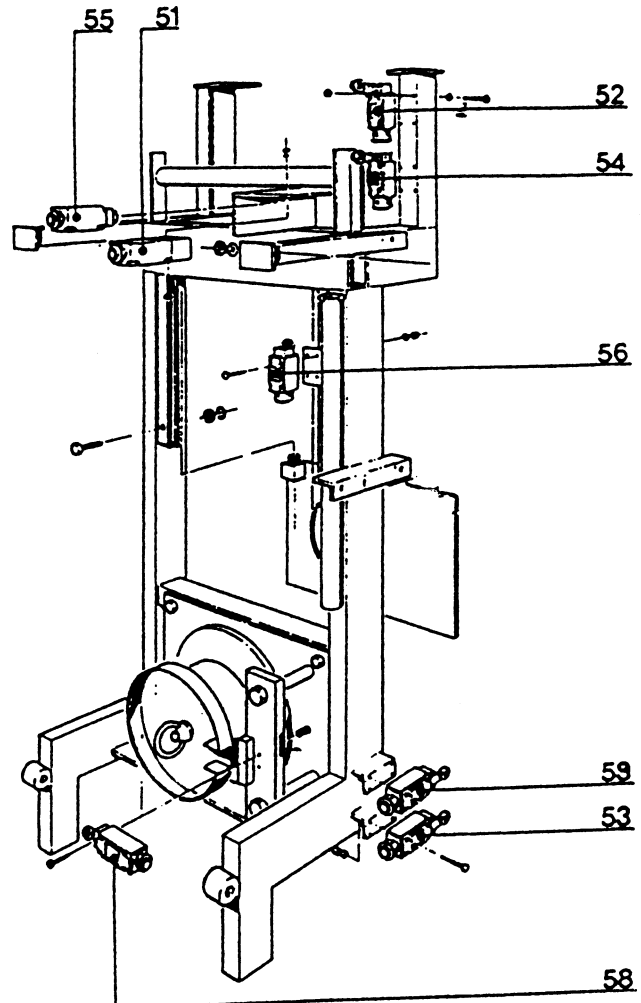


Fig. 17 Switch components on the drive unit

5.6 Fail safe brake

If the speed of descent is exceeded, the hoist platform is stopped immediately by the fail safe brake and fixed in this position.

When the fail safe brake is operated the power supply to the motor is also interrupted.

When the hoist platform ascends again, the fail safe brake is automatically released.

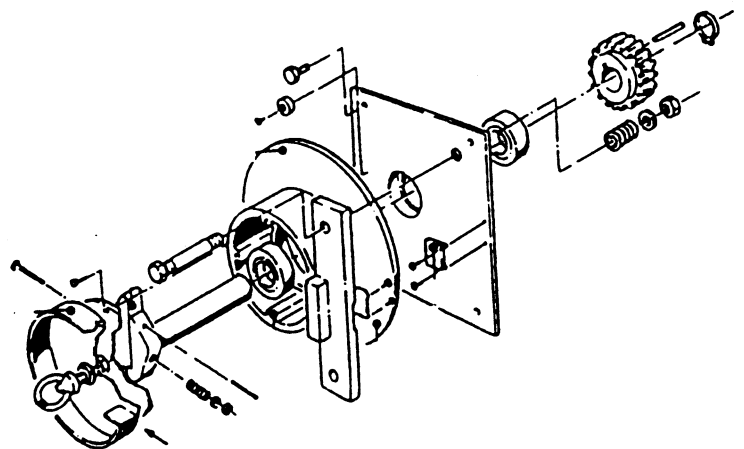


Fig. 18 Fail safe brake

5.7 Landing safety barrier

- 59. Safety barrier
- 60. Limit switch (S14)
- 61. Safety barrier plug (X9)
- 62. Safety barrier connection box (X8)

If, on any landing, the safety barrier is not closed, the hoist cannot be operated.

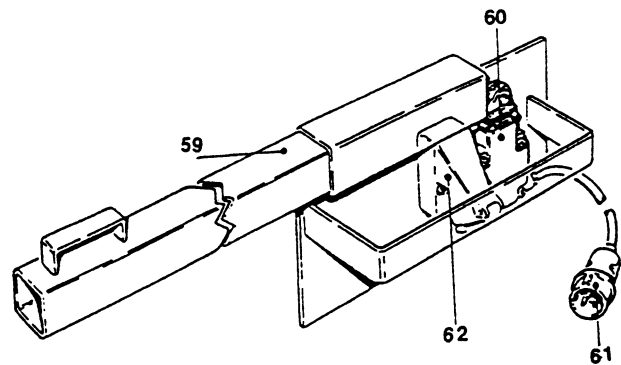


Fig. 19 Landing safety barrier

5.8 DOWN pushbutton

- 63. DOWN pushbutton (S13)
- 64. DOWN pushbutton plug (X13)
- 65. DOWN pushbutton connection box (X14)

At each landing a down pushbutton can be mounted with which the hoist can be made to descend.

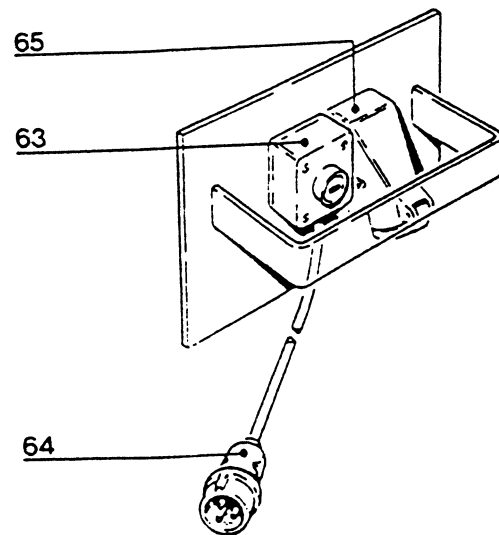


Fig. 20 Descent pushbutton

5.9 2.5 metre stop

- 66. 2.5 m. Switch
- 67. 2.5 m. Striker plate

During the descent, the hoist stops at a height of 2.5 metres, after which the pushbutton must remain pressed to make it descend further.

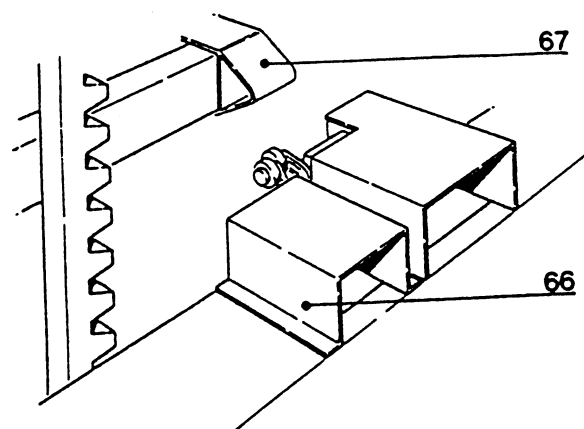


Fig. 21 2.5 meter stop

6. ASSEMBLING THE HOIST AND ANCHORING THE MAST

If assembly work must be interrupted, this must be done in such a way that, when the work is restarted it is clear what stage had been reached when work was stopped. For this reason always complete a part of the assembly, for example, assemble, collect or secure all the components for a connection, complete a bedding or completely assemble an anchor before stopping work.

While the mast is being mounted, no more than two persons may be on the platform, so that no more than 75% of the lifting capacity is used.

The assembly must always be followed by a test run. Until the test has been performed, the hoist may not be used for any purpose other than transporting its own mast elements.

The loading of the hoist must be planned so that when, in the assembly situation, the maximum distance between anchors has been reached, the material load on the platform is a minimum.

6.1 Preparation for assembly



Ensure that the site where the hoist is to be placed conforms to the national safety regulations and that permission has been obtained from the local authorities to assemble the hoist

1. Ensure that a suitable electrical power supply, good lighting, lifting equipment and tools are available.
2. Ensure that the building site is easily accessible to the vehicle which will deliver the hoist.
3. Ensure that the hoist site has good drainage.

4. Plan the location of the hoist so that where the mast needs to be anchored, it can be so anchored with the standard material.
5. The electrical power supply on the building site must be placed as close as possible to the hoist to reduce the voltage drop to a minimum.

6.2 Assembly

1. Place the machine in the desired position. Pay attention to the distance between the scaffolding and/or the building and the path of the hoist platform (400 mm).

The ground loading may not exceed 200 kN/m². The wood used for packing under the machine must be capable of bearing a load of 2000 kN/m².

2. Screw down the three jacks (4) so that the transport wheels (if present) are clear of the ground.
3. Remove the locking springs (8), the transport wheels and the tow bar. Store the transport set in a safe place for future use.

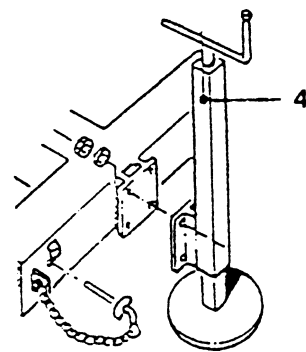


Fig. 22 Jacks

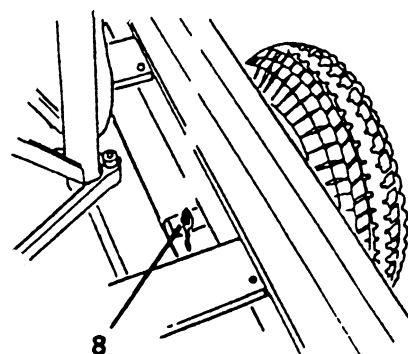


Fig. 23 Demounting the transport wheels

4. Pull the two outriggers (2) out of the ground frame (1) and secure them with the locking pins (3). Turn the locking pins so that the cam on the pin is behind the lug on the frame.
5. Level the machine with the three jacks (4). Check this with a spirit level with a minimum length of one metre, held against the mast (14) (in two directions!).
6. Support the ground frame at the four corners, under the mast, and at the ends of the outriggers. The support (24) must be arranged not only to compensate for any differences in ground level but also to distribute the total load more evenly. The ground support must also be suitable for the type and condition of the ground.
7. Screw the jacks (4) up so that they are clear of the ground.

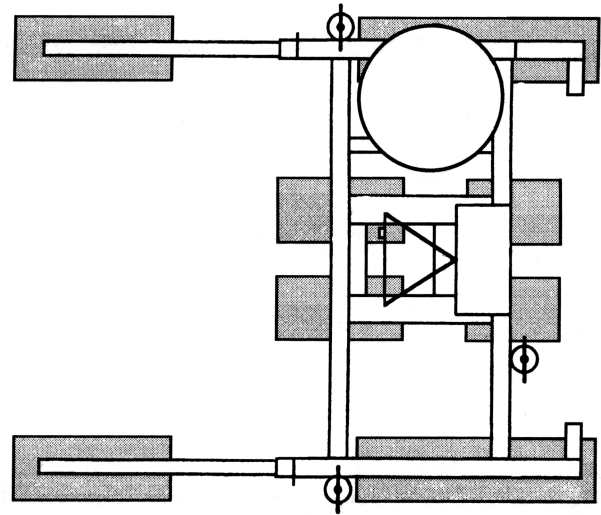


Fig. 24 Ground support

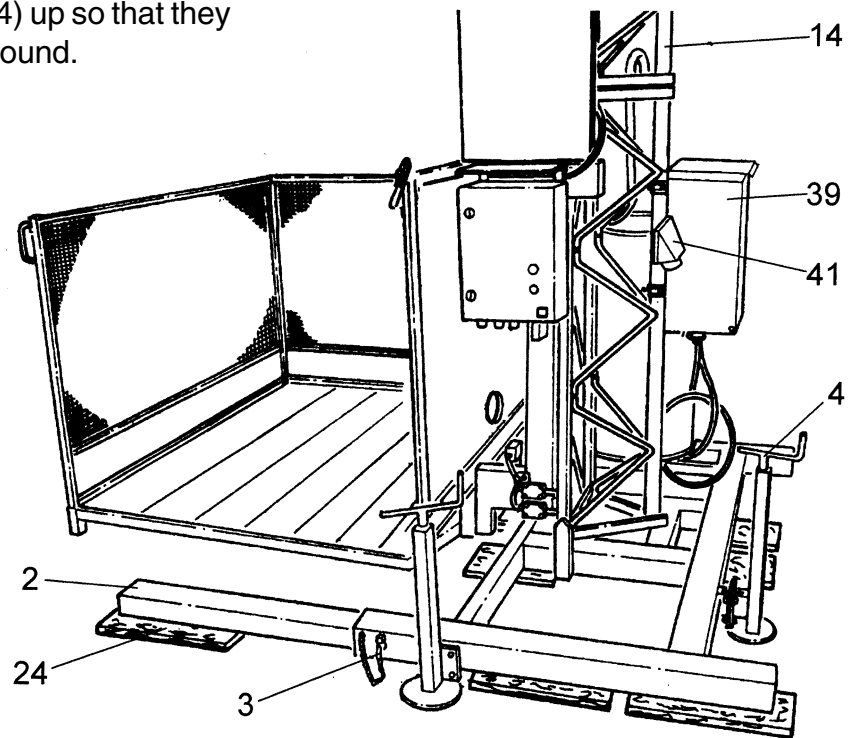
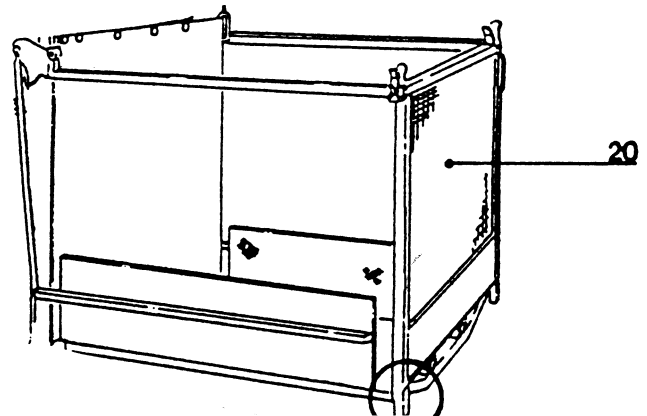


Fig. 25 Supporting the ground frame

8. Remove the securing device from the hoist platform (38).



9. Place the fixed front wall (20) in position secure it with the bolts provided (22).

Fig. 26 Hoist platform transport safety device

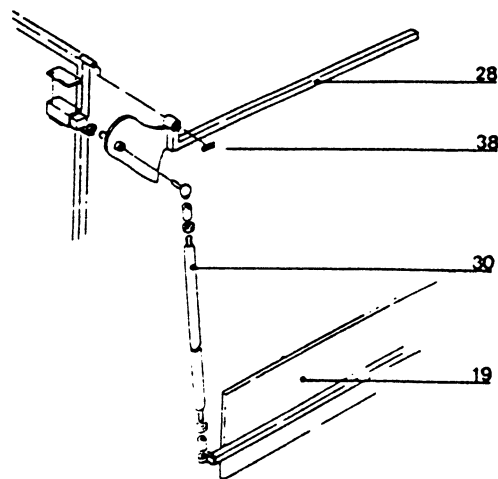
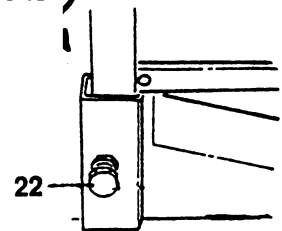


Fig. 27 Fitting the front wall

10. Fit the ramp (19) on both sides of the platform with the switch plate (38) and the rod (19) to the back wall. The switch plate must be so mounted that the switch is on the right side of the plate.

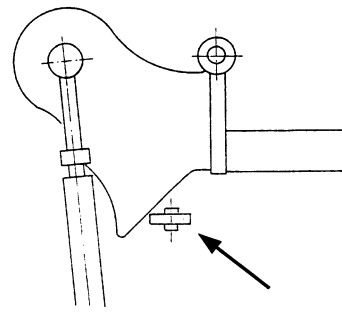


Fig. 28 Gate switch

11. Check that the LOWER striker plate (10) is fitted.

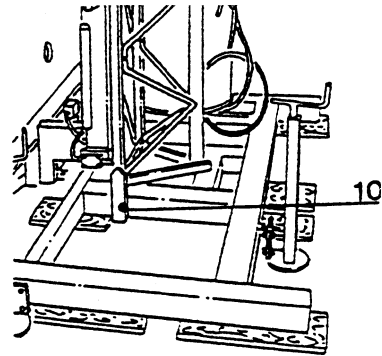
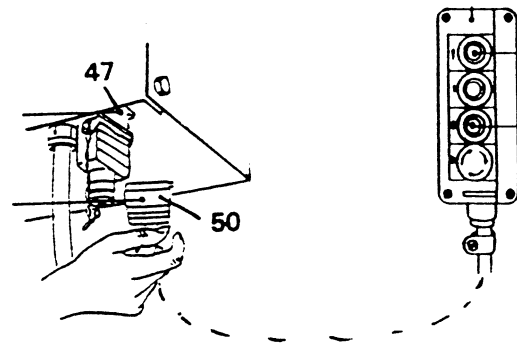


Fig. 29 Striker plate - lower

12. Connect the hoist to the building site power supply. The connection box (X15) (41) is mounted on the frame box (39).
13. Remove the connecting plug (X202) from the platform socket (X201) (47). Insert the plug from the control box (50) in the switchbox socket (40) and place the key switch (S15) (49) in the inspection position.



If the control box plug is removed again, the connecting plug (X202) must be immediately replaced.

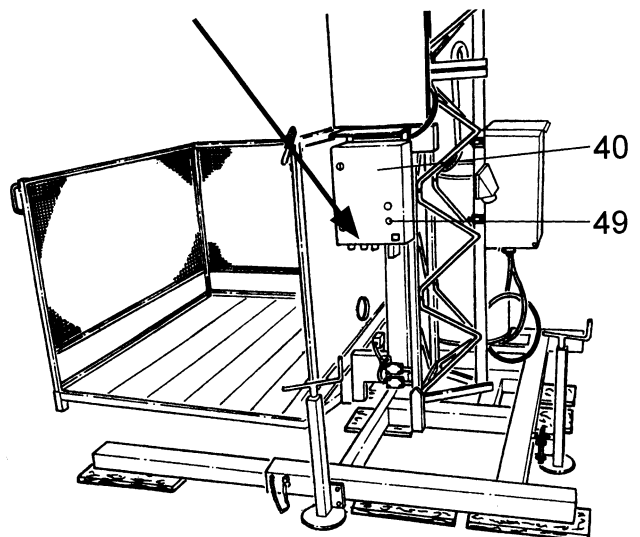


Fig. 30 Electrical connection

14. Now assemble the mast elements.
Place a number of mast elements on the hoist platform, ensuring that there is adequate working space.
15. Use the manual control (50) to elevate the drive unit (31) with the platform (15) until the tilting mechanism just extends beyond the topmost mast element.
16. The drive unit with the hoist platform must not be raised too high; the proximity switch (51) must always remain in front of the mast. If the proximity switch cannot detect the metal of the mast, the hoist can only descend.
17. When the correct height has been reached, a mast element can be placed on the tilting mechanism (32). Tilt the mast onto the previously fitted mast element and secure it with four zinc-plated M14 x 90 bolts (material 8.8; torque 65 Nm).

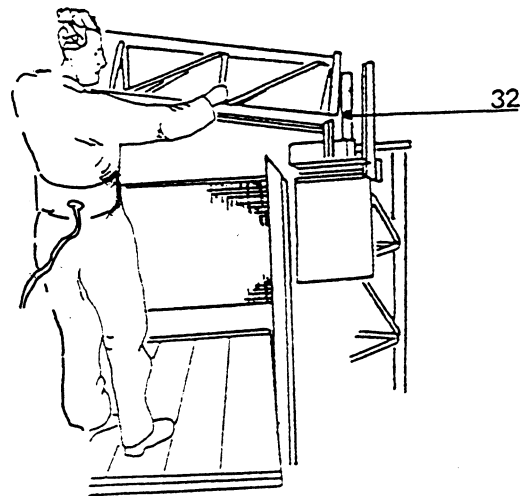


Fig. 31 Assembling the mast elements

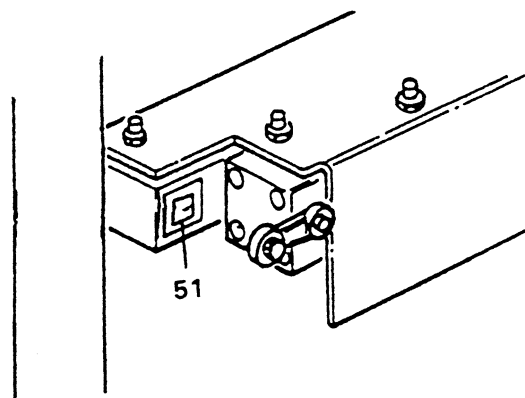


Fig. 32 Proximity switch

Repeat this procedure for the following mast elements.

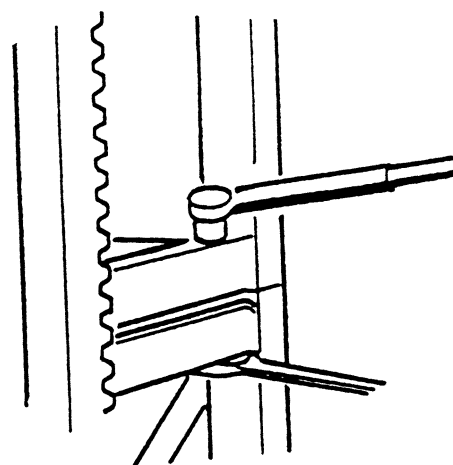


Fig. 33 Tightening the mast bolts

18. Once the first three mast elements have been assembled, the first anchor must be fitted. Check again with a spirit level that the mast is truly vertical in both directions. Drill (if required) the holes for two wall anchors.

19. Fix the mast adaptor (26a).

20. The hoist can be anchored to the facade of the building or to the scaffolding.

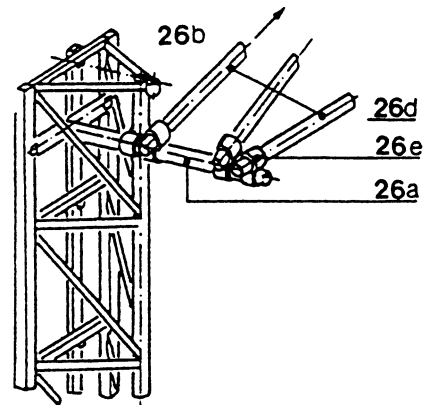


Fig. 34 Mast adapter

Use only bolt couplings.

Anchoring to the building facade:

Ensure that the facade can withstand the forces involved, see Part 6.4.

- Fix the anchor plates with the anchor bolts (26b).
- Fit the anchor tubes (26d) to the mast adaptor with the bolt couplings.

Attaching to scaffolding:

Ensure that the scaffolding can withstand the forces involved, see Part 6.4.

- Secure the anchor tubes with bolt couplings to the mast adaptor and the scaffolding.

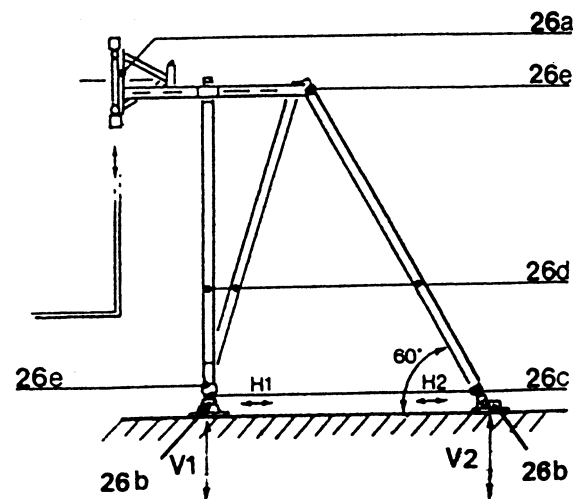


Fig. 35 Mast anchoring

Additional anchors must be positioned every six metres.



The power supply cable must not run on the anchored side of the machine.

- 26a Mast adapter
- 26b Wall plate + wall anchor
- 26c Anchor coupling
- 26d Scaffold tube
- 26e Rotatable coupling

Hoist with a ramp on the facade side

When landing barriers are used the hoist can be placed in the following way:

1. See figure A.

There is no extension mounted on the storey level.

- The distance between the hoist and the storey level must be 0,5 meter.
- On the storey level a side protection with a height of 1.1 meter, with a knee rail and a kickboard must be placed.

- A = Distance hoist - Storey level.
 B = Distance hoist - landing barrier.
 C = Landing barrier.
 D2 = Storey level.

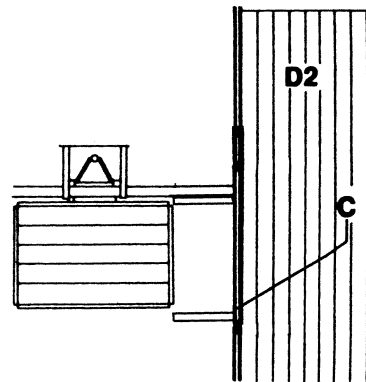
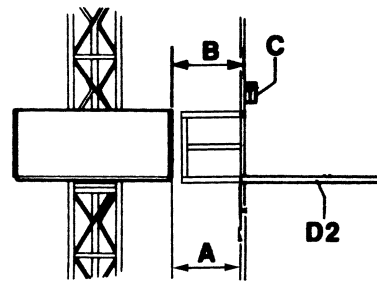


Fig. A

21. Attach the cable guide (27) with the rotatable coupling to the mast. The first cable guide must be placed 1 meter above the cable drum. Additional cable guides must be attached every six metres.

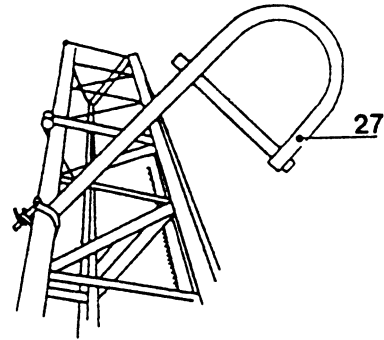


Fig. 36 Cable guide

22. When the desired mast height has been reached, the limit striker plate (12) must be mounted. The limit striker plate is painted red.

23. Mount the striker plates for the landings (13) at the desired heights.

24. Perform a test run and check:

- the anchoring;
- the mast attachments;
- the operation of the limit switches;
- the emergency limit switches (upper and lower);
- the functioning of the control box;
- the power cable and the cable guides;
- the smooth running of the power cable through the cable guides and in the cable drum;
- the correct functioning of the landing operating controls.

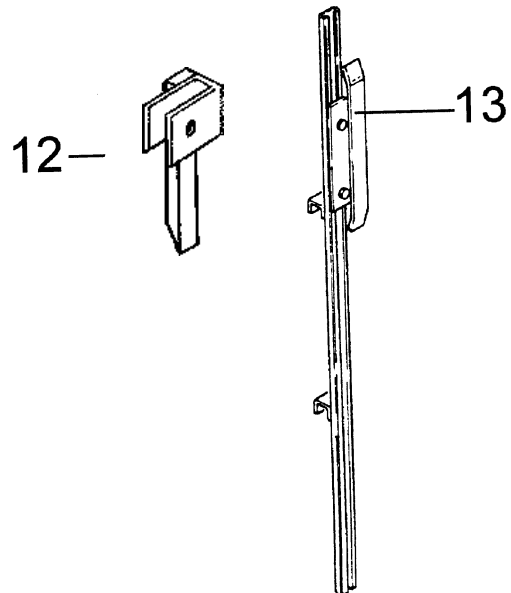


Fig. 37 Limit and landing striker plates

25. Grease the rack.

26. Withdraw the control box plug (50) from the platform box socket (X201) (47). Insert the connecting plug (X2).

Return the key switch (S15) (49) to the normal position and remove the key.

The machine is now in the normal operating mode!

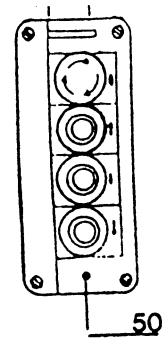


Fig. 38 Manual control box

27. Fasten the mast guard (17) with the bolts provided.

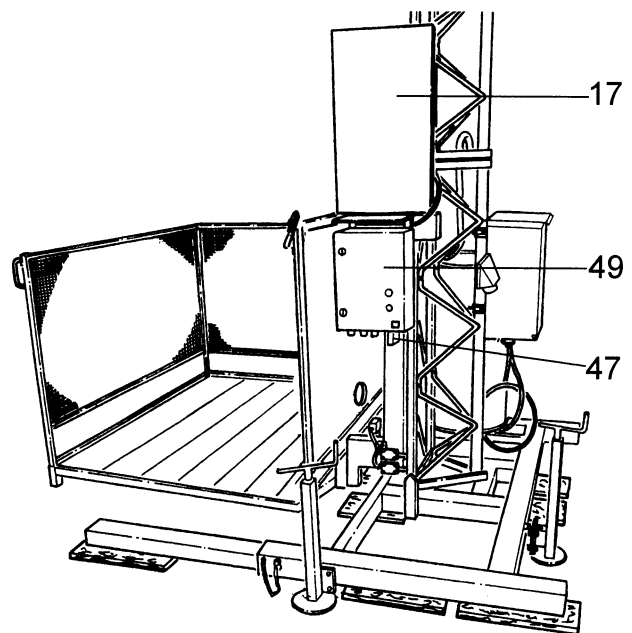


Fig. 39 Mast protection

28. Withdraw the connecting plug (X106) from the frame box socket (X101) and insert the plug (50) of the hand-held control box.

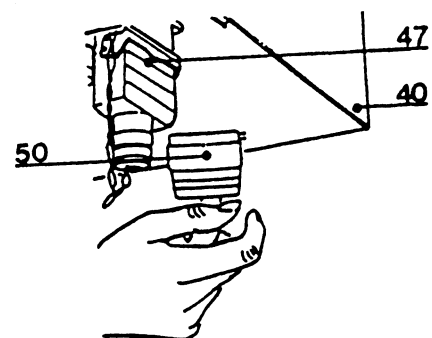


Fig. 40 Connector

29. The connecting plug (X7) (45) must be inserted in the socket at the highest landing gate.
30. A descent pushbutton (S13) (63) may be installed at each landing gate.

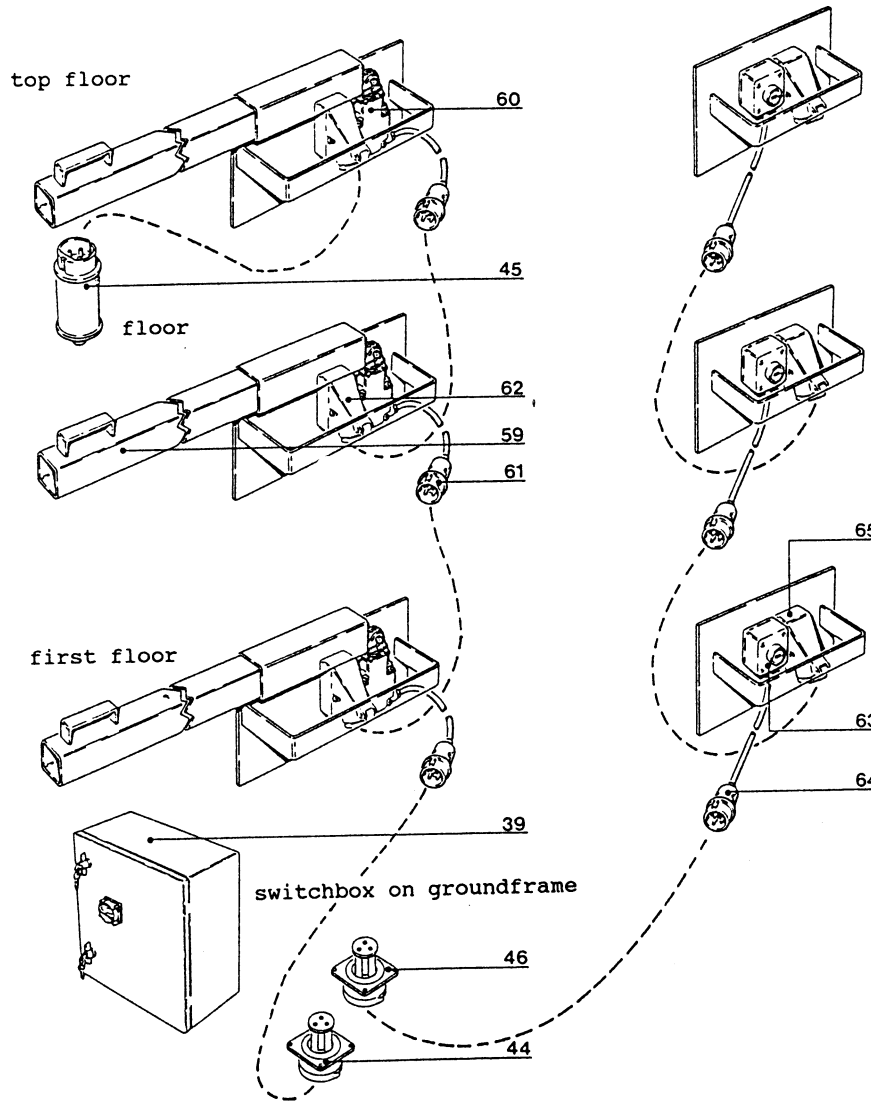
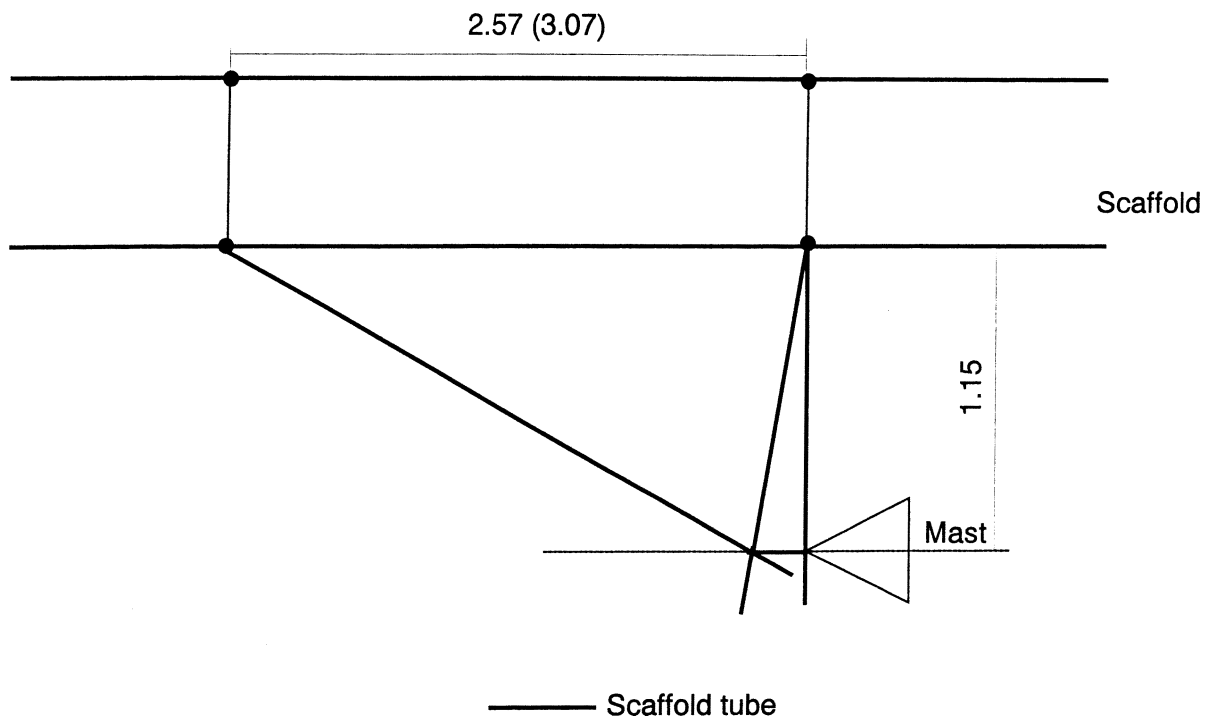


Fig. 41 Landing safety barriers and descent pushbuttons

31. Attach the ground station fencing to each side of the hoist to ensure that no one can enter the space under the hoist while it is being operated.

6.3 Anchor forces

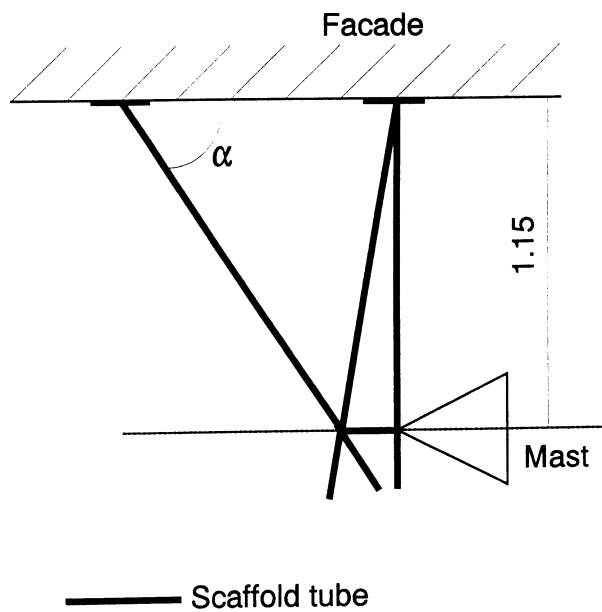
Anchoring to scaffolding



	Anchor force [kN] (length of scaffold section 2.57 m)	Anchor force [kN] (length of scaffold section 3.07 m)
Perpendicular	2.3	2.1
Parallel	2.8	2.8

The anchor forces are based on the generally accepted construction regulations for forces transmitted to the facade via the scaffolding.

Anchoring to the facade



	Anchor force [kN] (angle alpha = 60°)	Anchor force [kN] (angle alpha = 45°)
Perpendicular	4.0	2.9
Parallel	2.1	2.5

The anchor forces are based on the generally accepted construction regulations for forces transmitted to the facade.



7. OPERATION

1. Before the hoist is put into use it must be visually inspected for the following points:
 - anchors and cable guides
 - safety fixings
 - connections between mast elements
 - any loose components
 - the supports and the quality of the ground
 - electrical connections
 - safety aspects.

2. Remove the padlock from the main switch (42).

3. Put the main switch in position I or position II, depending on the phase rotation of the power supply on the building site.

4. Close the access gate (19) and secure the gate with the bolt (21), at both access points.

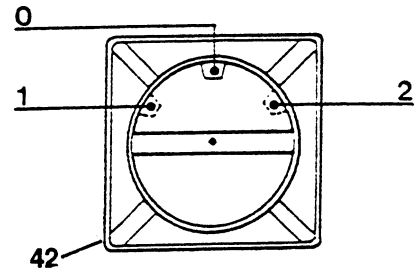


Fig. 42 Main switch

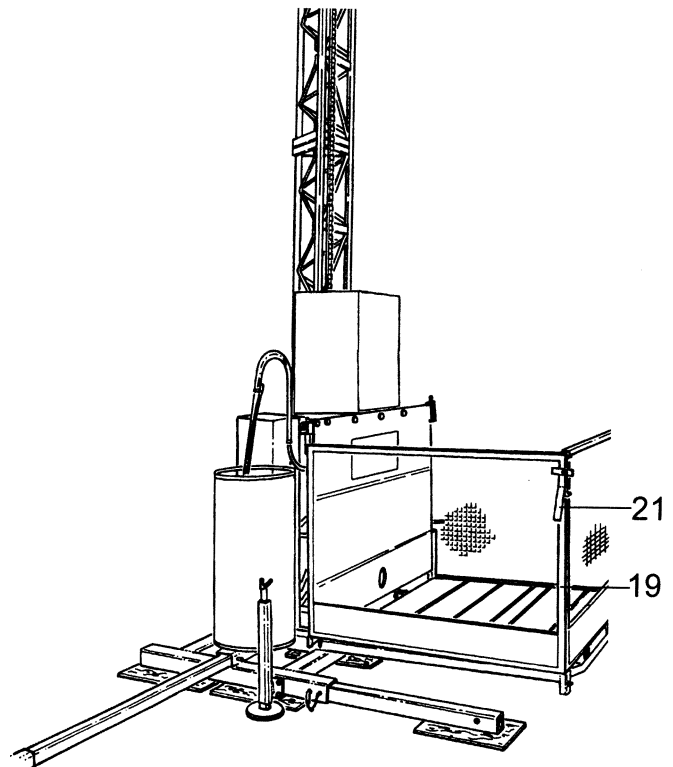


Fig. 43 Access gate

5. Check that the EMERGENCY STOP push button (50d) on the control box (50) is not activated (the pushbutton must be out {rotate if necessary}).
6. Operate the hoist with the pushbuttons on the control box (50):

- **"UP" (50a)**

Press the pushbutton momentarily
The hoist ascends

- **"DOWN" (50c)**

Press the pushbutton.
The hoist descends to ground level. For the lowest 2.5 metres the pushbutton has a 'dead man's' function.

- **"LANDING" (50b)**

Press the pushbutton.
The hoist stops at the landing.

If it is required that the hoist stop at a particular landing, press the pushbutton "LANDING" after the hoist has passed the penultimate landing

- **"EMERGENCY STOP" (50d):**

In a dangerous or critical situation the hoist can be stopped immediately by pressing this pushbutton.

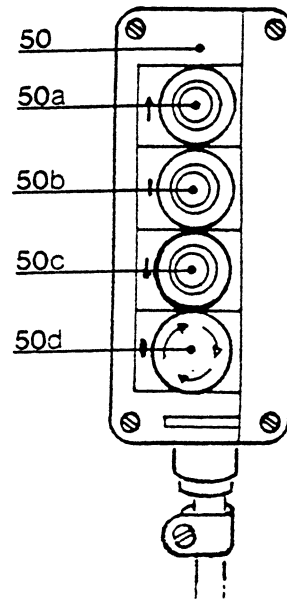


Fig. 44 Manual control box

7. A test run must be made at the beginning of each day.
8. Landing striker plates can be fixed to the mast at any height. In this way it is possible to stop the hoist any desired height.



Transporting persons on the hoist is strictly forbidden!



When work is stopped or when the building site is unattended the hoist must be placed in the lowest position and the main switch must be secured in the OFF position with a padlock.



Regardless of size, the materials being transported must never extend over the edge of the platform. Materials which can roll must be properly secured. The load must never be supported against the fencing.



It is forbidden to be in the area immediately under the hoist.

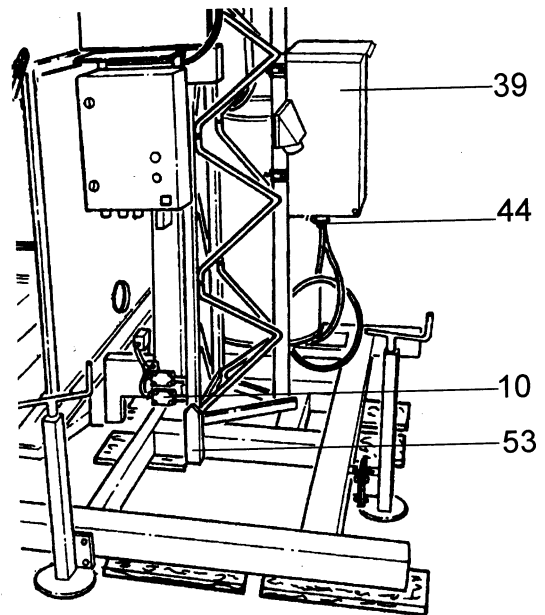


Fig. 45 Test run



For safety reasons, every landing higher than two meters above the ground, and which provides access to the hoist, must be provided with a barrier to prevent anyone falling.



Using the hoist without barriers being present is not permitted.

7.1 Emergency descent

In an emergency situation, for example, in the event of a power failure, the hoist can always be made to descend.

- Operate the brake release lever on the motor. Ensure that the speed of descent is not greater than normal, otherwise the fail safe brake will be automatically operated.



After a descent of five metres, the hoist must be stopped for two minutes in order to allow the brake to cool down.

8. DISASSEMBLING THE HOIST AND PREPARING IT FOR TRANSPORTATION



Ensure that the maximum loading which is applicable in the assembly situation is not exceeded during disassembly.

1. Disassemble the landing barriers.
2. Withdraw the plug (50) for the hand-held control box from the socket on the ground frame switchbox (X101) and replace it with the connecting plug (X106) (47).
3. Disassemble the mast guards.
4. Withdraw the connecting plug (X202) from the socket (X201) (47) and replace it with the plug for the hand-held control box (50). Set the key switch (S15) (49) in the inspection position.
5. Disassemble the landing striker plates.
6. Disassemble the cable guides.
7. Remove the uppermost mast elements one at a time. Lower the disassembled mast elements to the ground before removing the uppermost anchor.
8. Repeat this procedure until the hoist is in the lowest position and the mast is completely disassembled.

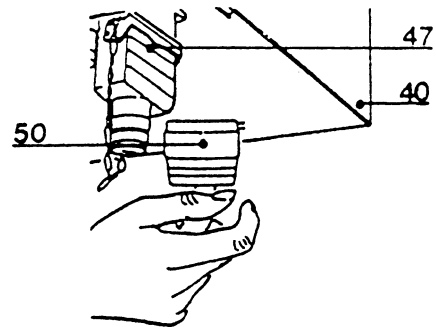


Fig. 46 Connector

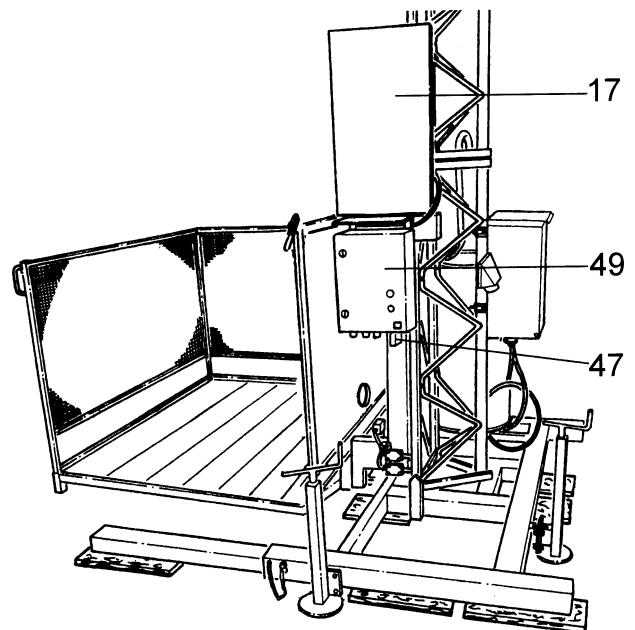


Fig. 47 Disassembling the mast guards

9. Disassemble the access gates..
10. Disassemble the fencing at the front of the machine. Fold the platform up and secure it in position.
11. Screw the three jacks down.
12. Slide the outriggers in and secure them with the locking pins.
13. Mount the transport wheels and secure them. Mount the tow bar.
14. Screw the jacks clear of the ground.

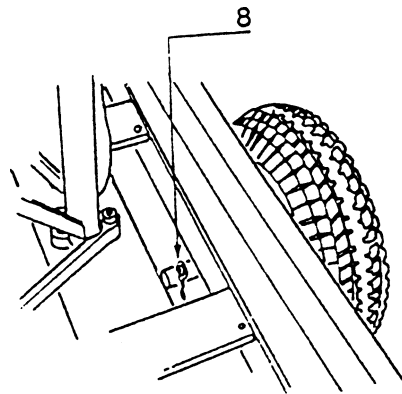


Fig. 48 Assembling the transport wheels

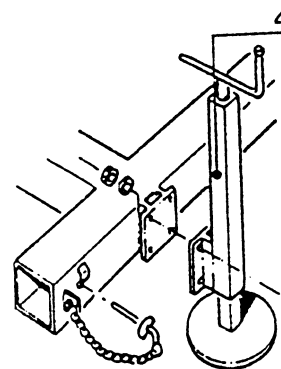


Fig. 49 Jacks

9. MAINTENANCE

9.1 General

The simple and robust construction of the machine allows maintenance to be kept to a minimum.

Sensible use of the machine, regular checks for correct functioning and regular cleaning will result in a minimum requirement for maintenance. This will guarantee a long working life for the machine.

9.2. Weekly maintenance

- Coat the rack and pinion with special "HEK rack and pinion grease". If deposits of sand or grit are present, they must be cleaned off.
- Check:
 - the anchoring;
 - the mast attachments;
 - the power supply cable;
 - the cable guides;
 - the emergency switches;

9.3. Monthly maintenance

Check:

- the guide rollers;
- visually all fastenings and bearings;
- that all mast bolts are tight;
- the bolts securing the rack;
- the operation of all limit switches, especially the upper emergency limit switches and the limit switch on the motor mounting plate;
- the fastening of all anchors;
- the air gap for the motor brake and adjust as necessary. (Part 11.1).

9.4. Annual maintenance

- Check the operation of the fail safe brake mechanism while the platform is empty.
- Check the oil level in the gearbox. If necessary, top up as described in Part 9.7.
- Check the transport wheel tyre pressures.
- Repair any damaged zinc coatings or paintwork.
- Check all mast bolts for corrosion and tightness. (tightening torque 65 Nm).

9.5 Triennial maintenance

Renew the oil in the gearbox in accordance with Part 9.7.

9.6 Storing the hoist

- Inspect the machine thoroughly.
- Check all important machine parts. If necessary, replace any parts which are damaged.
- Grease the rack and the pinion.
- Inspect the mast elements (with the associated rack sections) and check that all removable connections are in order.
- Check the lower mast bolts for corrosion and replace them if necessary.
- Check the transport wheel tyre pressures; for long term storage, jack up the ground frame to lift the wheels off the ground.
- Cover the machine with a tarpaulin; as a minimum, always cover the switchboxes and the limit switches.

9.7 Renew the gearbox oil

Removing the oil

- Set the machine in an upright position on a flat level floor.
- Place a tray under the drainage plug to receive the oil.
- Unscrew the drainage plug and allow all the oil to run out.
- Dispose of the used oil by a garage or waste disposal facility.

Refilling with clean oil after draining

- Re-fit the drain plug, together with a new sealing washer or liquid sealant (depending on construction).
- Remove the filling plug and the level plug.
- Pour oil in the filler opening until it begins to run out of the level opening.
- Re-fit the level plug and the filling plug, together with new sealing washers or with liquid sealant (depending on construction).

Check the gearbox oil level

- Set the machine in an upright position on a flat level floor.
- Unscrew the level plug.
- Check that the oil level is up to the bottom of the oil level opening.
- If necessary, top up with oil.

Recommended gearbox oil:

- SHELL OMALA 770
- ESSO SPARTAN 460
- TOTAL AZOLA 190

9.8 The motor brake

General

The electric motor is fitted with an electromagnetically operated spring brake. The brake functions according to the "normally ON" principle, that is to say, if the power supply to the motor is not present the brake will be activated and the motor shaft will be braked ($n = 0$ rpm). The braking effect is achieved by friction between a number of plates. The brake will only function if it is used "dry" (ungreased).

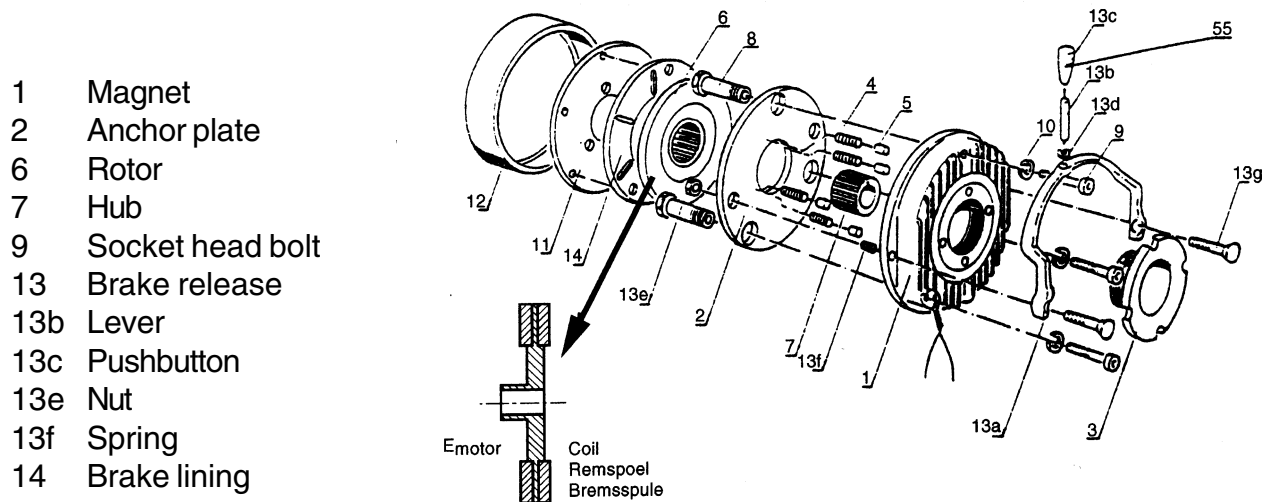
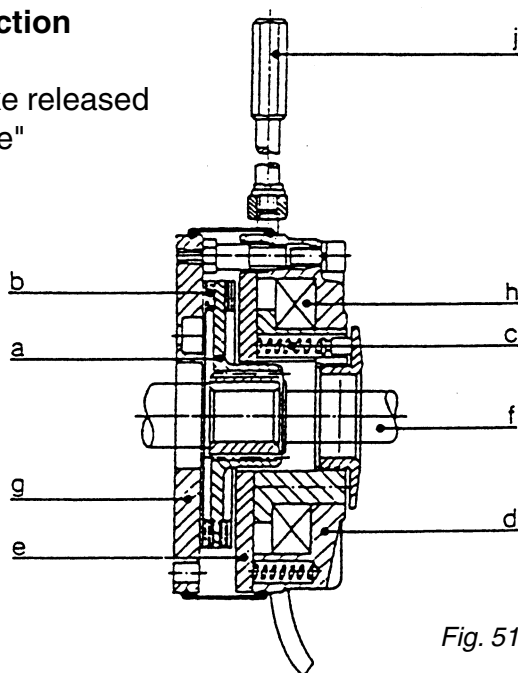


Fig. 50 Motor brake

In normal use the motor brake requires practically no maintenance. Only after frequent ascent and descent of the hoist may it be necessary to adjust the width of the air gap between the anchor disc and the stator, and to replace the rotor if required.

Function

Brake released
"Free"



Brake active
"Brakes"

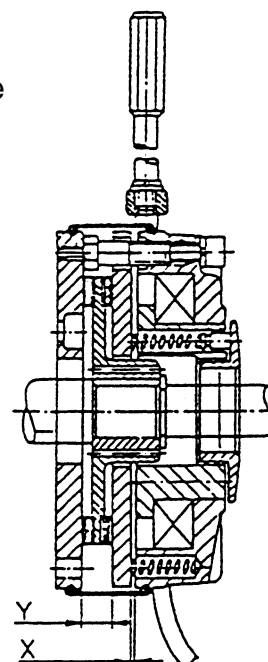


Fig. 51 Motor brake

The mechanism contains a metal rotor (a) with friction material (b) on both sides. Four compression springs (c) in the stator (d) exert an axial force on the anchor plate (e). The anchor plate thus pressed against the rotor. The rotor is mounted on the motor shaft in such a way that it can slide along the shaft in an axial direction. The anchor plate is pressed against the rotor causing the rotor to be pressed, in turn, against the friction plate (g). The friction between the brake lining material on either side of the rotor, the anchor plate and the friction plate produce the necessary braking torque (32 Nm).

A braking coil (h) is fitted in the stator; this coil produces a strong magnetic field when a DC current is passed through it. When it is necessary to release the brake, a current must be passed through the coil. The magnetic field generated by the braking coil "pulls" the anchor plate toward the stator, releasing the brake.

The motor brake can also be released manually (j). When the brake release lever is moved in the direction of the arrow two ball-ended bolts move the anchor plate toward the stator, against the spring pressure, thus releasing the brake.

Check the condition of the brake

To check the condition of the brake measure the width of the air gap "X" and the thickness of the friction material on the rotor "Y" every three months (see the illustration on the previous page). The air gap "X" is adjusted in the factory to 0.3 mm and may never be greater than 0.75 mm. The total thickness of the rotor (including the friction material) must not be less than 6 mm.

Adjustments

1. Switch off the power supply to the hoist with the main switch and secure this with a padlock.
2. Remove the brake release (j) with the aid of an open ended spanner (10 mm).
3. Remove the fan cover from the motor.
4. Use a feeler gauge to measure the air gap "X" close to the three hollow adjusting bolts (m).
5. Remove the rubber dust ring (n) and measure the thickness of the rotor "Y" with a vernier gauge. Replace the rotor if its thickness is smaller or equal to 6 mm.
6. After reassembling the brake, screw the adjusting ring (o) as far as possible into the stator.
7. Adjust the width of the air gap "X" as follows:
 - Unscrew the three locking bolts.
 - Use an open-ended spanner to screw the three hollow adjusting bolts further into the stator. Ensure that the three bolts are all screwed into the stator by an equal amount.
 - Use a feeler gauge to measure the width of the air gap "X" at a point close to each of the three bolts and adjust them until the width of the air gap is 0.3 mm.
 - Re-tighten the three locking bolts.
8. Re-fit the rubber dust ring, the fan cover and the brake release mechanism..
9. Check the operation of the brake.

The metal rotor and other components for the motor brake can be ordered from HEK Manufacturing B.V. in Middelbeers.

9.9 The fail safe brake

General

The fail safe brake is set by the manufacturer to operate at the correct maximum speed.



This setting must never be changed!!

The disc springs for the brake blocks are adjusted to the correct pre-pressure and locked with nuts.

Operation

When the maximum permitted speed of descent is exceeded the centrifugal weight (37d) flies outward and is snagged by the contact pawls (37e) on the inner surface of the housing (37). The brake disc (37f) now starts to rotate and is brought to rest by the brake blocks.



If the fail safe brake is operated, the cause of the defect must be discovered and corrected before the fail safe brake is returned to the rest position and the hoist is put back into operation. In the event of any uncertainty, inform the service organization.

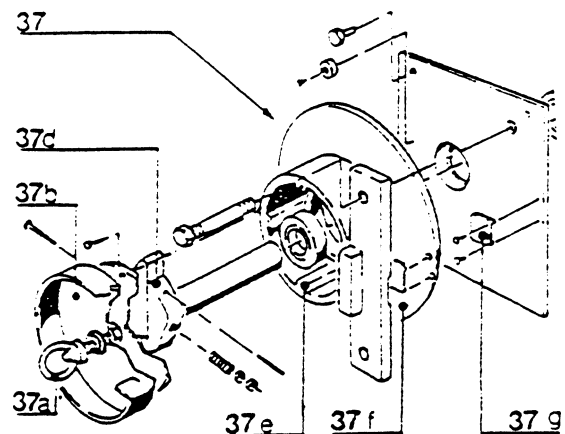


Fig. 52 Fail safe brake

Returning the fail safe brake to the normal position

- Determine the cause of the defect!
1. Withdraw the control box plug (50) from the frame box socket (X101) (43) and insert the connecting plug (X106) in the frame box socket.
 2. Climb onto the hoist platform, taking the hand-held control box with you!
 3. Withdraw the connecting plug (X202) from the platform socket (X101) (47). and insert the control box plug (50) in the platform box socket (X101) (47).
 4. Set the key switch (S15) (49) with the key in the inspection position.
 5. Press the UP pushbutton (50a) and at the same time operate the reset switch (S201) until the platform has ascended by 1 metre.
The centrifugal weight (37d) in the fail safe brake now returns to its neutral position.
 6. Unscrew the eye nut (37a) from the fail safe brake and rotate the disc (37b) until the fail safe brake limit switch (S3) (58) drops back into the recess (37c). This results in the control current being restored (the eye nut can be reached via the gap in the fixed wall of the hoist platform).
 7. Re-tighten the eye nut (37a).

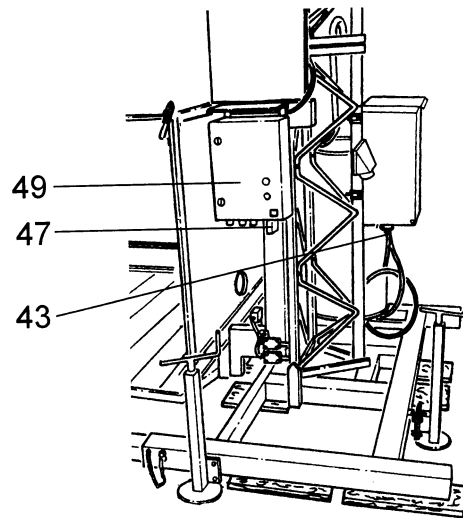


Fig. 53 Returning the fail safe brake

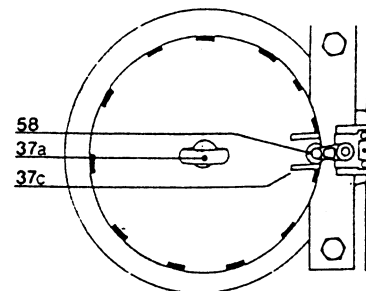


Fig. 54 Fail safe brake switch

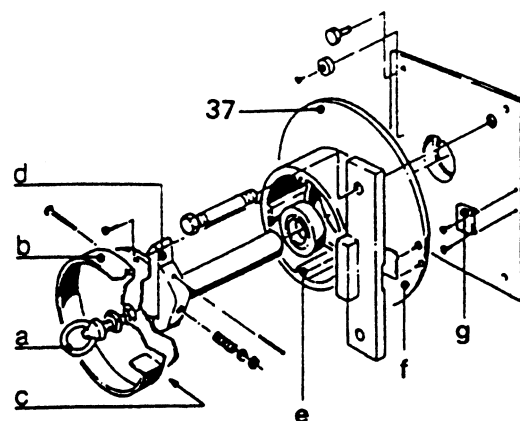


Fig. 55 Centrifugal fail safe brake

8. Press the DOWN pushbutton (50c), until the hoist platform is stopped by the LOWER limit switch (S5).
9. Withdraw the control box plug (50) from the platform box socket (X201) (47) and insert the connecting plug (X202) in its place.
10. Withdraw the connecting plug (X106) from the frame box socket (X101) (43) and insert the control box plug (50) back in the frame box socket.
11. Set the key switch (S15) (49) again in the normal position and remove the key.

The hoist is again ready for normal use.

9.10 Checking the main power relay K1, K2 en K3

The relay (K1) controls the power supply to the motor when the hoist is ready for use. This is the case when:

- the thermal cut-out fuses are switched on,
- the phase rotation of the power supply is correct,
- the EMERGENCY pushbuttons are unlocked,
- the loading ramps and gates are closed,
- The upper EMERGENCY limit switch is not operated,
- the fail safe brake limit switch is not activated, so that the relay (K1) is actuated.

All the above mentioned safety switches and contacts are connected in series and integrated in the control circuit of the relay (K1). These switches and contacts, which are connected between the 42-volt transformer winding and the coil of the relay (K1) form the so called "safety circuit".

The relay (K2) causes the motor(s) to drive the hoist in an upward direction. The relay (K2) can only be actuated if:

- the relay (K1) is actuated,
- the UPPER limit switch is not operated,
- the proximity switch for the mast assembly detects the presence of a mast,
- the relay (K3) (DESCEND) is not actuated (mutually exclusive switching).

The relay (K3) causes the motor(s) to drive the hoist in a downward direction. The relay (K3) can only be actuated if:

- the DESCEND limit switch is not operated,
- the limit switch at the motor mounting is not operated,
- the relay (K2) (ASCEND) is not actuated (mutually exclusive switching).

In addition to the above mentioned standard safety arrangements, some HEK machines may be fitted with extra safety switches and contacts in the safety circuit or in the control circuit of relays K2 or K3.



10. MALFUNCTION TABLE

Motor does not rotate	Power supply not connected	<ul style="list-style-type: none"> - Fuses for the building site supply defective - Cable damaged - Motor protection relay F1 defective
	Phases incorrectly connected	<ul style="list-style-type: none"> - Set the main switch in position 1 or 2.
	Voltage is too low	<ul style="list-style-type: none"> - Incorrect type of cable used - Cable is too long (see Part 1).
	42 VAC control voltage not present	<ul style="list-style-type: none"> - Automatic fuse F2 switched out - Fuse F3 defective
	42 VAC not switched <ul style="list-style-type: none"> - connection to the barrier (or switchbox) is not present - limit switches UPPER, EMERGENCY UPPER, or LOWER, not functioning 	<ul style="list-style-type: none"> - Check switch S1 - Motor current limiter F4 switched out - Check switch S14 and the connection - Pushbutton "EMERGENCY STOP" depressed - Check switch, cable and plug for S3, S4, S5, S7, S8, S9, S2
Power supply present but hoist will not move up or down	Relays K1 and k2 are actuated but hoist will not ascend or descend	<ul style="list-style-type: none"> - Motor brake is jammed - repair brake - Brake rectifier defective
Other malfunctions	Braking distance too long The hoist does not descend smoothly The hoist does not develop sufficient lifting power and the problem does not fail under the above described fault analysis	<ul style="list-style-type: none"> - Adjust brake - Contact the technical service department or the dealer



Inform the technical service department of the importer or the HEK establishment in every case not covered in the above malfunction table.





11. ENVIRONMENTALLY FRIENDLY DISPOSAL OF THE MACHINE

General

After a number of years of reliable service the life of every machine inevitably comes to an end.

The machine must then be disposed of in an as environmentally friendly manner as possible.

The possibilities which then present themselves include:

- Part-exchange for a new machine.
- Disposal by a recycling facility.
- Demolition.

Discarding the machine

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



12. LIST OF KEYWORDS

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