Scando

Instruction Manual

YOUR HOIST HAS:

Manufacturing number:	Year:	461690-105 1984-05-30

Important Safety Instructions

0. SCOPE

The purpose of this chapter, entitled "Important Safety Instructions" is to give the user as much information as possible on how to ensure a high standard of safety. ALIMAK has made great efforts to foresee safety problems and give useful directions on how to ensure, during different phases of carrying out work on the hoist, that safety is achieved. Authorized personnel must be very familiar with all instructions in this provided manual and follow these instructions precisely.

Why is SAFETY important to YOU?

3 MAIN REASONS:

ACCIDENTS HURT!
ACCIDENTS COST MONEY!
ACCIDENTS CAN BE AVOIDED!

The information in "Important Safety Instructions" is only intended to be supplementary and does not replace applicable safety codes, insurance requirements, federal, state and local laws, rules and regulations.

As it is not possible in this manual to cover the entire broad subject of "Safety, compliance with good safety practice at the work site" is in the end the responsibility of the user.

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1. GENERAL SAFETY – RESPONSIBILITY

It is the user's responsibility to read and understand this manual (in total).

Employers' Safety Programmes should require that one man at each job site be assigned the responsibility and authority for safety.

During each phase of operations on or with a hoist each person involved must be safety conscious, responsible, reliable and eager to follow the instructions provided.

People who use or operate hoists must be:

COMPETENT

- Physically – to react correctly and quickly to avoid accidents.
- Mentally – to understand and apply established rules, regulations and safety practices.
- Emotionally – to withstand stress and prevent mistakes.

EXPERIENCED

- Trained – in the relevant phase or part of the hoist work. They shall have read and understood the Instruction Manual.
- Licenced – if required by law.

People involved in any hoist work as prescribed, but not limited to phases 2–8 in this section of the Instruction Manual, must always be trained before start. Therefore:

- Learn – beforehand – as mush about your working area and tasks as possible.
- Check for missing safety equipment, maintenance and safety instructions.
- Make sure that all safety devices provided are in place and in good operating condition.
- Be familiar with the use of all safety equipment.
- Always wear required protective items such as hard hats, safety belts, safety glasses and safety shoes.
- Plan ahead – work safely – avoid accidental damage and injury.
- Never take anything for granted.
- Do not assume that everything is all right at the start of work today just because everything seemed all right at the end work yesterday.

REMEMBER – SAFETY IS UP TO YOU!

2. INSTALLATION AND ERECTION

2.0 Scope

This sub-section is prepared in addition to sub-sections 0 and 1 of this chapter "IMPORTANT SAFETY INSTRUCTION" in order to give advice on important safety measures during installation and erection of the ALIMAK hoist.

2.1 Responsibility

The user/owner of a hoist is responsible in all aspects for safety during installation and erection. All such work should be performed in accordance with federal, state or local laws, regulations etc. and with normal precautionary measures. Prior to installation and erection of the Alimak hoist, detailed instructions in the chapter of this manual entitled "INSTALLATION AND ERECTION" should be carefully studied, as well as this entire chapter "IMPORTANT SAFETY INSTRUCTIONS". Besides all other requirements we strongly recommend that only a *qualified person* be authorized to supervise all installation and erection work.

2.2 Important Safety Measures Before Start of Installation and Erection

- Always make sure that a sufficiently large area at the ground level has been fenced in.
- Always make sure that the lifting devices provided are suitable for the load in question and that they are in good condition.
- Always make sure that the foundation can bear the loads in question and also meets local safety requirements.

2.3 Important Safety Measures During Installation and Erection

- Never permit the hoist to be used during installation and erection by anyone than *persons qualified* for the work.
- Never perform erection in a wind speed above 15 m/sec (33.5 mph).
- Never permit anyone to stand under a hanging load.
- Never permit a mast section to hang on the erection crane when the hoist is travelling.
- Never permit anyone to work within the base enclosure, on top of, or leaning over any enclosure, within the hoistway, within the counterweightway, in the mast, on tie-ins or in otherwise unsafe areas, unless the power supply or main switch is securely switched off.
- Never perform any installation or erection work from the cage roof unless the "Emergency Stop" button has been pressed in.
- Never permit electrical connections or re-connections to be carried out by anyone other than *qualified* persons. Always ensure that the power supply is cut off during such work.
- Never move the hoist until all bolts are securely tightened and the lifting yoke has been removed from the mast section just fitted.

2.4 Important Safety Measures when Installation and Erection is completed

- Never permit the hoist to be taken in normal operation unless the Acceptance Test has been carried out in accordance with safety codes, federal, state and local laws, rules and regulations.

3. ACCEPTANCE TESTS AND INSPECTIONS OF NEW INSTALLATION AND ALTERATIONS

3.0 Scope

In order to ensure the safe operation of new hoists and hoists, which have undergone major alterations, the hoist shall on completion and before being placed into service, be subjected to an acceptance inspection.
The purpose of this instruction is to inform the users/owners of tests and inspections needed.

3.1 Responsibility

The user/owner of a hoist is responsible for seeing that tests and inspections are carried out such that the whole installation meets requirements prescribed in all applicable safety codes, federal, state and local laws, rules and regulations. All tests and inspections shall be performed in the presence of an inspector, if required by the enforcing authorities, or an otherwise *qualified person.* Tests and inspections shall cover at least (but are not limited to) the following subjects:

A. Tests and Inspection of General Installation

It is very important to make sure that the general installation meets local requirements and is performed in accordance with general instructions given in this manual.

Therefore check carefully:

a/ Hoist structure – be sure:

- Dimensions and load bearing capacity of the foundation meet prescribed requirements.
- Condition of the mast sections and racks are correct.
- Correct installation of the mast.

  Use and location of prescribed mast sections for intended lifting height.
  Tightening at mast joints.
  Fastening of racks.
  Tie-in location and installation
  Free-standing/overhang section.
  Installation of limit cams.

b/ Hoist Enclosures – be sure:

- Enclosure meets applicable requirements for interior or exterior location.
- Enclosure including supports, braces and brackets, has sufficient strength and location in order to ensure correct running clearance.

c/ Hoistway, Doors and Door Locking Devices – be sure:

- Height, material, installation and strength are correct.
- Locking devices meet local requirements and are working properly.

d/ Hoist Cage – be sure:

- Dimensions and load capacity are correct for intended use.
- Material and strength meet requirements.
- Cage doors and gates meet requirements for dimensions, material strength, interlocking etc. and are working properly.
- Guide rollers and safety hooks are correctly assembled.
- Cage floor is undamaged and not slippery.
- Safety railing on cage roof meets local requirements.
- Erection crane is in good condition and correctly attached.

e/ Drive Unit – be sure:

- Drive unit is properly attached to hoist cage frame.
- Climbing pinions on racks are in good condition.
- Worm screws and worm wheels are in good condition.
- Brakes have prescribed capacity.

f/ Cable Guiding Device – be sure:

- Guiding devices are fitted in correct positions and at the prescribed intervals.
- Retaining guide springs are in good condition.

g/ Electric Equipment – be sure:

- It conforms to local requirements.
- It is in safe condition.

h/ Control System – be sure:

- Complete master control box is in good condition.
- All control equipment is attached at suitable locations which are safe for use in service.

i/ Counterweights – be sure:

- Any required enclosure is properly installed and meets applicable requirements for interior or exterior located hoist.
- Guide members, supports and fastenings are in conformance with applicable requirements and are in good order.
- The weight of the counterweight corresponds with the requirements prescribed in this manual for the type of hoist concerned.
- Rope and rope fastenings are correct.
- Counterweight guide rollers are correctly adjusted.
- Cathead used is correct for type of hoist in question and is securely attached.

j/ Cage and Counterweight Buffers – be sure:

- Buffers are installed in accordance with requirements.

k/ Bottom and Top Runbys and Clearances – be sure:

- Bottom cage clearances meet applicable requirements.
- Bottom runbys of cage and counterweight are correct.
- Top cage clearance and top counterweight clearance are in accordance with applicable requirements.

B. Tests and Inspection of Safety Features

When the general installation has been tested and inspected to full satisfaction, some special checks are necessary in order to ensure safe operation of the hoist. As a minimum the following checks should be made:

a/ Safety Device

- Ensure correct attachment of the safety device.
- Make a drop test with rated load in accordance with instructions in this manual. No passengers should be in the cage during the test.
- Make sure that the stopping distance satisfies local demands.

- Reset the safety device in accordance with instructions in this manual.
- Ensure that the safety device is sealed.

b/ Instruction Signs and Instruction Manual

- Make sure that sufficient information is given on warning and instruction signs and that a manual for safe operation of the hoist is available (in the cage).
- Check that operators have read and understood information in the manual and on warning and instruction signs.

c/ Warning Signs and Warning Instructions

- Ensure that there are sufficient warning signs for safe operation of the whole hoist installation.
- Check that operators have read and understood warnings on signs and in the instruction manual.

f/ Final Run Test

- Make a final run test using "Operating Instructions".

e/ Final Report

- Acceptance Tests and Inspection shall conclude with a final report to the owner/user of the hoist. This report shall very clearly summarize all faults found during the inspection and state all that is required before the hoist can be taken in operation.

3.2 Safety Precautions for Acceptance Tests and Inspections

During acceptance tests and inspections it is of the utmost importance to take sufficient steps in order to ensure safety for persons directly involved and any other persons who may be in the immediate vicinity of the hoist. Load testing and safety device test should be carried out without any person being in the cage or on the platform. Remote control arrangement should be used.

4. PERIODIC INSPECTION AND TESTS

4.0 Scope

This part of the "IMPORTANT SAFETY INSTRUCTIONS" chapter is intended to provide the users/owners with suitable information in order to ensure that each hoist installation is always in a safe operating condition.

4.1 Requirements for Inspection and Tests

All existing installations shall be inspected and tested in accordance with applicable local safety standards, rules, regulations and laws. In addition to local standards etc., and whenever no such standards exist, periodic inspection and tests shall be made at intervals not to exceed three months and cover at least the following subjects.

4.2 Responsibility

It is the user's responsibility to ensure that required periodic inspection and tests are carried out in order to create the safest conditions for all of employees or any other persons using the hoist.

4.3 Inspector

Inspections and Tests shall be carried out by a *qualified authorized person.*

4.4 Safety Precautions when Testing

Before making any functional tests it is necessary to ensure the safety of persons involved and any other persons who may be in the immediate vicinity of the hoist. Load testing and safety device tests should be carried out without any person in the cage or on the platform. Remote control arrangement should be used.

4.5 Inspections and Tests of the General Installation

All parts of the equipment shall be inspected and where necessary tested to determine that they are in safe operating condition. Inspections and tests shall be carried out in accordance with applicable Service and Maintenance Instructions.
Any worn or defective parts shall be adjusted or replaced with original spare parts. Make sure that any alteration has been subsibility to safety inspections. ALIMAK AB takes no responsibility for alterations carried out without our written permission. For example, the mast shall not be used to support any extraneous equipment unless written specific instructions have been prescribed by ALIMAK AB.

4.6 Inspections and tests of Safety Equipment

A drop test of the safety device shall be carried out in accordance with instructions given for drop test in this manual. The stopping distance shall meet local requirements.

For safety's sake, make sure:

- That before starting a drop test the electric motor brakes are in good order.
- That the hoist is driven to a safe height before drop test commences – to ensure it does not hit the buffers.
- That during a drop test of the safety device no person is riding in the cage. If the hoist is installed with a counterweight, this must be in use during the drop test.
- That the safety device is correctly reset after each drop test.

5. DAILY SAFETY CHECKS

5.0 Scope

In order to ensure the safe operation of an ALIMAK hoist it is important that the user/owner and the authorized safety officer on the job site always make sure that required daily safety checks are carried out. In addition to sub-sections 0 and 1 of this "IMPORTANT SAFETY INSTRUCTIONS" chapter, the following safety measures should be followed for daily safety checks of the ALIMAK hoist.

5.1 Responsibility

The user of the hoist is always responsible for safety during daily safety checks. Any work found to be needed should be performed in accordance with federal, state or local laws, regulations etc. and with normal precautionary measures. Prior to this work on the ALIMAK hoist detailed instructions contained in the sub-section "DAILY SAFETY CHECKS" of the chapter "OPERATING INSTRUCTIONS" should be carefully studied and followed.

5.2 Important Safety Measures when Daily Safety Checks are carried out

- Never perform any daily safety checks on a hoist installed outside of a building which has been hit by a storm/hurricane, before an inspection has been carried out by a competent person and special safety measures have been performed.
- Never operate an exterior located hoist at wind speeds exceeding 20 m/s **(40 mph for USA and Canada).**
- Never run the hoist before being sure that periodic inspections and tests, service and maintenance have been carried out.
- Never run the hoist before being sure that the hoistway and, if applicable, also the counterweight way is free from any obstacle and that nobody is at work in the vinicity of these areas.
- Never run the hoist before safety checks, with the cage at ground level, have been carried out.
- Always make sure that safety checks performed with a moving hoist are carried out with caution.

6. OPERATION

6.0 Scope

The purpose of these instructions is to inform users of any ALIMAK hoist of important safety measures during operation in addition to instructions given in sub-sections 0 and 1 of this chapter and all general instructions in the sub-section "OPERATING" of the chapter "OPERATING INSTRUCTIONS".

6.1 Responsibility

The user of the hoist is always responsible for safety during operating in accordance with federal, state or local laws, rules and regulations and with normal precautionary measures. Prior to operation of the ALIMAK hoist detailed instructions in the sub-section "OPERATING" of the chapter "OPERATING INSTRUCTIONS" should be carefully studied by anyone operating the hoist.

6.2 Important Safety Measures for Operation

- Never run an exterior located hoist at wind speeds exceeding 20 m/s **(40 mph for USA and Canada).**
- Never run a hoist before making sure that daily checks, service and maintenance have been carried out.

- Never exceed the maximum payload or the number of passengers stated on the sign posted in the cage.
- Never permit loads to project through the cage side panels or through the top of the cage since they may hit an obstacle.
- Never operate the hoist unless all guards and safety devices are working properly.
- Never operate the hoist before being sure that the hoistway and, if applicable, also the counterweight way is free from any obstacle and that nobody is at work in the vicinity of these areas.
- Never permit any person to stand on the roof of the cage when the hoist is operated from the inside of the cage.
- Always immediately report any fault or safety risk to the authorized safety officer on the site.

7. SERVICE AND MAINTENANCE

7.0 Scope

Service and Maintenance are prescribed in this manual in order to promote the safe and efficient use of ALIMAK hoists. The purpose of this part is to present valuable safety information for service and maintenance work.

7.1 Responsibility

The user/ owner of a hoist is responsible for all aspects of safety during service and maintenance. All such work should be performed in accordance with federal, state or local laws, regulations etc., and with normal precautionary measures. Prior to service and maintenance of the ALIMAK hoist, the detailed instructions in the chapter "SERVICE AND MAINTENANCE" should be carefully studied by anyone carrying out such work.

7.2 Important Safety Measures during Service and Maintenance

- Never start any repair work on the hoist installation, within the hoistway or, if applicable, the counterweightway, or in the vicinity of these areas, unless the main power supply has been securely switched off.
- Never start repair work on the cage, machinery or safety device until the hoist cage is firmly rested on the buffers and, if provided, the counterweight has been safely supported.
- Never test the brake torque on an electrically driven hoist unless the cage is lowered to rest on its buffers at the ground level and the main power supply is securely cut off.

8. DISMANTLING

8.0 Scope

The purpose of this part is to describe safety measures in addition to instructions in sub-sections 0 and 1 and general instructions in chapter "DISMANTLING", in order to minimize the risk of accidents during dismantling.

8.1 Responsibility

The user/owner of a hoist is responsible for all aspects of safety during dismantling. Any work should be performed in accordance with federal, state or local laws, rules and regulations and with common precautionary measures. Prior to dismantling of the ALIMAK hoist, detailed instructions in the chapter of this manual entitled, "DISMANTLING", should be carefully studied, in addition to the aforementioned sub-sections of "IMPORTANT SAFETY INSTRUCTIONS". We strongly recommend that a *qualified* person be authorized to supervise all dismantling work.

8.2 Important Safety Measures before Start of Dismantling

- Always make sure that a sufficiently large area at the ground has been fenced in.
- Always make sure that the lifting devices provided are those intended for the loads in question and that they are in good condition.
- Always make sure that the whole installation is in a safe condition before starting to dismantle. Daily safety checks should be carried out.

8.3 Important Safety Measures during Dismantling

- Never permit the hoist to be used during dismantling by anyone other than the qualified persons engaged for the work.
- Never perform dismantling at wind speed above 15 m/s (33.5 mph).
- Never permit anyone to stand under a hanging load.
- Never permit a mast section to hang on the erection crane when the hoist is travelling.
- Never permit anyone to work within the base enclosure, on top of, or leaning over any enclosure, within the hoistway, within the counterweight-way, in the mast, on tie-ins or otherwise unsafe areas unless the power supplied or main switch is securely switched off.
- Never perform dismantling work from the cage roof unless the "Emergency Stop" button has been pressed down.
- Never leave the manual control box in the cage while working on the roof.
- Never loosen and remove mast bolts until the erecting and dismantling crane has been connected to the lifting yoke on the mast top.
- Never move the hoist until the disconnected mast section is lifted away and put on the cage roof.
- Never overload the cage during dismantling.
- Never permit dismantled or any other equipment to project through or over the railings.
- Never permit electrical work to be carried out by anyone other than a competent person. Always ensure that the power supply is cut off during such work.

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APPENDIX

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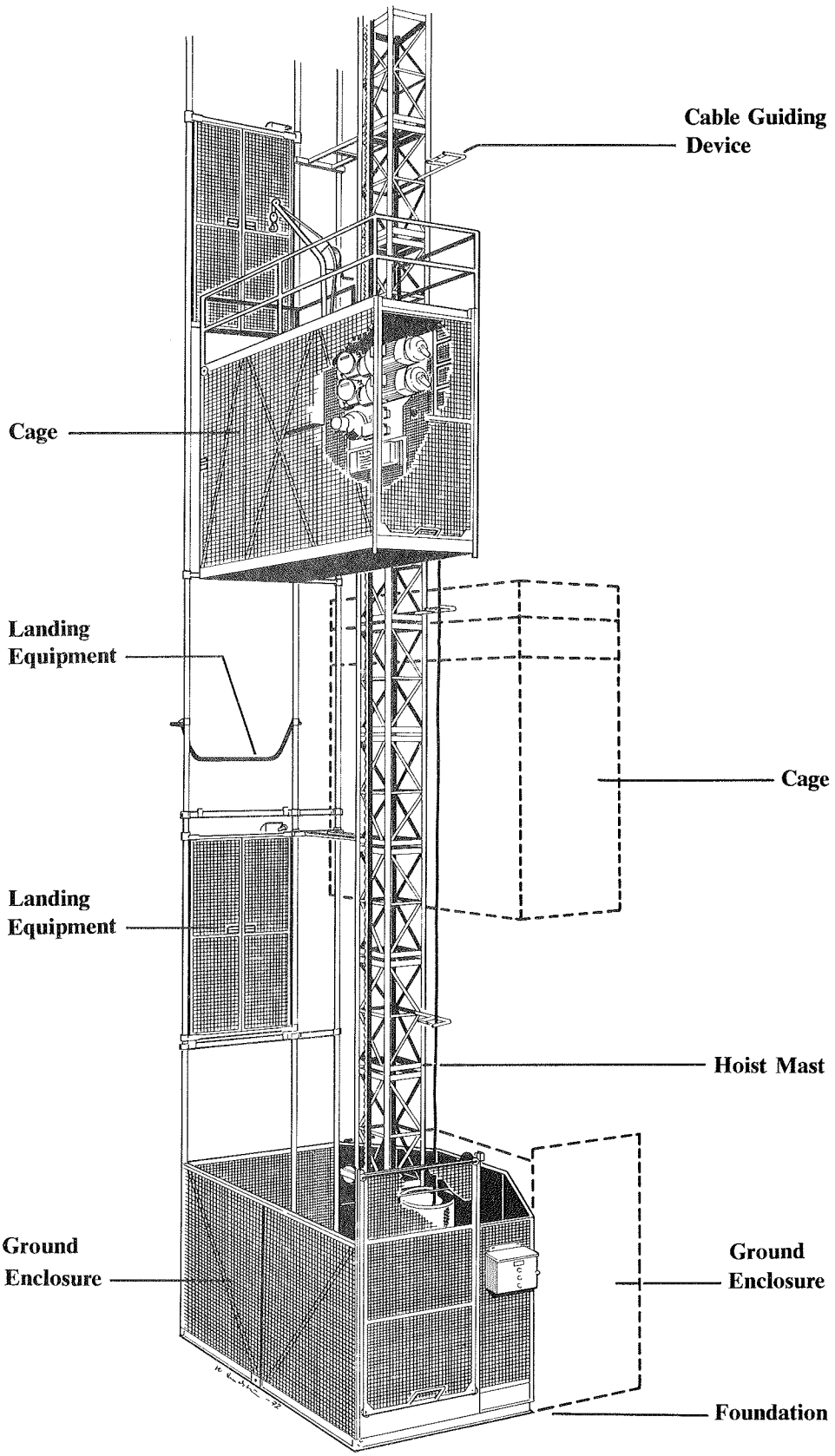
Cable Guiding Device
Cage
Landing Equipment
Cage
Landing Equipment
Hoist Mast
Ground Enclosure
Ground Enclosure
Foundation

General & Technical description

Read the following text while studying the pictures in the spare parts booklet, which are arranged in the same order and which describe in detail the components, assembly and function of the equipment.

HOIST DENOMINATION: The capacity of the hoist as well as the cage length can be taken from the hoist denomination printed on the sign in the cage.
Multiply the *first* two figures of the denomination by 100 and you have the load capacity in *kg.*
Multiply the figures *after the slanting line* by 100 and you have the cage length in *mm.*
Example: Scando 10/30. Load capacity 10 x 100 = 1000 kg.
Cage length 30 x 100 = 3000 mm or 3.0 m.

A "C" after the figures indicates that the hoist is provided with a Counterweight.

The word "SUPER" after Scando indicates that the hoist is electro-hydraulically driven.

If the hoist is provided with two cages, this is indicated by the Roman numeral II after SCANDO or SCANDO SUPER.

FOUNDATION: A reinforced concrete slab with brackets for the base frame of the mast. The foundation is cast "on the spot" in accordance with instructions given under "**Preparations before installation**" and "**Foundation**" in the instruction manual.

GROUND ENCLOSURE: A base frame to support the hoist mast. The foundation is enclosed by 2150 mm or 2500 mm high wire mesh sections attached to the base frame. A ground enclosure for a single cage hoist can be transformed into a twin cage enclosure by adding just a few parts.
The enclosure is fitted with a mechanically and/or electrically interlocked, vertically sliding gate placed on the optional side of the ground enclosure. Horizontally sliding gates are also available.

A mechanically interlocked gate is " locked" mechanically and cannot be opened unless the cage is at the ground landing.
If the gate is electrically interlocked, the cage will stop at once if the gate is opened or will not start unless the gate is closed.

HOIST MAST: Tubular sections of 1508 mm length. The main pipes are dia. 76.1 mm and the most common material thickness is 4.2 mm. Each section is provided with one or two precision-cut racks. The sections are bolted together with screws and nuts.

Mast sections for twin cage hoists with counterweight are available in two versions: with *fixed* (welded-on) counterweight guide rail or with *removable* counterweight guide rail.

The mast is tied to the building with so called mast ties. These mast ties are fitted to the angle iron frames of the mast sections and to special brackets or bolts cast into the wall of the building. There are four different types of mast ties which are available in several sizes with steplessly variable lengths within certain ranges. The mast ties allow a max. inclination of 8^{o} to horizontal level.

Limit cams at top and bottom of the hoist mast ensure automatic stopping of the cage by actuating limit switches attached to the cage. There is also a 3-phase ultimate switch which will cut off the main power supply, in event the normal stop limit switches should be out of order.

COUNTERWEIGHT EQUIPMENT: (marked "**C**" in the hoist denomination).
The counterweight equipment is mainly used to increase the capacity of the hoist at an unchanged power consumption (compare erection load capacity and load capacity in "**Technical Data**"). The counterweight runs on the *rear* corner pipes of the mast or, on twin cage hoists, on a special guide rail welded or bolted to the mast.
The counterweight wire rope goes via pulleys on top of the mast to a rope equalizer with slack rope switch on the cage roof.

CAGE: There are four different cage sizes (width x length): 1.3 x 2.0, 1.3 x 3.0, 1.5 x 3.2 and 1.5 x 3.7 m. The height inside the cage is 2.7 m.

The cage walls are of wire mesh which lets the daylight in and gives the cage operator a clear view of the hoistway.
Roof and floor are of wear-resistant, plastic-coated, glassfibre reinforced plywood with a patterned surface so as not to be slippery.

As the cage roof serves as working platform during erection, it is provided with a safety railing. There is also a trap door in the roof and a ladder in the cage so that one can easily get up on the roof for erection purposes. An erection crane is located on the cage roof.

Individually adjustable, ball bearing mounted guide rollers guide the cage to the mast.

The cage has mechanically and electrically or only electrically interlocked entrance and exit gates. The exit gate is usually made in two parts whereas the entrance gate is in one part. (The entrance gate is the one facing the gate of the ground enclosure).

DRIVE UNIT: A compact unit with one or more pinions engaging into the rack of the mast. The pinion is fitted to a worm gear driven by a direct started, squirrel cage induction motor with built-in electro-magnetic disc brake.
The drive unit is fitted to the cage frame on vibration damping brackets.

The safety device fitted in conjunction with the drive unit has a *pinion* engaging in the rack. The device is actuated by a centrifugal weight and stops the hoist in case the normal travelling speed is *exceeded.*

Scando Super hoists are electro-hydraulically driven.
A Y/D-started induction motor drives a pump unit - located on the cage roof - which is connected to a hydraulic motor in the cage. The Y/D start is used to reduce the inrush current of the electric motor at the very start.
The hydraulic motor drives three serial-connected and synchronized worm gears, each having a pinion in engagement with the rack of the mast.

As the displacement of the hydraulic pump is variable, the speed of the hoist can be steplessly varied from creeping rate to max. speed which is 96 m/min.

LANDING EQUIPMENT: Mechanically and electrically or merely electrically interlocked wire mesh gates or bars at the landings.

The landings are supported by vertical pipes parallel to the mast from the ground enclosure to the top landing. The landing equipment can also be installed by connecting them to special brackets at the landings, in openings, on projections or facade scaffoldings.
The electric interlocking of the landing equipment is connected to the control system of the hoist (stop circuit).

CABLE GUIDING DEVICE: U-shaped guides with plate springs along the hoistway guiding the trailing power cable between the cable basket at ground landing and the cable guide on the cage.

To overcome the voltage drop in the power cable at high lifting heights, the power cable is *fixed firmly* to the mast from ground landing to a junction box in the mast halfway to the mast top.

The *trailing* power cable from the junction box to the cable guide on the cage is stretched by a cable trolley. The cable trolley is travelling on a *special* guide rail attached close to the mast from the ground landing to a point halfway to the mast top.

The method described above is also used for hoist installations in tough surroundings with winds, low temperatures etc.

Cable guiding device with trolley is also available in a version where the trolley is guided on to the hoist mast.

ELECTRIC EQUIPMENT: The electric equipment can be of several different kinds depending on local requirements and regulations. The equipment is designed and dimensioned to conform to operation conditions on construction sites. The components have been thoroughly tested and conform to one or several of the following international/national standards: IEC, CEE, EN, DIN, UL, CSA, SS etc.

Because of the varying codes and requirements, the electric equipment is always treated *separately* and *individually* for each order.

Necessary documents such as wiring diagrams, circuit diagrams and component lists are packed in the electric control panel of the hoist.

CONTROL SYSTEM: Two different systems are available:

a) Operator control system from the cage only by means of push buttons for "Up", "Stop" and "Down" or control lever for "Up", "Stop" and "Down".

   The push button system requires pressing of the stop button to bring the cage to a stop. The control lever system is automatic, i.e. the cage stops as soon as the lever has been released (automatic return to "Stop"-position = dead man type control).

b) Operator control from cage and remote control from landings by means of push buttons for "Up", "Stop" and "Down".
   The push button "Stop" must be pressed to stop the hoist.

   In order to operate the hoist from the landings, besides the trailing power cable, a *separate trailing control cable* is also required between ground landing and cage.
   Two cables make it impossible to use the standard cable guiding device having a cable trolley running on the guide rail at the mast. The use of two trailing cable limits this control system to not exceed 100 m lifting height.

   During erection, the "Erection/Operation" switch in the electric control panel can be turned to "erection". The hoist will then stop immidiatly when the control push button is released.

OPTIONAL EQUIPMENT

Automatic Stop Equipment:
Stopping the cage at right level at the landings can be difficult for people using the hoist sporadically. With Automatic Stop Equipment this very operation is automatized.

The equipment consists of auxiliary relays and a proximity switch on the cage. The switch is activated by steel plates fitted to the mast at the landings.
By pressing the button *for opposite direction* a while in advance, the cage is automatically stopped at *right* level at the landing.

The lever control system can also be provided with this automatic equipment. Between the extreme positions "Up" and "Down" there is an intermediate position in both directions on the lever device. At these positions the automatic equipment is actuated and the cage will stop automatically at right level without having to release the control lever.

Single Automatic Floor Selection System:
There is a floor control gear in the cage with a button for *each individual* landing. At each landing there is one call button.

The cage stops *automatically* when reaching the landing to which it has been ordered either from the cage buttons or the landing call button.

The floor selection system picks up signals from the call button at landings or the push button in the cage *only* when the cage is standing still with closed gates. Only *one* order at a time is carried out.

A floor control gear tells the system where the cage is located in the hoistway.

Fully Automatic Floor Selection System:
There is a floor control gear in the cage with buttons for each landing. At each landing there are two buttons "Up" and "Down".

The control equipment picks up and memorize all impulses received both when the cage is stationary or when running.

During operation the hoist stops *automatically* to pick up/let off passengers in a consequent and systematic order. The system works in the same way as that used for indoor lifts in hotels, office buildings, hospitals etc.

Tone Frequency Equipment:
A transmitter converts the impulses from the landing push buttons to signals with different tones for "Up", "Stop" and "Down". The tones signals are transferred along the power supply cable to a receiver in the cage. The receiver converts the signals and by means of relays the order is carried out.
No control cable is required.

The tone frequency equipment is used at high lifting heights. The cable trolley for single power cable only can be used.
Furthermore the payload capacity of the hoist is optimized due to the elimination of the weight of the control cable.

Bus Bar System:
Bus bar power supply is used in applications with tough conditions such as high lifting heights in combination with usually windy weather conditions.
The capacity of the hoist is the same irrespective of the lifting height since the weight of the power and control cables is eliminated.

Aliphone Communication System:
Aliphone Communication System with a combined transmitter/receiver using the power supply cable for its signals, thereby eliminating a separate communication cable. The signals are transmitted by means of FM technique.

The equipment provides two-way communication between the hoist cage and base landing. Communication to the other landings is obtained by adding optional equipment to base station. The equipment can also be connected to a Paging System.

ALIMAK
Personnel and materials hoist

SCANDO®

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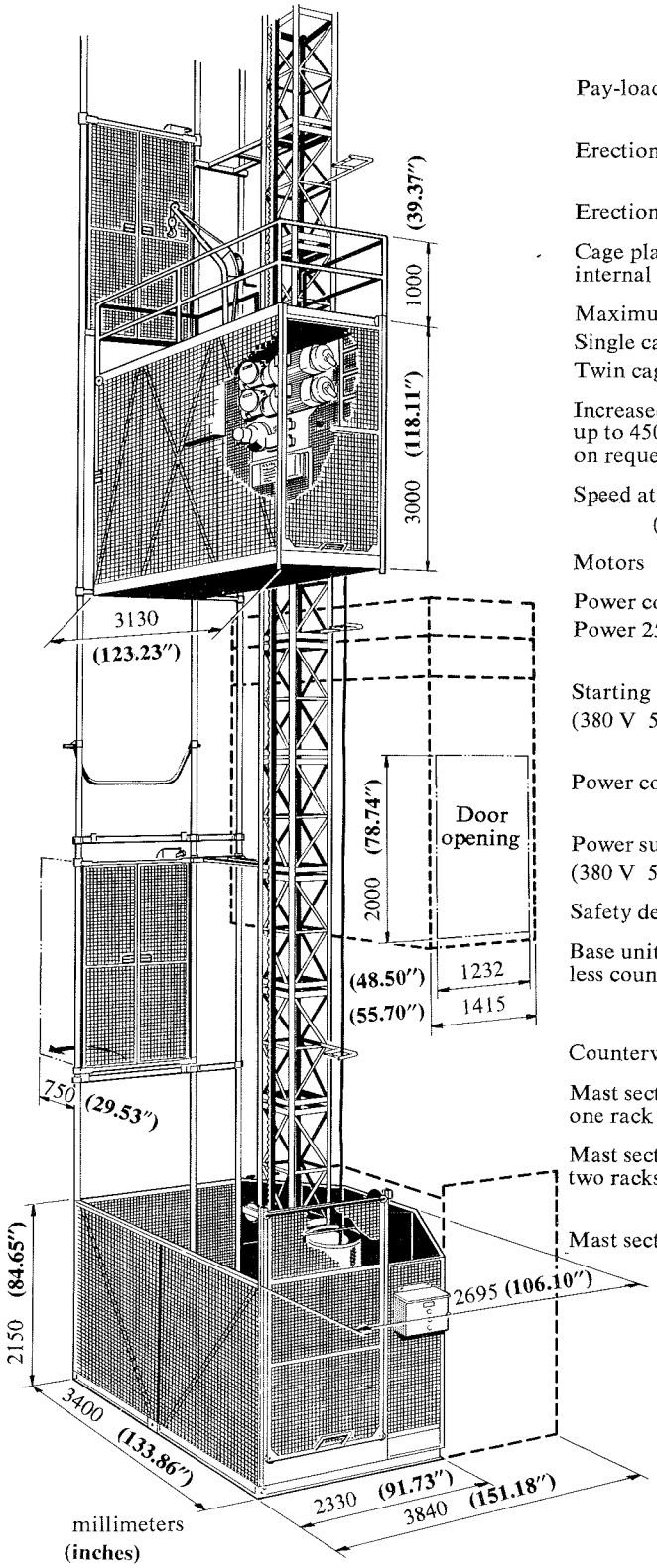

Technical Data

		SCANDO			
		10/30	15/30	18/30	20/30C
Pay-load capacity	pounds			4000	4400
Erection load capacity	pounds			4000	2200
Erection crane capacity	pounds			330	330
Cage platform dimension internal width×length	inches			51.2×118	51.2×118
Maximum lifting heights					
Single cage	feet			500	500
Twin cage	feet			500	500
Increased lifting heights up to 450 metres on request					
Speed at 50 Hz (60 Hz)	feet per min			150	150
Motors				3	2
Power cont. duty	kW			3×7.5	2×7.5
Power 25% int. duty	kW			3×9.5	2×9.5
Starting current (380 V 50 Hz)	Amp.			270	180
Power consumption	kVA			39	26
Power supply fuses (380 V 50 Hz)	Amp.			80	63
Safety device	type			GFD-200	GF 3.0/1.2
Base unit weight, less counterweight	pounds			5580	5070
Counterweight	pounds			—	2670
Mast section with one rack	pounds			276	276
Mast section with two racks	pounds			327	377
Mast section length	inches			59.37	59.37

NOTE: Speed, power and current at 440 V/60 Hz

Especificaciones Técnicas	Tekniska Data		SCANDO			
			10/30	15/30	18/30	20/30C
Capacidad de carga	Lastkapacitet	kg	1000	1500	1800	2000
Carga de montaje	Montagelast	kg	1000	1500	1800	1000
Grúa de montaje, carga máxima	Monteringskran, max. last	kg	150	150	150	150
Dimensiones interiores de cabina, anchura×longitud	Korgstorlek inv. bredd×längd	meter	1.3×3.0	1.3×3.0	1.3×3.0	1.3×3.0
Altura máxima de elevación	Max. lyfthöjd					
Una cabina	En hisskorg	meter	150	200	150	150
Dos cabinas	Två hisskorgar	meter	150	200	150	150
Alturas mas importantes de elevación hasta 450 m a pedido	Högre lyfthöjder upp till 450 m på förfrågan					
Velocidad 50 Hz	Hastighet 50 Hz		40	40	40	40
(60 Hz)	(60 Hz)	m/min	(48)	(48)	(48)	(48)
Número de motores	Antal motorer		2	3	3	2
Potencia, servicio cont.	Märkeffekt kont.	kW	2×7.5	3×7.5	3×7.5	2×7.5
Potencia, 25% servicio int.	Märkeffekt 25% int.	kW	2×9.5	3×9.5	3×9.5	2×9.5
Intensidad de corriente de arranque	Startström					
(380 V 50 Hz)	(380 V 50 Hz)	Amp.	180	270	270	180
Consumo de energia	Effektförbrukning	kVA	26	39	39	26
Fusibles, suministración de corriente	Nätavsäkring					
(380 V 50 Hz)	(380 V 50 Hz)	Amp.	63	80	80	63
Disposición de seguridad	Fångapparat	typ	GF 3.0/1.2	GF 3.0/1.2	GFD-200	GF 3.0/1.2
Peso, unidad de base exclusive contrapeso	Vikt, basenhet exkl. motvikt	kg	2300	2500	2530	2300
Contrapeso	Motvikt	kg	—	—	—	1210
Sección de mástil con una cremallera	Mastsektion med 1 st kuggstång	kg	125	125	125	125
Sección de mástil con dos cremalleras	Mastsektion med 2 st kuggstänger	kg	148	148	148	171
Longitud por sección de mástil	Längd per mastsektion	meter	1.508	1.508	1.508	1.508

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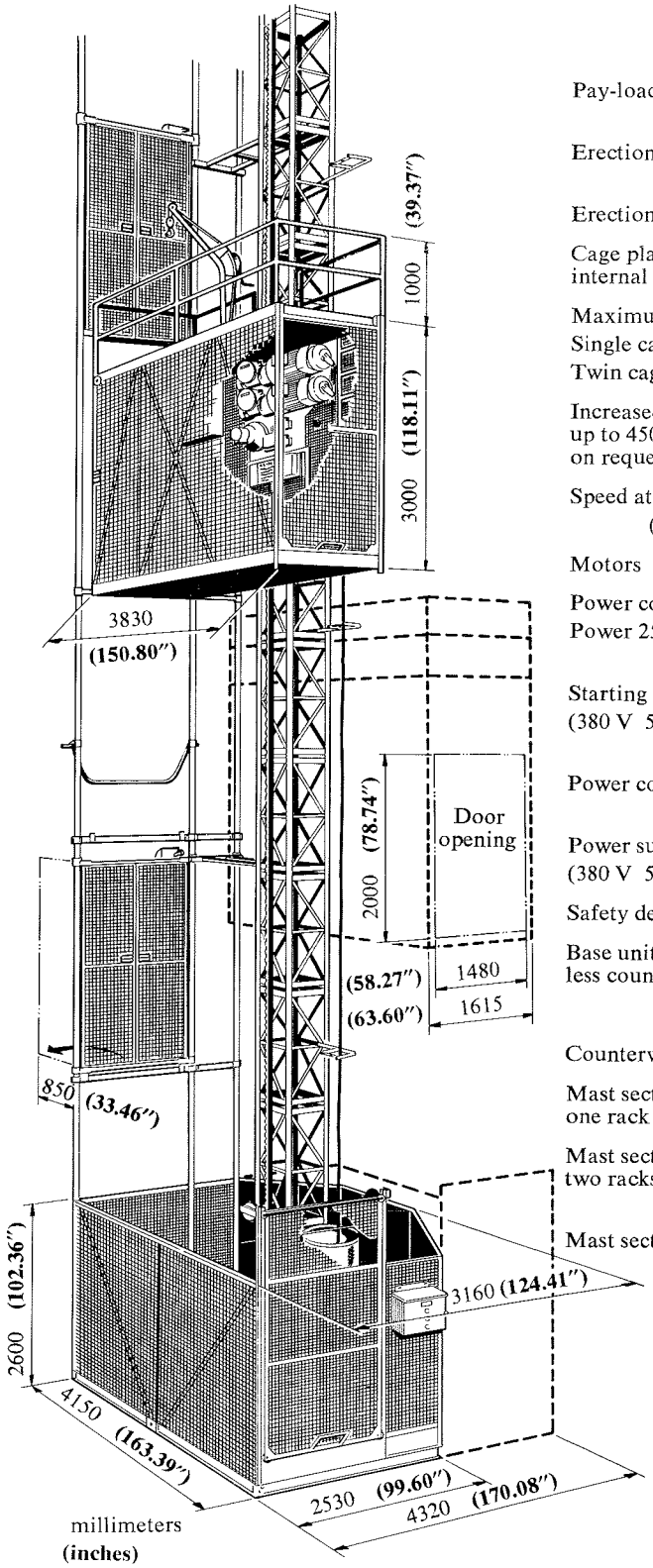

Technical Data

		SCANDO 27/37C	SCANDO SUPER 27/37C
Pay-load capacity	pounds	6000	6000
Erection load capacity	pounds	1760	1760
Erection crane capacity	pounds	550	550
Cage platform dimension internal width×length	inches	59.05×145.66	59.05×145.66
Maximum lifting heights			
Single cage	feet	980	1150
Twin cage	feet	980	1150
Increased lifting heights up to 450 metres on request			
Speed at 50 Hz (60 Hz)	feet per min	150	0-300
Motors		2	1
Power cont. duty	kW	2×7.5	1×30
Power 25% int. duty	kW	2×9.5	1×38
Starting current (380 V 50 Hz)	Amp.	180	167
Power consumption	kVA	26	50
Power supply fuses (380 V 50 Hz)	Amp.	63	63
Safety device	type	GFD-200	GFD-200
Base unit weight, less counterweight	pounds	6390	7720
Counterweight	pounds	6060	6060
Mast section with one rack	pounds	276	276
Mast section with two racks	pounds	443	443
Mast section length	inches	59.37	59.37

NOTE: Speed, power and current at 440 V/60 Hz

Especificaciones Técnicas	Tekniska Data		SCANDO 27/37C	SCANDO SUPER 27/37C
Capacidad de carga	Lastkapacitet	kg	2700	2700
Carga de montaje	Montagelast	kg	800	800
Grúa de montaje, carga máxima	Monteringskran, max. last	kg	250	250
Dimensiones interiores de cabina, anchura×longitud	Korgstorlek inv. bredd×längd	meter	1.5×3.7	1.5×3.7
Altura máxima de elevación	Max. lyfthöjd			
Una cabina	En hisskorg	meter	300	350
Dos cabinas	Två hisskorgar	meter	300	350
Alturas mas importantes de elevación hasta 450 m a pedido	Högre lyfthöjder upp till 450 m på förfrågan			
Velocidad 50 Hz	Hastighet 50 Hz		40	0-96
(60 Hz)	(60 Hz)	m/min	48	0-96
Número de motores	Antal motorer		2	1
Potencia, servicio cont.	Märkeffekt kont.	kW	2×7.5	1×30
Potencia, 25% servicio int.	Märkeffekt 25% int.	kW	2×9.5	1×38
Intensidad de corriente de arranque (380 V 50 Hz)	Startström (380 V 50 Hz)	Amp.	180	167
Consumo de energia	Effektförbrukning	kVA	26	50
Fusibles, suministración de corriente (380 V 50 Hz)	Nätavsäkring (380 V 50 Hz)	Amp.	63	63
Disposición de seguridad	Fångapparat	typ	GFD-200	GFD-200
Peso, unidad de base exclusive contrapeso	Vikt, basenhet exkl. motvikt	kg	2900	3500
Contrapeso	Motvikt	kg	2750	2750
Sección de mástil con una cremallera	Mastsektion med 1 st kuggstång	kg	125	125
Sección de mástil con dos cremalleras	Mastsektion med 2 st kuggstänger	kg	201	201
Longitud por sección de mástil	Längd per mastsektion	meter	1.508	1.508

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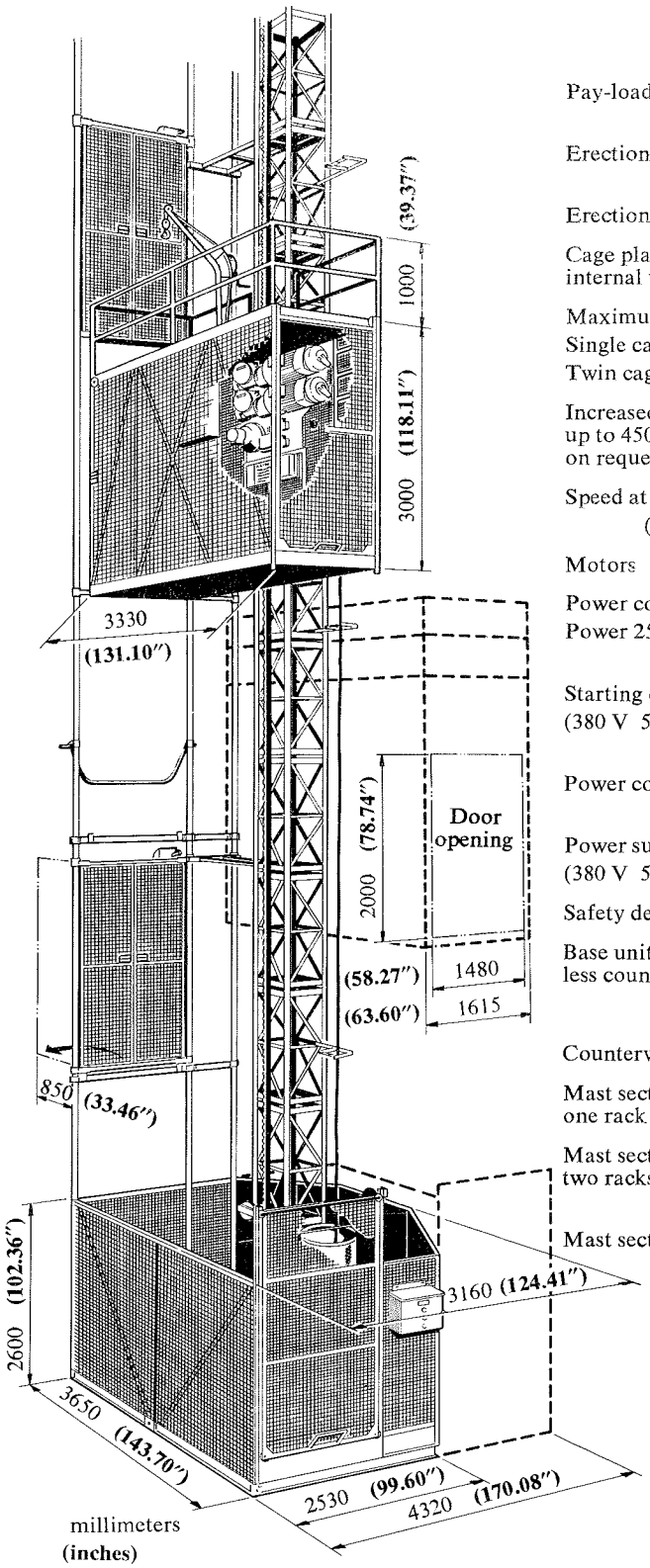

Technical Data

		SCANDO 16/32	SCANDO 18/32C	SCANDO 25/32C	SCANDO SUPER 27/32C
Pay-load capacity	pounds			5500	6000
Erection load capacity	pounds			1760	1760
Erection crane capacity	pounds			550	550
Cage platform dimension internal width×length	inches			59.05×125.98	59.05×125.98
Maximum lifting heights					
Single cage	feet			660	1150
Twin cage	feet			660	1150
Increased lifting heights up to 450 metres on request					
Speed at 50 Hz (60 Hz)	feet per min			150	0-300
Motors				2	1
Power cont. duty	kW			2×7.5	1×30
Power 25% int. duty	kW			2×9.5	1×38
Starting current (380 V 50 Hz)	Amp.			180	167
Power consumption	kVA			26	50
Power supply fuses (380 V 50 Hz)	Amp.			63	63
Safety device	type			GFD-200	GFD-200
Base unit weight, less counterweight	pounds			5950	7050
Counterweight	pounds			4650	6060
Mast section with one rack	pounds			276	276
Mast section with two racks	pounds			443	443
Mast section length	inches			59.37	59.37

NOTE: Speed, power and current at 440 V/60 Hz

Especificaciones Técnicas

Tekniska Data

			SCANDO			SCANDO SUPER
			16/32	18/32C	25/32C	27/32C
Capacidad de carga	Lastkapacitet	kg	1600	1800	2500	2700
Carga de montaje	Montagelast	kg	1600	800	800	800
Grúa de montaje, carga máxima	Monteringskran, max. last	kg	250	250	250	250
Dimensiones interiores de cabina, anchura×longitud	Korgstorlek inv. bredd×längd	meter	1.5×3.2	1.5×3.2	1.5×3.2	1.5×3.2
Altura máxima de elevación	Max. lyfthöjd					
Una cabina	En hisskorg	meter	200	150	200	350
Dos cabinas	Två hisskorgar	meter	200	—	200	350
Alturas mas importantes de elevación hasta 450 m a pedido	Högre lyfthöjder upp till 450 m på förfrågan					
Velocidad 50 Hz	Hastighet 50 Hz		40	40	40	0-96
(60 Hz)	(60 Hz)	m/min	48	48	48	0-96
Número de motores	Antal motorer		3	2	2	1
Potencia, servicio cont.	Märkeffekt kont.	kW	3×7.5	2×7.5	2×7.5	1×30
Potencia, 25% servicio int.	Märkeffekt 25% int.	kW	3×9.5	2×9.5	2×9.5	1×38
Intensidad de corriente de arranque (380 V 50 Hz)	Startström (380 V 50 Hz)	Amp.	270	180	180	167
Consumo de energia	Effektförbrukning	kVA	39	26	26	50
Fusibles, suministración de corriente (380 V 50 Hz)	Nätavsäkring (380 V 50 Hz)	Amp.	80	63	63	63
Disposición de seguridad	Fångapparat	typ	GFD-200	GF 3.0/1.2	GFD-200	GFD-200
Peso, unidad de base exclusive contrapeso	Vikt, basenhet exkl. motvikt	kg	2870	2670	2700	3200
Contrapeso	Motvikt	kg	—	1210	2110	2750
Sección de mástil con una cremallera	Mastsektion med 1 st kuggstång	kg	125	125	125	125
Sección de mástil con dos cremalleras	Mastsektion med 2 st kuggstänger'	kg	148	—	201	201
Longitud por sección de mástil	Längd per mastsektion	meter	1.508	1.508	1.508	1.508

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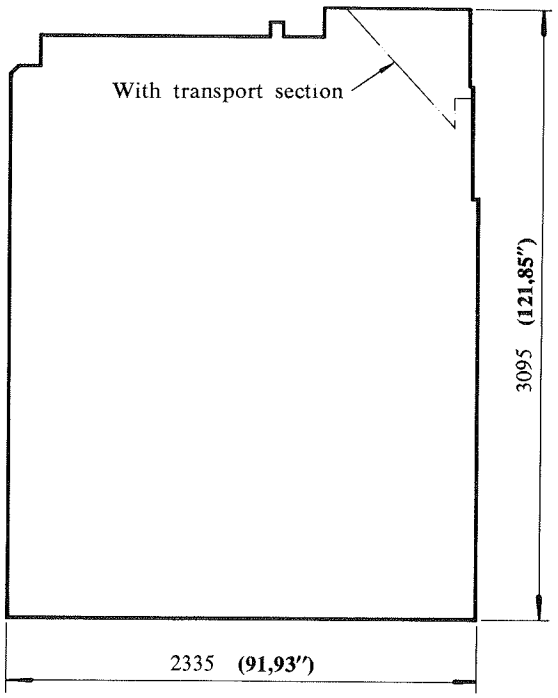
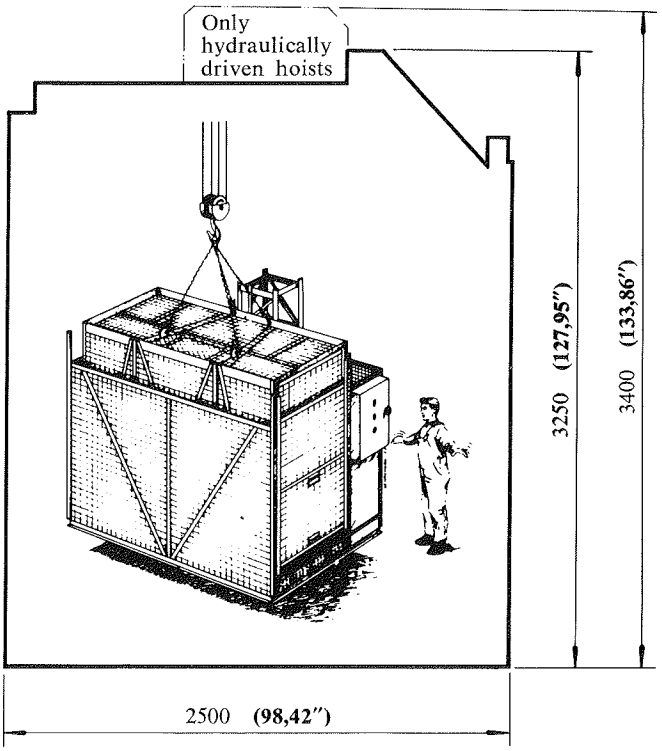
LOADING GAUGE

Hoist with a cage width of 1,3 meters
(4,26 feet)

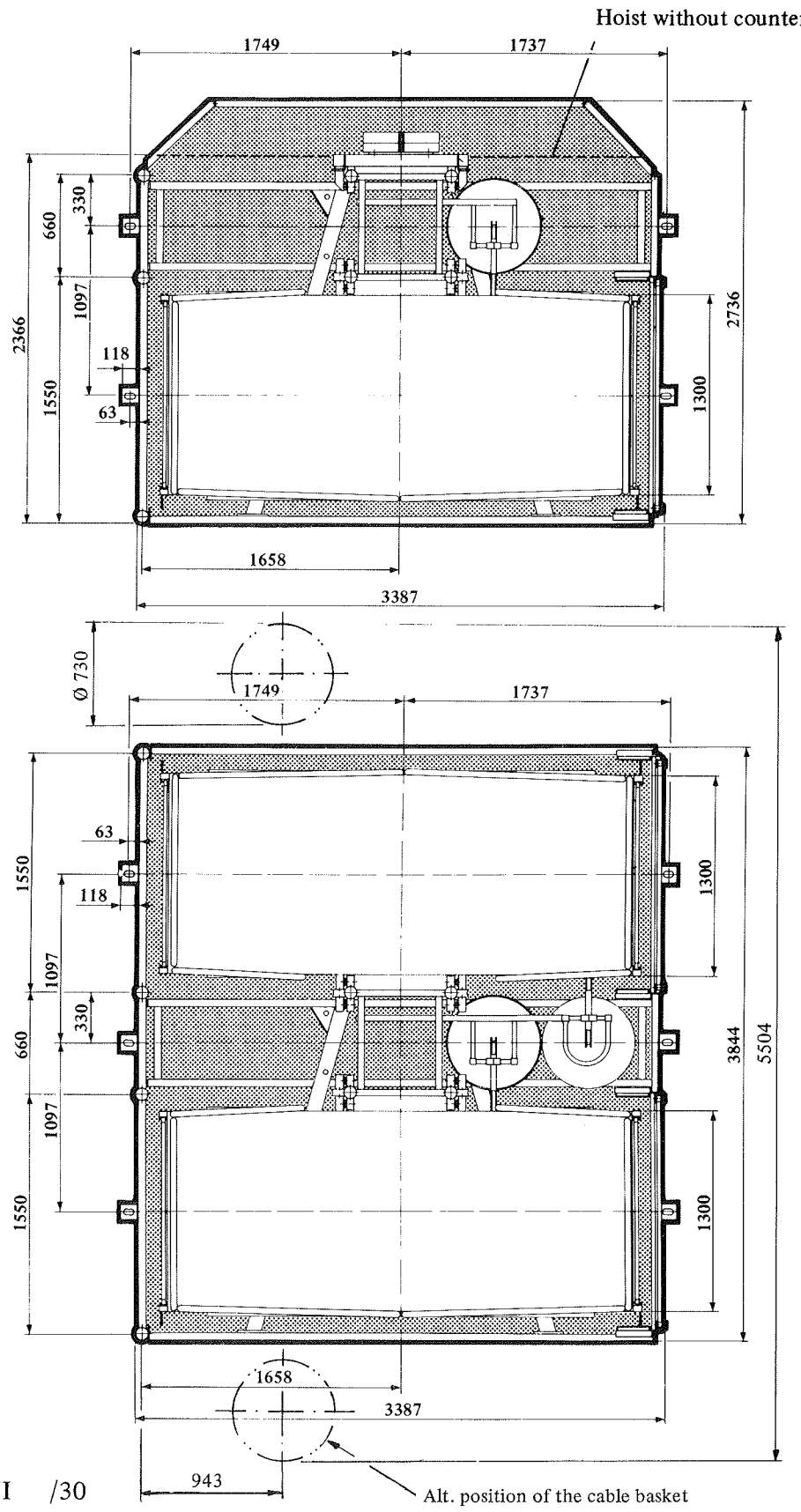


Hoists with a cage width of 1,5 meters
(4,92 feet)



SPACE REQUIREMENT

SCANDO I /30

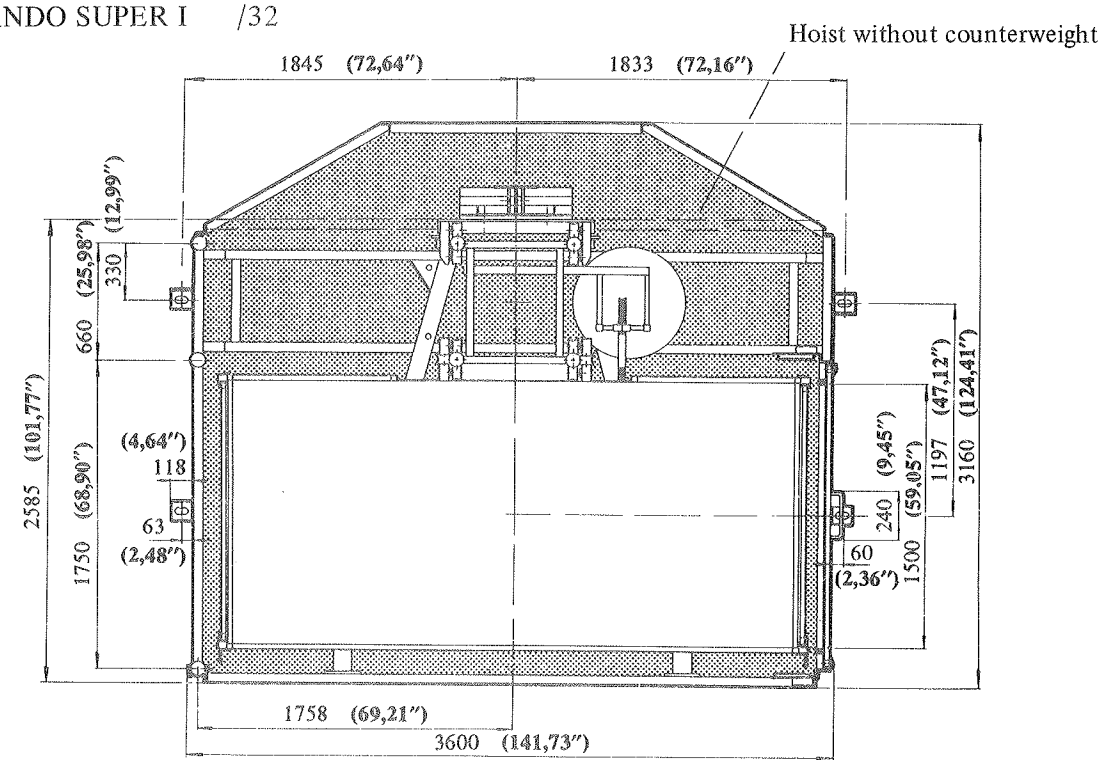


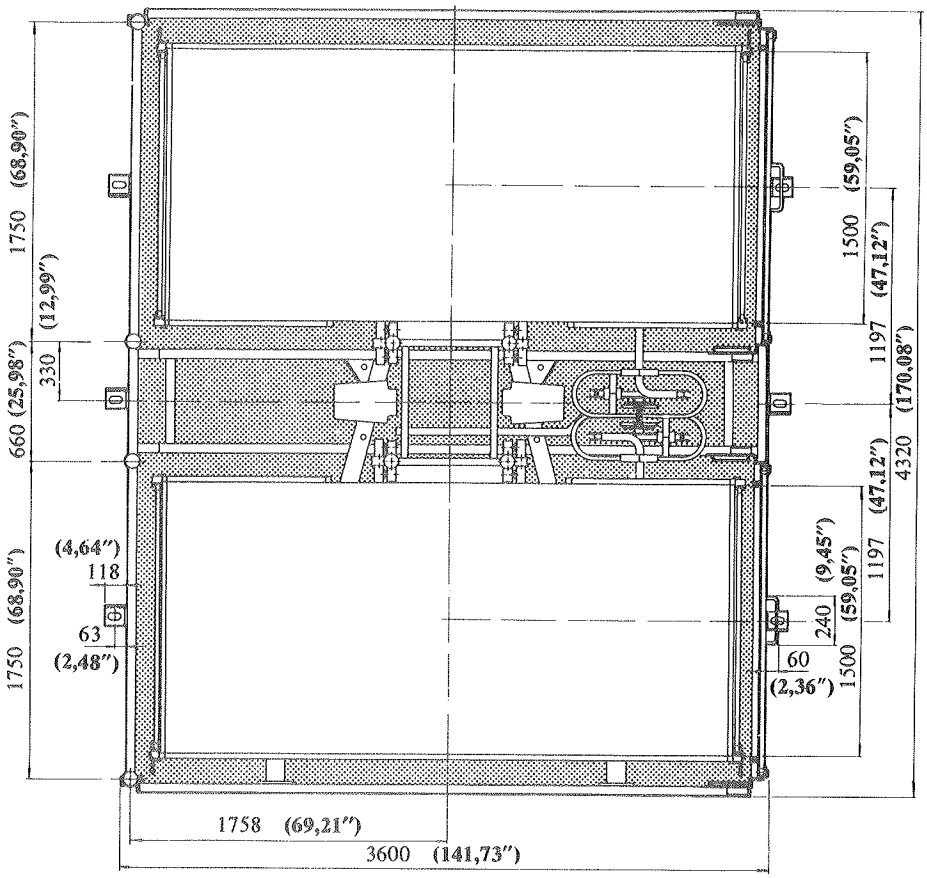
SCANDO II /30

The figure shows hoist without counterweight.

SPACE REQUIREMENT

SCANDO I /32
SCANDO SUPER I /32

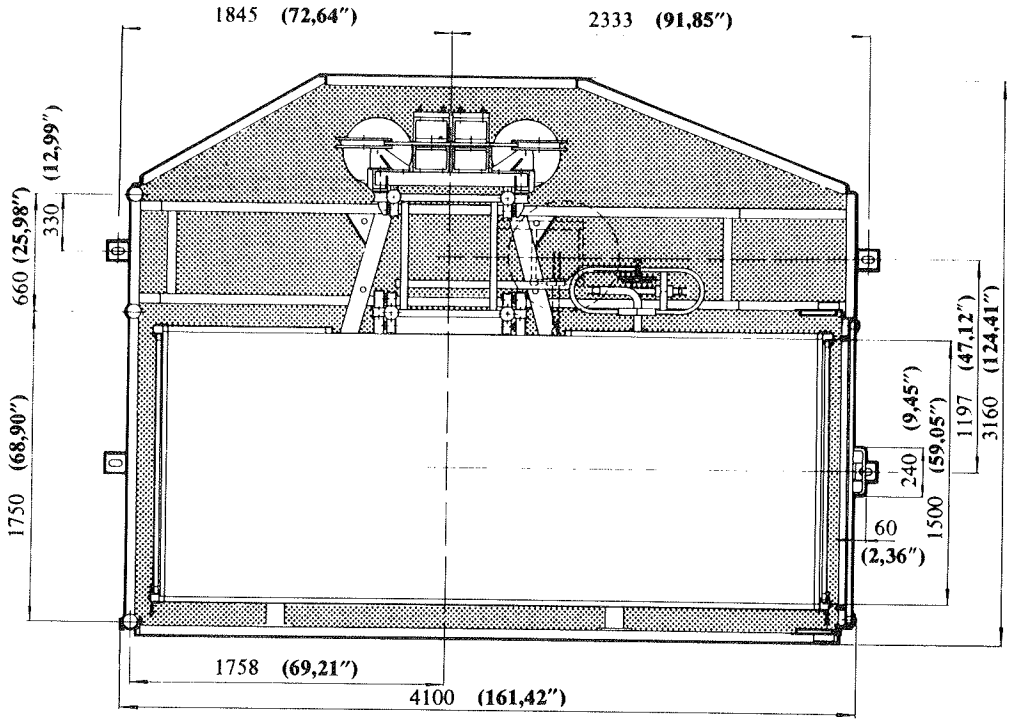


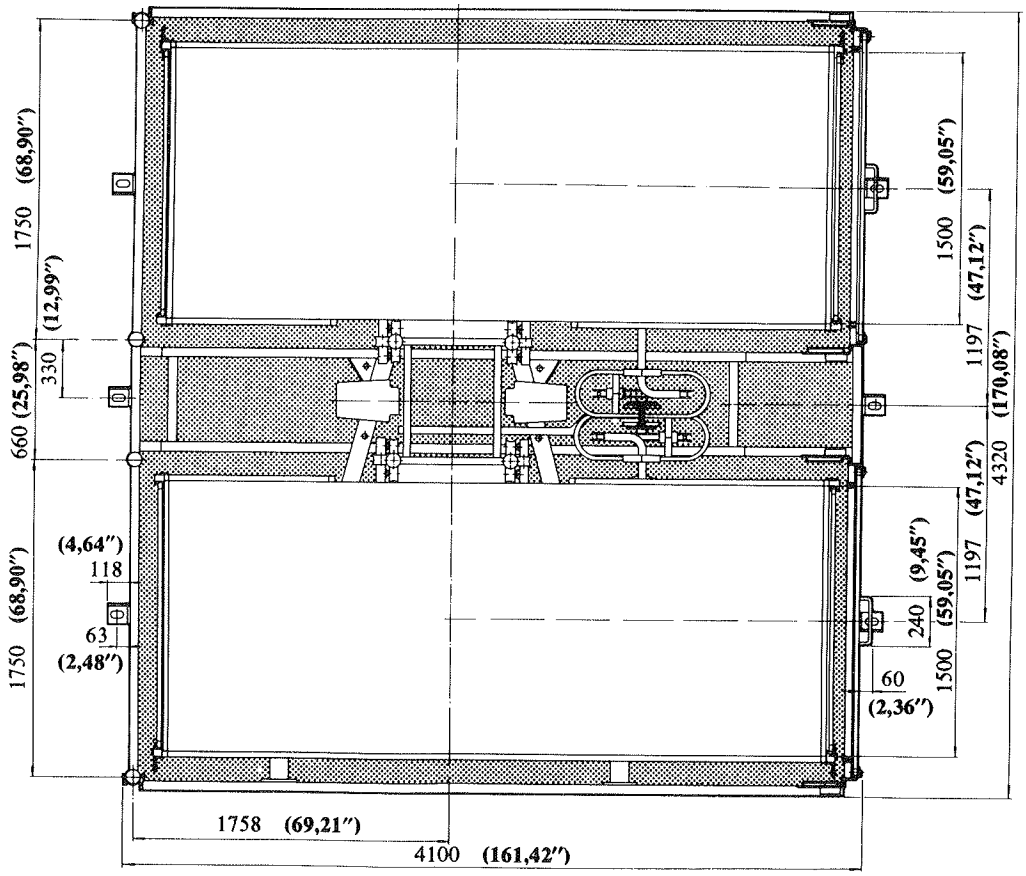


SCANDO II /32
SCANDO SUPER II /32

SPACE REQUIREMENT

SCANDO I /37
SCANDO SUPER I /37





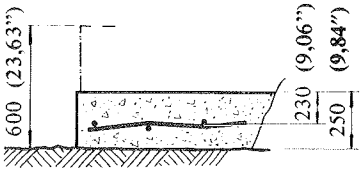
SCANDO II /37
SCANDO SUPER II /37

PREPARATION OF FOUNDATION

Alt. I

Concrete slab on the ground

Advantage: No draining required
Disadvantage: High sill

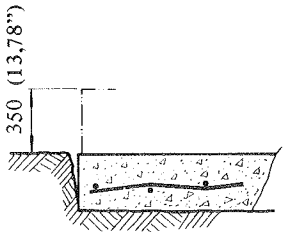


Alt. II

Concrete slab level with ground

Advantage: Draining required
Disadvantage: Sill

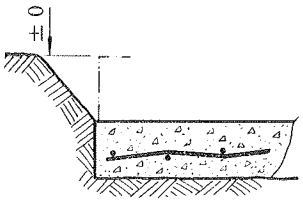
The most common type of foundation
Used in combination with a simple wooden bridge which is built up to the level of the sill



Alt. III

Concrete slab below ground level

Advantage: No sill between ground level and cage
Disadvantage: High corrosion if water remains on the foundation.
Requires careful draining



CONCRETE SLAB ACC. TO ALT. II, III AND ALL CONCRETE PITS MUST BE DRAINED.

FOUNDATION PARTS

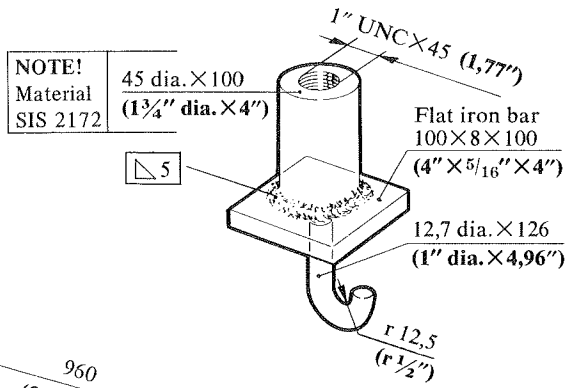
Material:

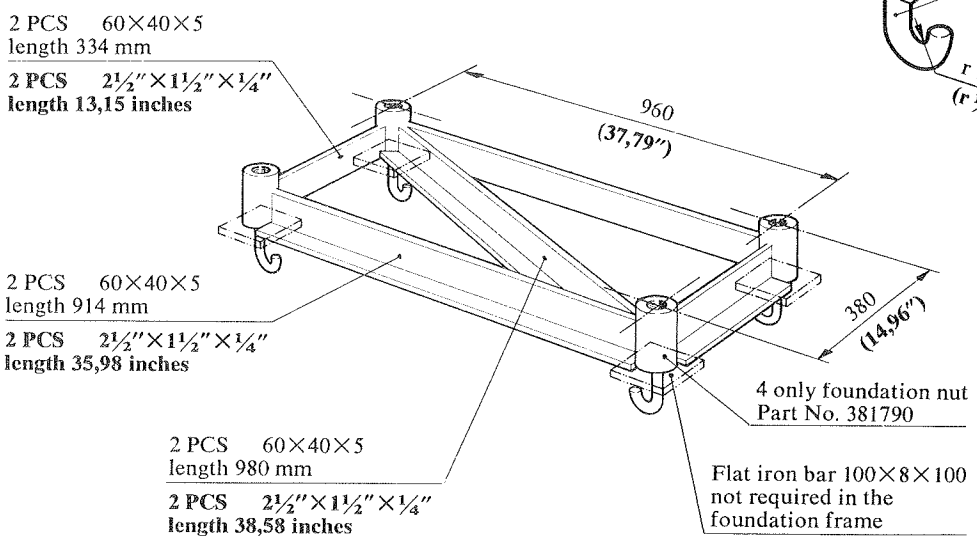
SIS	ISO R 630	USA ASTM
1312	Fe 360 B	A 573 (65)
2172	Fe 52 B	A 572 (50

To be welded ◺ 5 (0,02")

FOUNDATION FRAME
Part No. 371487

FOUNDATION NUT
Part No. 381790





CALCULATION OF STATIC LOAD ON THE FOUNDATION

Example

Twin cage Scando 18/30, mast height 150 m, equal to 100 mast sections. (The weights stated below have been taken from the technical specification of the data sheets).

Dead weight of base unit (incl. 1 cage and 2 mast sections)	2 530 kg
1 extra cage	1 410 kg
98 (100-2) mast sections, each 148 kg	14 504 kg
Load per cage 1800 kg (×2)	3 600 kg
	22 044 kg
22 044×9.81	= 216 252 N

For mast tie-ins, power cable and cable guiding system, add 10%	21 625 N
	237 877 N

If vertical pipe supports with landings are used, add 25%	59 469 N
	= 297 346 N
	say 297.3 kN

P_{max} for the concrete slab is 530 kN which means that the foundation strength is more than adequate in the above instance.

Ground pressure

The foundation can stand up to the maximum allowable load (=P_{max}) on condition that the ground can take a pressure of 0.15 MPa.

If the ground can stand a higher pressure, the maximum allowable load may perhaps be exceeded somewhat, but be sure to contact Linden-Alimak for information when going beyond the value indicated for P_{max}.

Examples of acceptable ground pressures:
(taken from the Swedish Building Standards SBN 1975)

Moraine = 0.4—1.0 MPa
Fine sand = 0.2 MPa

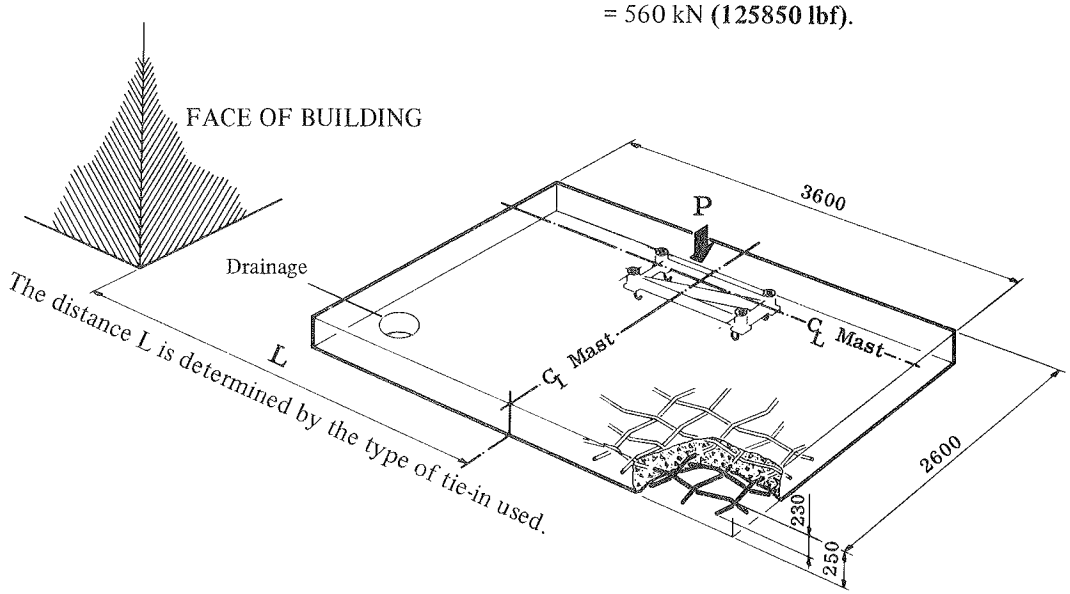
CONCRETE SLAB

SCANDO I /30

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} = 560 kN **(125850 lbf).**



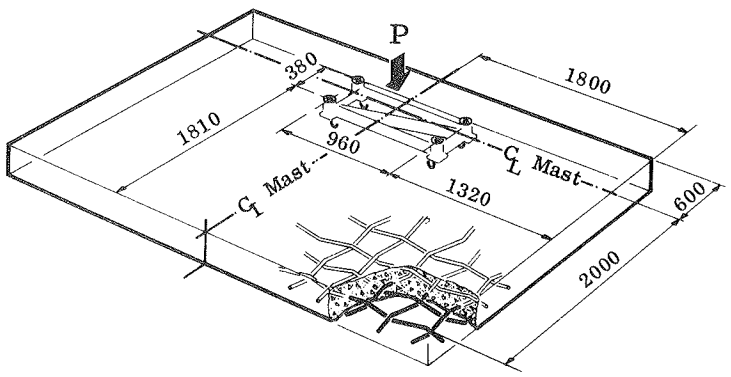
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume 2.4 m^3 **(3.14 cubic yards).**

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

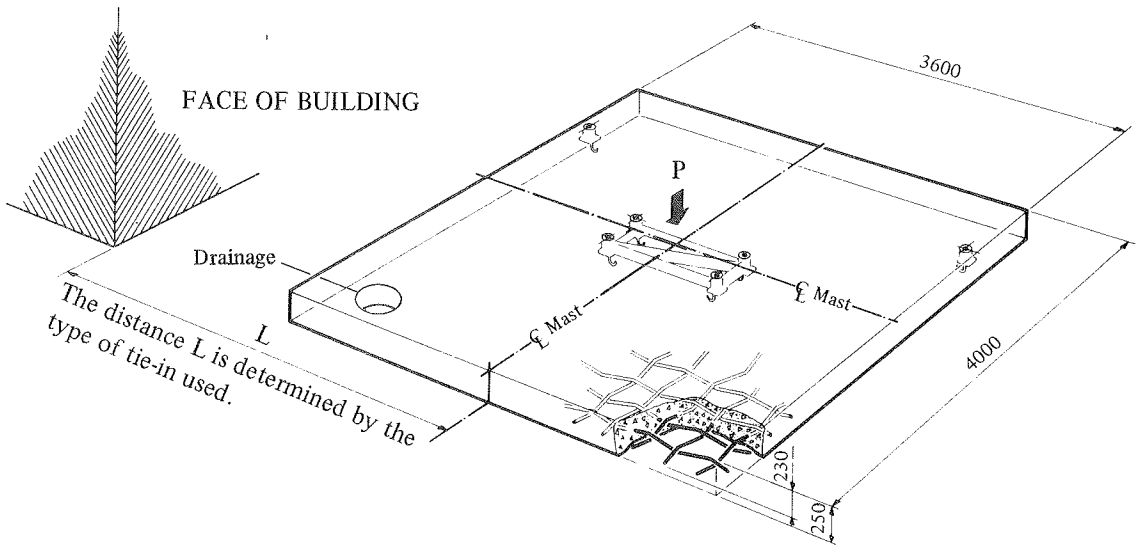
CONCRETE SLAB

SCANDO II /30

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used, the weight of the second cage in the case of a twin cage hoist, and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} = 530 kN **(119108 lbf).**



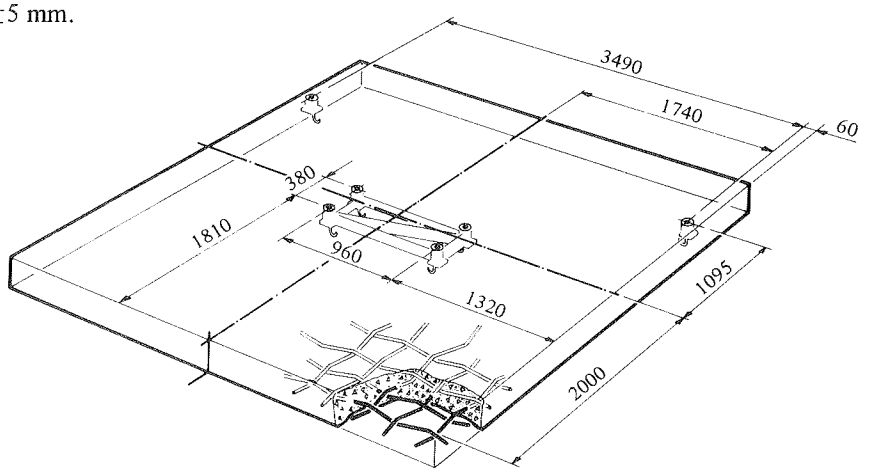
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume 3.7 m^3 **(4.84 cubic yards).**

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

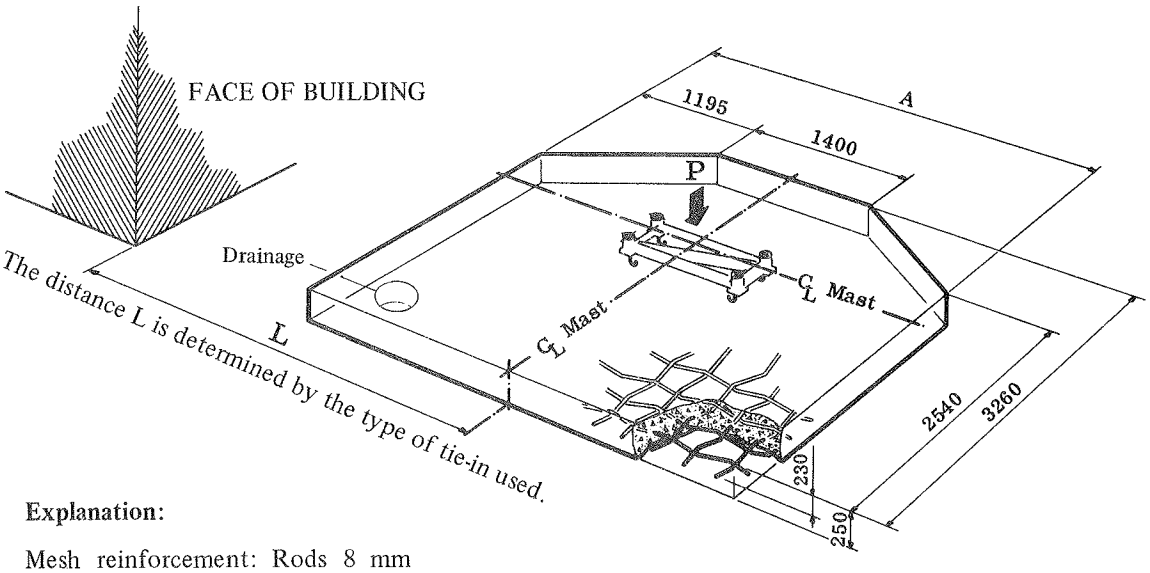
CONCRETE SLAB

SCANDO I /32 & /37
SCANDO SUPER I /32 & /37

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} according to table.



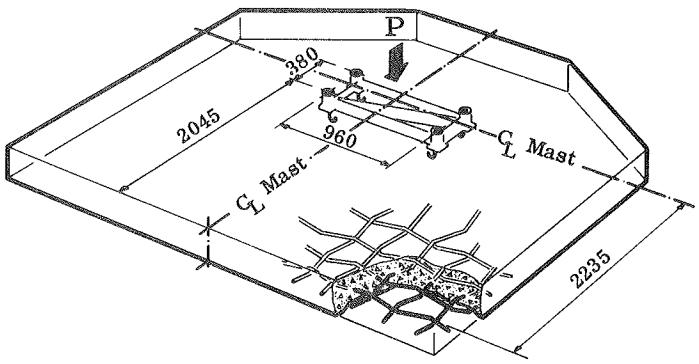
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume see table.

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

Type of hoist	A	Conc. volume	P_{max}
Scando /32 Scando Super 27/32 C	3790	2.9 m^3 **(3.79 cu.yds)**	530 kN **(119148 lbf)**
Scando 27/37 C Scando Super 27/37 C	4290	3.2 m^3 **(4.18 cu.yds)**	520 kN **(116900 lbf)**

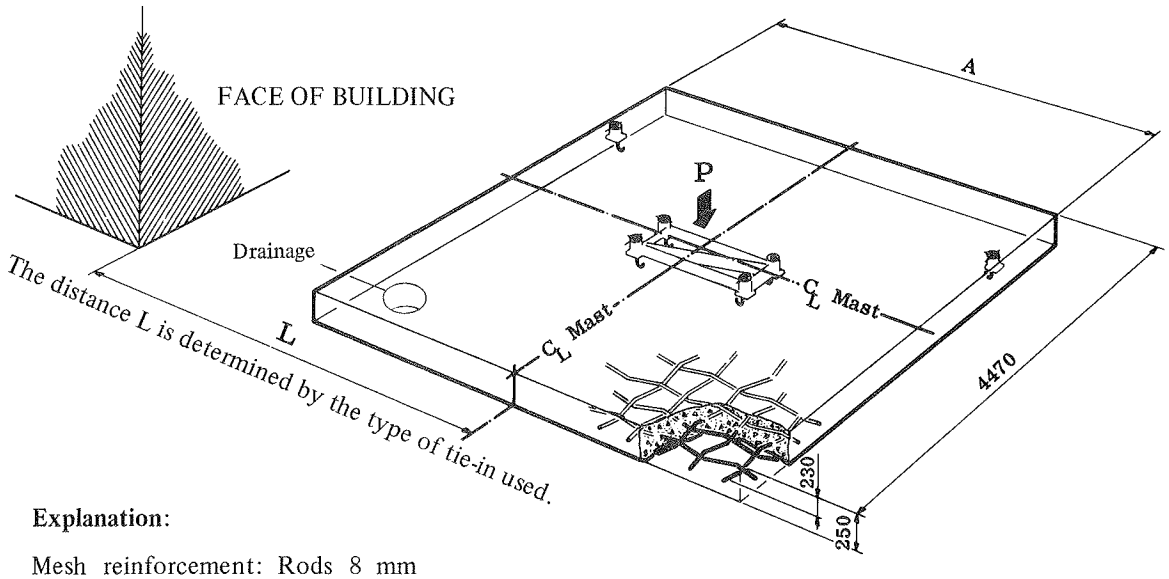
CONCRETE SLAB

SCANDO II /32 & /37
SCANDO SUPER II /32 & /37

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used, the weight of the second cage in the case of a twin cage hoist, and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} according to table.



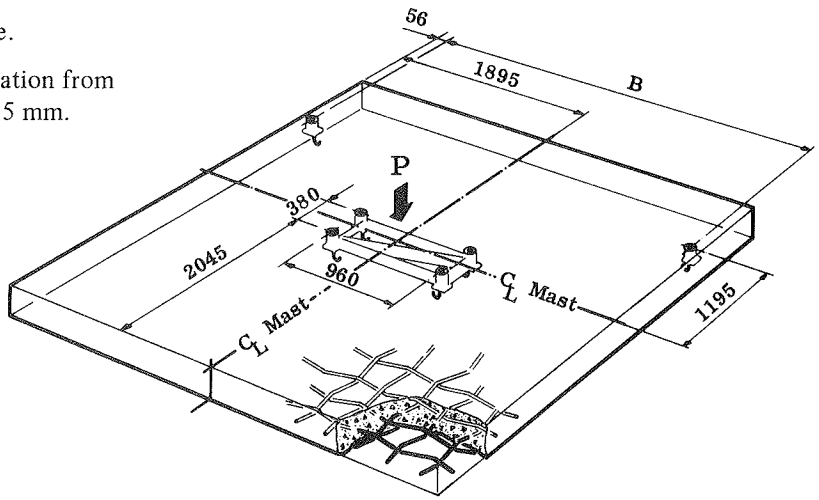
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume see table.

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

Type of hoist	A	B	Conc. volume	P_{max}
Scando /32 Scando Super 27/32 C	3790	3678	4.4 m^3 **(5.75 cu.yds)**	530 kN **(119148 lbf)**
Scando 27/37 C Scando Super 27/37 C	4290	4178	5 m^3 **(6.54 cu.yds)**	520 kN **(116900 lbf)**

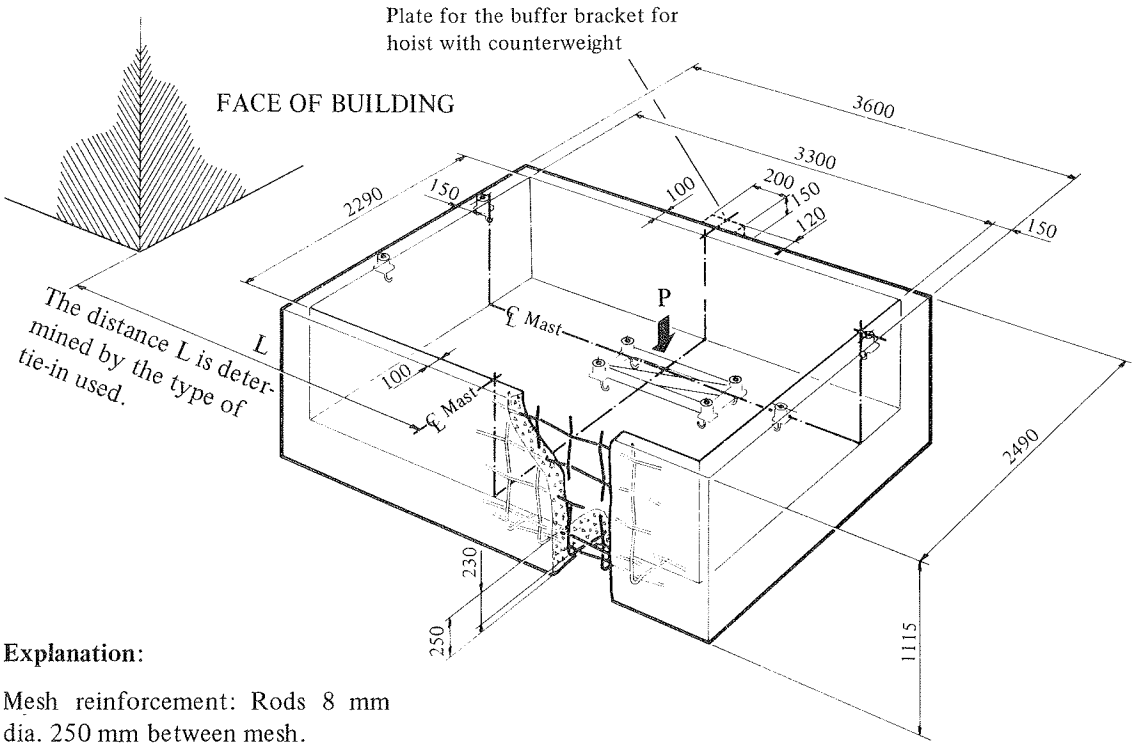
CONCRETE PIT

SCANDO I /30

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} = 560 kN **(125850 lbf).**



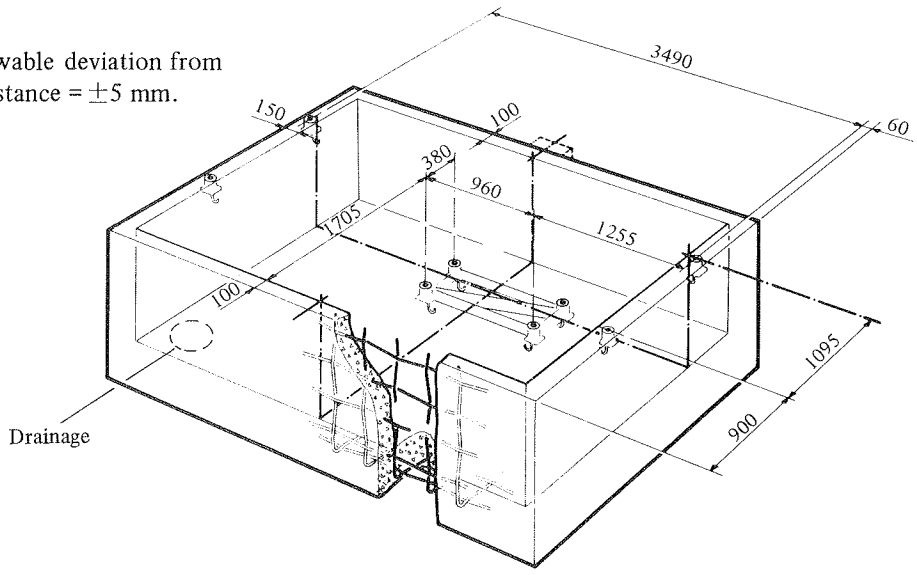
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume 3.5 m^3 **(4.58 cubic yards).**

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

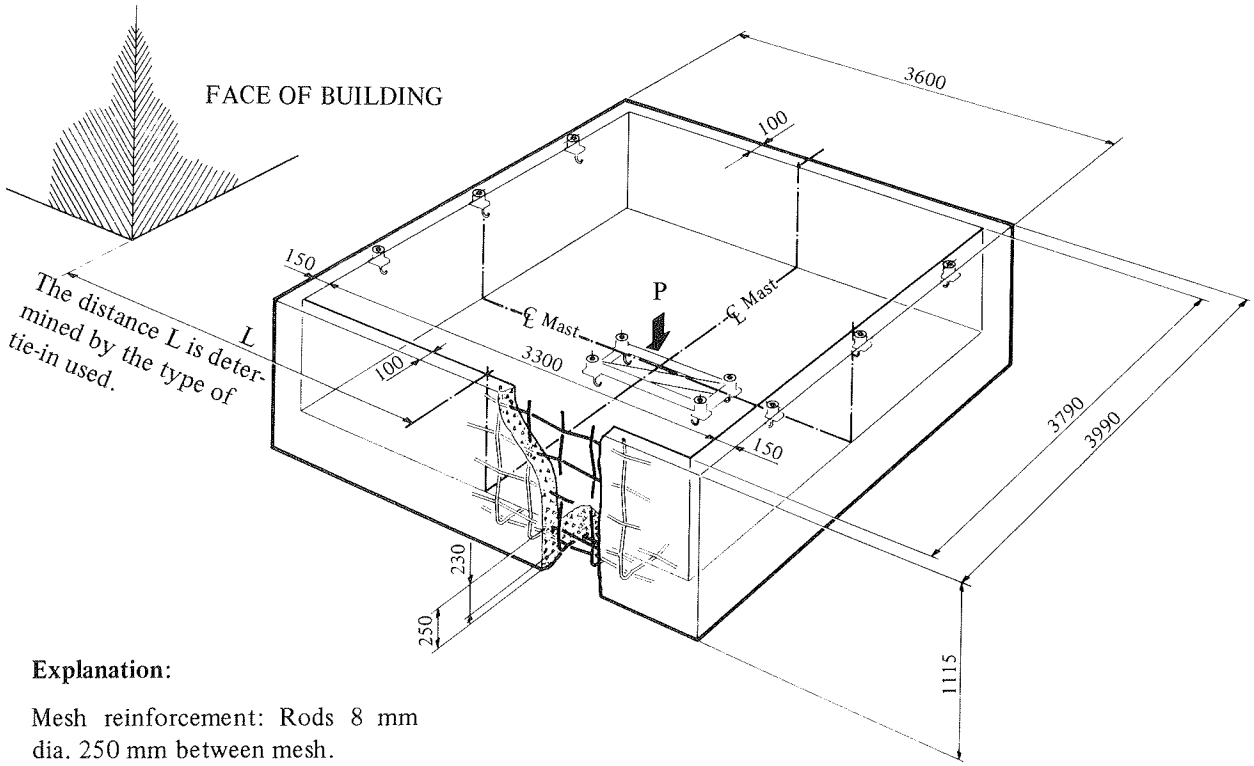
CONCRETE PIT

SCANDO II /30

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used, the weight of the second cage in the case of a twin cage hoist, and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} = 530 kN **(119108 lbf).**



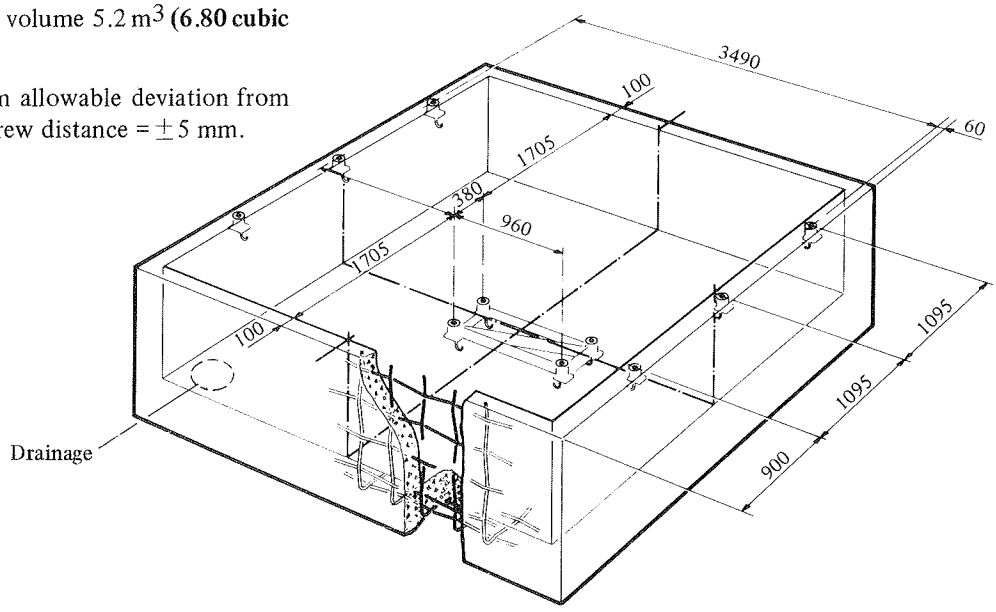
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume 5.2 m^3 **(6.80 cubic yards).**

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

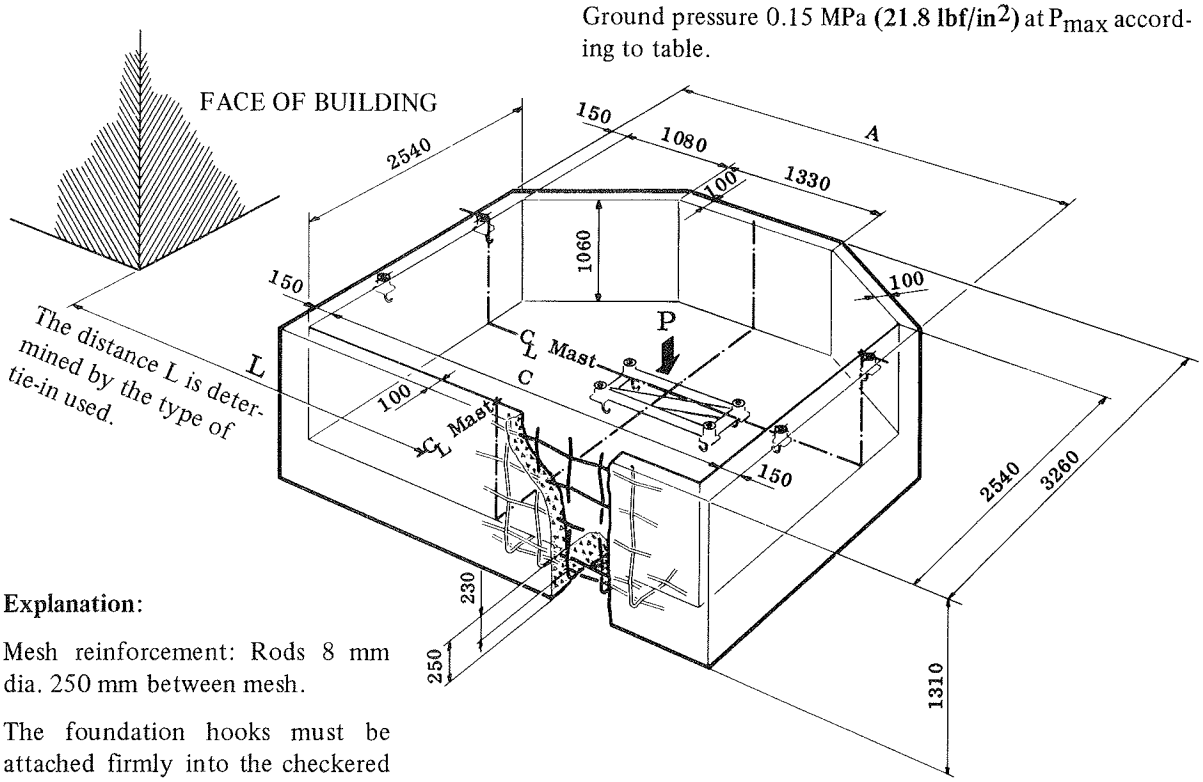
CONCRETE PIT

SCANDO I /32 & /37
SCANDO SUPER I /32 & /37

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used and the weight of the hoist mast.

Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} according to table.



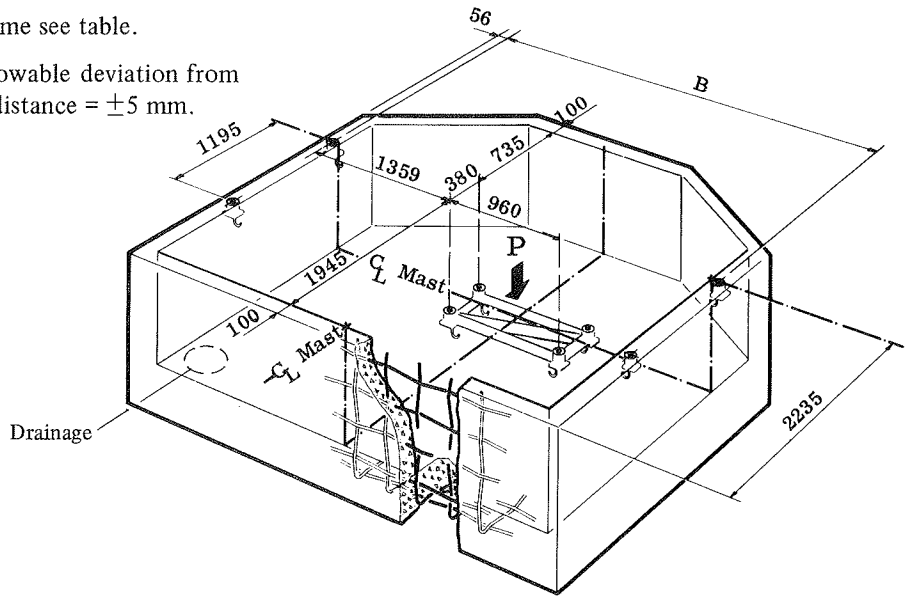
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume see table.

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x 0.03937 = inches

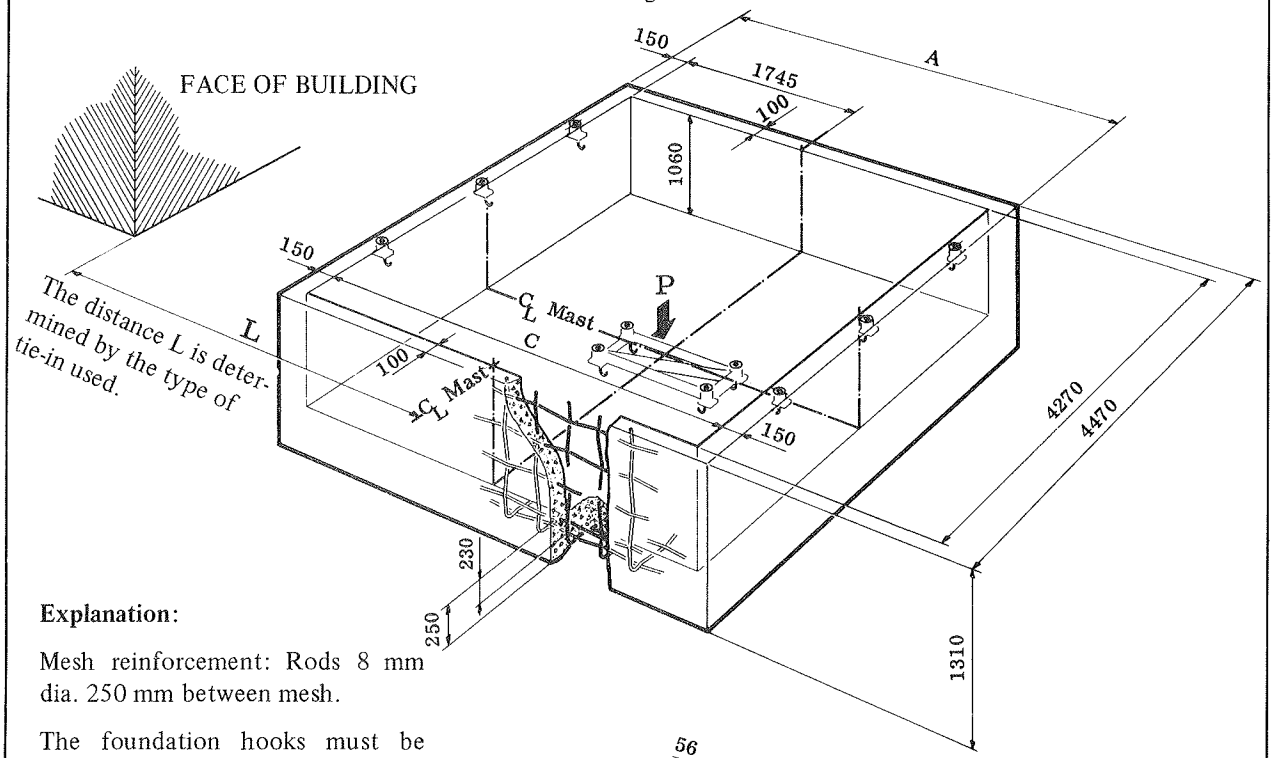
Type of hoist	A	B	C	Conc. volume	P_{max}
Scando /32 Scando Super 27/32 C	3790	3678	3490	4.4 m^3 **(5.75 cu.yds)**	530 kN **(119148 lbf)**
Scando 27/37 C Scando Super 27/37 C	4290	4178	3990	5 m^3 **(6.54 cu.yds)**	520 kN **(116900 lbf)**

CONCRETE PIT

SCANDO II /32 & /37
SCANDO SUPER II /32 & /37

Static load P on the foundation (approximately):

Add together the load capacity, the dead weight of the base unit, the weight of the counterweight if used, the weight of the second cage in the case of a twin cage hoist, and the weight of the hoist mast.
Ground pressure 0.15 MPa **(21.8 lbf/in^2)** at P_{max} according to table.



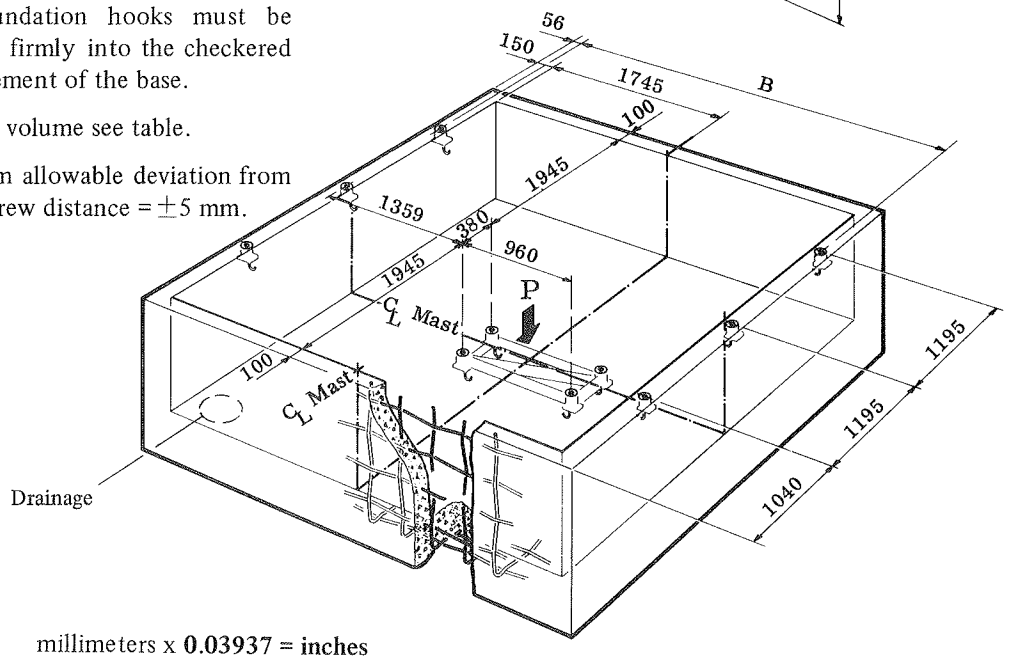
Explanation:

Mesh reinforcement: Rods 8 mm dia. 250 mm between mesh.

The foundation hooks must be attached firmly into the checkered reinforcement of the base.

Concrete volume see table.

Maximum allowable deviation from stated screw distance = ±5 mm.



millimeters x **0.03937 = inches**

Type of hoist	A	B	C	Conc. volume	P_{max}
Scando /32 Scando Super 27/32 C	3790	3678	3490	6.6 m^3 **(8.63 cu.yds)**	530 kN **(119148 lbf)**
Scando 27/37 C Scando Super 27/37 C	4290	4178	3990	7.3 m^3 **(9.55 cu.yds)**	520 kN **(116900 lbf)**

Tying the Hoist Mast

GENERAL

The mast must be tied to the building at regular intervals. The distance between the tie-ins depends upon the mast height, the type of hoist and local safety regulations.

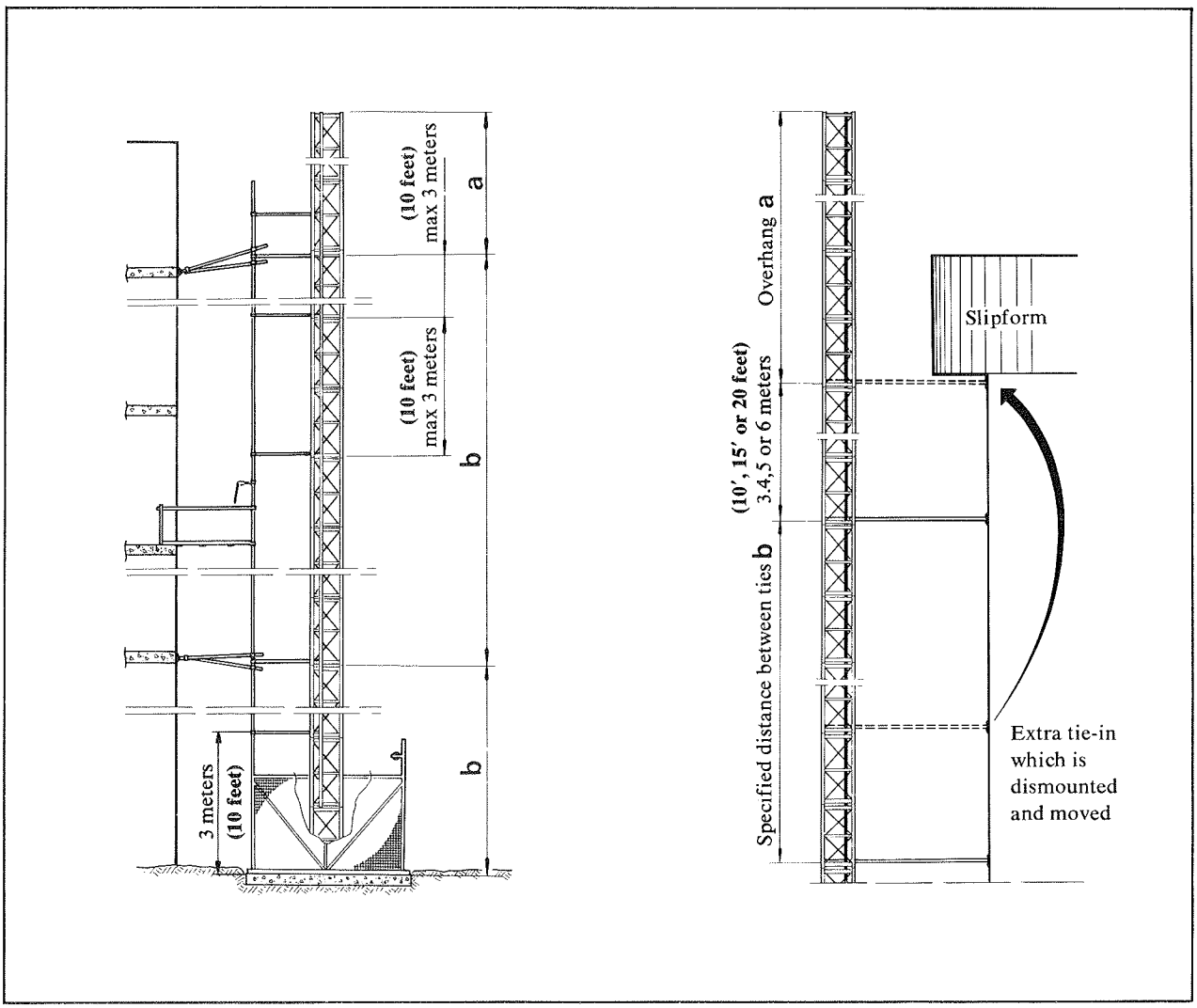
DISTANCE BETWEEN THE TIE-INS

The tie-in distance (**b**) and the overhang (**a**) are specified in the table beside in accordance with the various national regulations.

When using a hoist for slipform construction, it may be difficult to follow the height prescribed for the overhang. To this end, an extra tie-in may be installed just under the slipform as shown on the illustration below. The overhang can then be reduced to the maximum allowable height.

The extra tie-in may be removed when the hoist mast is extended further and can be tied at the normal level.

Remember, when planning for a slipform application, to order a sufficient number of tie-ins and brackets to cover the need for any extra tie-ins.



The tables are for Scando-mast and tie-in type I, II and III.

See explanation on backside this page.

Tie-in distance b in meters	Overhang a in meters	Maximum mast height with mast sections 76/68 at various tie-in distances and overhang																	
Table 1 acc. to DIN 1055, acc. to KAS no. 58		Scando I 10/30	Scando II 10/30	Scando I 15/30	Scando II 15/30	Scando I 18/30	Scando II 18/30	Scando I 20/30 C	Scando I 16/32	Scando II 16/32	Scando I 18/32 C	Scando I 25/32 C	Scando II 25/32 C	Scando Super I 27/32 C	Scando Super II 27/32 C	Scando I 27/37 C	Scando II 27/37 C	Scando Super I 27/37 C	Scando Super II 27/37 C
15	15	200	–	200	–	200	–	–	200	–	–	–	–	–	–	–	–	–	–
12	15	200	–	200	–	200	–	–	200	–	–	–	–	–	–	–	–	–	–
9	15	200	–	200	–	200	–	–	200	–	–	–	–	–	–	–	–	–	–
15	12	350	210	350	180	330	170	200	300	160	200	200	–	200	–	140	–	110	–
12	12	370	230	370	210	350	180	200	320	190	200	200	–	200	–	150	–	130	–
9	12	380	250	380	220	360	200	200	330	200	200	200	–	200	–	170	–	150	–
15	10,5							330			310	200	–	200	–	140	–	110	–
12	10,5							340			320	200	–	200	–	150	–	130	–
9	10,5							360			330	200	–	200	–	170	–	150	–
15	9											270	–	280	–	140	–	110	–
12	9											280	–	290	–	150	–	130	–
9	9											290	–	300	–	170	–	150	–
Table 2 acc. to British Stand. 4465:1969																			
15	15	60	–	60	–	60	–	–	60	–	–	–	–	–	–	–	–	–	–
12	15	60	–	60	–	60	–	–	60	–	–	–	–	–	–	–	–	–	–
9	15	30	–	30	–	30	–	–	30	–	–	–	–	–	–	–	–	–	–
15	12	250	150	250	150	250	150	60	250	150	60	60	–	30	–	30	–	30	–
12	12	250	150	250	150	250	150	60	250	150	60	60	–	30	–	30	–	30	–
9	12	250	150	250	150	250	150	60	250	150	60	60	–	30	–	30	–	30	–
15	10,5	350	210	350	180	330	160	130	300	150	130	130	–	100	–	100	–	100	–
12	10,5	370	230	370	210	350	170	130	320	180	130	130	–	100	–	100	–	100	–
9	10,5	380	250	380	220	360	190	130	330	190	130	130	–	100	–	100	–	100	–
15	9							–			–	270	–	200	–	140	–	110	–
12	9							320			320	280	–	200	–	150	–	130	–
9	9							320			320	290	–	200	–	170	–	150	–
7,5	9											290	–	200	–	–	–	–	–
15	7,5												–	290	–	140	–	110	–
12	7,5												–	290	–	150	–	130	–
9	7,5												–	300	–	170	–	150	–
7,5	7,5												–		–	170	–	150	–

Tie-in distance b in feet	Overhang a in feet	Maximum mast height with mast sections 76/68 at various tie-in distances and overhang																	
Table 3 acc. to ANSI A 58.1 –1972 Zon B																			
25	50	–	–					–	–	–									
25	40	–	–	600		600		–	–	–									
25	35	–	–		600		600	–	–	–	500		500		350		350		
25	30	–	–					–	–	–									
25	25	–	–					–	–	–									

At erection of hoists in accordance with above table and the tie-in distance exceeds the overhang, an overhang = tie-in distance +1.5 m **(5 feet)** can be allowed if erection is carried out at a windspeed of less than 15 m/s **(33.5 mile/h).**

NOTE! The mast height is theoretical for mast and tie-in and can be reduced of other factors, e.g. power consumption from motor, voltage drop in el-cable.

Explanation to the tables

Omitted information *does not mean* that respective value for tie-in distance (b) and overhang (a) cannot be used. The tables have been finished on the level, where, according to applied calculation standards, the max. mast height for a certain tie-in distance does not change any more with a decreasing overhang.
From a general point of view, the same max. mast height for the same tie-in distance is valid for the continuation of the tables.

A horizontal line *means that* respective values for tie-in distance and overhang are *not allowed.*

The tables are for Scando-mast and tie-in type I, II and III.

Tie-in distance b in meters	Overhang a in meters	Maximum mast height with mast sections 76/68 at various tie-in distances and overhang																	
Table 1 acc. to DIN 1055, acc. to KAS no. 58		Scando I 10/30	Scando II 10/30	Scando I 15/30	Scando II 15/30	Scando I 18/30	Scando II 18/30	Scando I 20/30 C	Scando I 16/32	Scando II 16/32	Scando I 18/32 C	Scando I 25/32 C	Scando II 25/32 C	Scando Super I 22/32 C	Scando Super II 22/32 C	Scando I 27/37 C	Scando II 27/37 C	Scando Super I 27/37 C	Scando Super II 27/37 C
15	15	200	–	200	–	200	–	–	200	–	–	–	–	–	–	–	–	–	–
12	15	200	–	200	–	200	–	–	200	–	–	–	–	–	–	–	–	–	–
9	15	200	–	200	–	200	–	–	200	–	–	–	–	–	–	–	–	–	–
15	12	350	210	350	180	330	170	200	300	160	200	200	–	200	–	140	–	110	–
12	12	370	230	370	210	350	180	200	320	190	200	200	–	200	–	150	–	130	–
9	12	380	250	380	220	360	200	200	330	200	200	200	–	200	–	170	–	150	–
15	10,5	(350)						330			310	200	–	200	–	140	–	110	–
12	10,5							340			320	200	–	200	–	150	–	130	–
9	10,5							360			330	200	–	200	–	170	–	150	–
15	9	(350)										270	–	280	–	140	–	110	–
12	9											280	–	290	–	150	–	130	–
9	9											290	–	300	–	170	–	150	–
Table 2 acc. to British Stand																			

The tables are for Scando-mast and tie-in type I, II and III.

See chapter Installation "Mast" concerning reinforced mast sections.

Tie-in distance b in meters	Overhang a in meters	Maximum mast height with mast sections (76/63 and 76/60), reinforced in the lower part, at various tie-in distances and overhang																
Table 1 acc. to DIN 1055, acc. to KAS no. 58		Scando I 10/30	Scando II 10/30	Scando I 15/30	Scando II 15/30	Scando I 18/30	Scando II 18/30	Scando I 20/30 C	Scando I 16/32	Scando II 16/32	Scando I 18/32 C	Scando I 25/32 C	Scando II 25/32 C	Scando Super I 27/32 C	Scando Super II 27/32 C	Scando I 27/37 C	Scando II 27/37 C	Scando Super I 27/37 C	Scando Super II 27/37 C
15	12												100	200	100	200	100	200	100
12	12												100	200	100	200	100	200	100
9	12												100	200	–	200	–	200	–
15	10,5												100	200	100	200	100	200	100
12	10,5												200	200	100	200	100	200	100
9	10,5												200	200	100	200	100	200	100
15	9												200	630	200	490	200	460	200
12	9												200	650	200	500	200	480	200
9	9												200	660	200	520	200	490	200
15	7,5												200		200		200		200
12	7,5												200		200		200		200
9	7,5												200		200		200		200
7,5	7,5												200		200		200		200
15	6												–		–		–		–
12	6												310		200		200		200
9	6												320		310		270		260
Table 2 acc. to British Stand. 4465:1969																			
15	10,5												30	100	–	100	–	100	–
12	10,5												30	100	–	100	–	100	–
9	10,5												30	100	–	100	–	100	–
15	9												60	200	30	200	30	200	30
12	9												60	200	30	200	30	200	30
9	9												60	200	30	200	30	200	30
15	7,5												–	–	–	430	–	430	–
12	7,5												180	300	120	500	120	480	120
9	7,5												200	580	120	520	120	490	120
7,5	7,5												200	570	120		120		120
15	6												–		–		–		–
12	6												310		–		–		–
9	6												320		310		270		260

Tie-in distance b in feet	Overhang a in feet	Maximum mast height with mast sections (76/63 and 76/60), reinforced in the lower part, at various tie-in distances and overhang																
Table 3 acc. to ANSI A 58.1 –1972 Zon B																		
25	50	–	–						–	–	–							
25	40	–	–						–	–	–							
25	35	–	–						–	–	–							
25	30	–	–						–	–	–	600	600	1600	990	600	660	990	660
25	25	–	–						–	–	–							

At erection of hoists in accordance with above table and the tie-in distance exceeds the overhang, an overhang = tie-in distance +1.5 m **(5 feet)** can be allowed if erection is carried out at a windspeed of less than 15 m/s **(33.5 mile/h).**

NOTE! The mast height is theoretical for mast and tie-in and can be reduced of other factors, e.g. power consumption from motor, voltage drop in el-cable.

The tables are for Scando-mast and tie-in type IV.

DIN = Deutsche Industrienormen (Germany)
KAS = Kungliga Arbetarskyddsstyrelsen (Sweden)
BS = British Standard
ANSI = American National Standard Institute

Tie-in distance b in meters	Overhang a in meters	Maximum mast height with mast sections 76/68, at various tie-in distances and overhang							
		Scando I 7/20	Scando II 7/20	Scando I 10/30	Scando II 10/30	Scando I 15/30	Scando II 15/30	Scando I 18/30	Scando II 18/30
Table 1 acc. to DIN 1055,									
12	12	100	–	100	–	100	–	100	–
12	10,5	100	100	100	100	100	100	100	100
9	10,5	100	100	100	100	100	100	100	100
7,5	10,5	100	–	100	–	100	–	100	–
12	9	200	100	200	100	200	100	200	100
9	9	200	200	200	200	200	200	200	200
7,5	9	200	200	200	200	200	200	200	200
9	7,5	490	200	380	200	380	200	360	200
7,5	7,5	490	200	380	200	380	200	360	200
Table 2 acc. to British Stand. 4465:1969									
12	12	–	–	–	–	–	–	–	–
12	10,5	–	–	–	–	–	–	–	–
9	10,5	–	–	–	–	–	–	–	–
7,5	10,5	–	–	–	–	–	–	–	–
12	9	30	–	30	–	30	–	30	–
9	9	30	30	30	30	30	30	30	30
7,5	9	30	30	30	30	30	30	30	30
9	7,5	90	60	90	60	90	60	90	60
7,5	7,5	480	60	480	60	480	60	480	60
Table 3 acc. to ANSI A 58.1 –1972 Zon B									
7,5	10,5	–	–	–	–				
7,5	9	–	–	–	–				
7,5	7,5	–	–	–	–				
Table 4 acc. to KAS no. 58									
12	12	50	40	50	40	50	40	50	40
12	10,5	65	55	65	55	65	55	65	55
9	10,5	65	55	65	55	65	55	65	55
7,5	10,5	60	50	60	50	60	50	60	50
12	9	85	75	85	75	85	75	85	75
9	9	90	75	90	75	90	75	90	75
7,5	9	85	75	85	75	85	75	85	75
9	7,5	490	330	380	250	380	220	360	200
7,5	7,5	490	330	380	250	380	220	360	200

At erection of hoists in accordance with above table and the tie-in distance exceeds the overhang, an overhang = tie-in distance + 1.5 m **(5 feet)** can be allowed if erection is carried out at a windspeed of less than 15 m/s **(33.5 mile/h).**

NOTE! The mast height is theoretical for mast and tie-in and can be reduced of other factors, e.g. power consumption from motor, voltage drop in el-cable.

SELECTION OF TIE-INS

Type I:

Intended only for single cage hoists, with or without counterweight, **especially when erected without vertical pipe supports.** It can, however, also be used together with vertical pipes.

Type II:

Intended for single or twin cage hoists, with or without counterweights.
The hoist **must be provided with vertical pipes.**

Type III:

Intended for single or twin cage hoists with or without counterweight.
The hoist **must not be equipped with vertical pipes.**

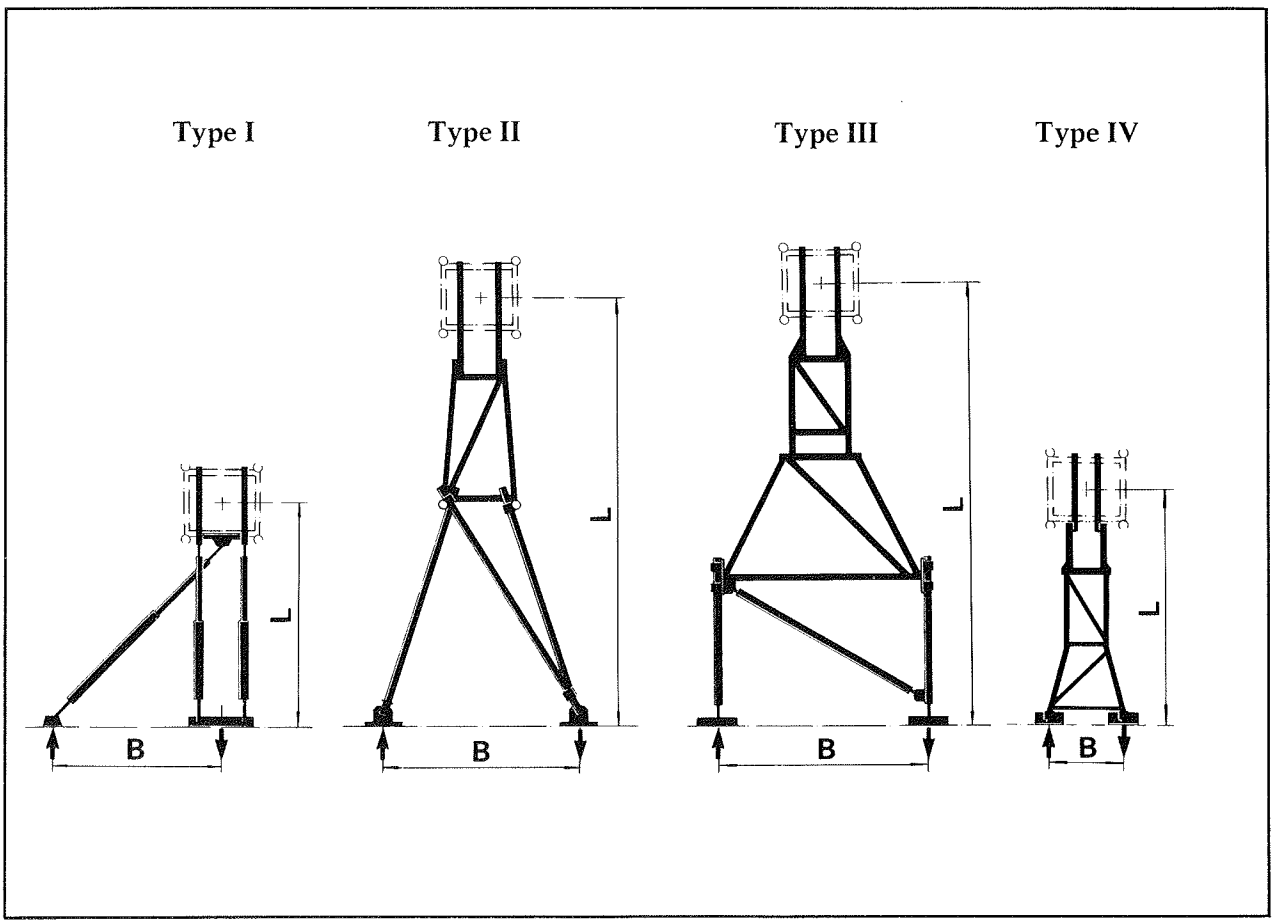
Type IV:

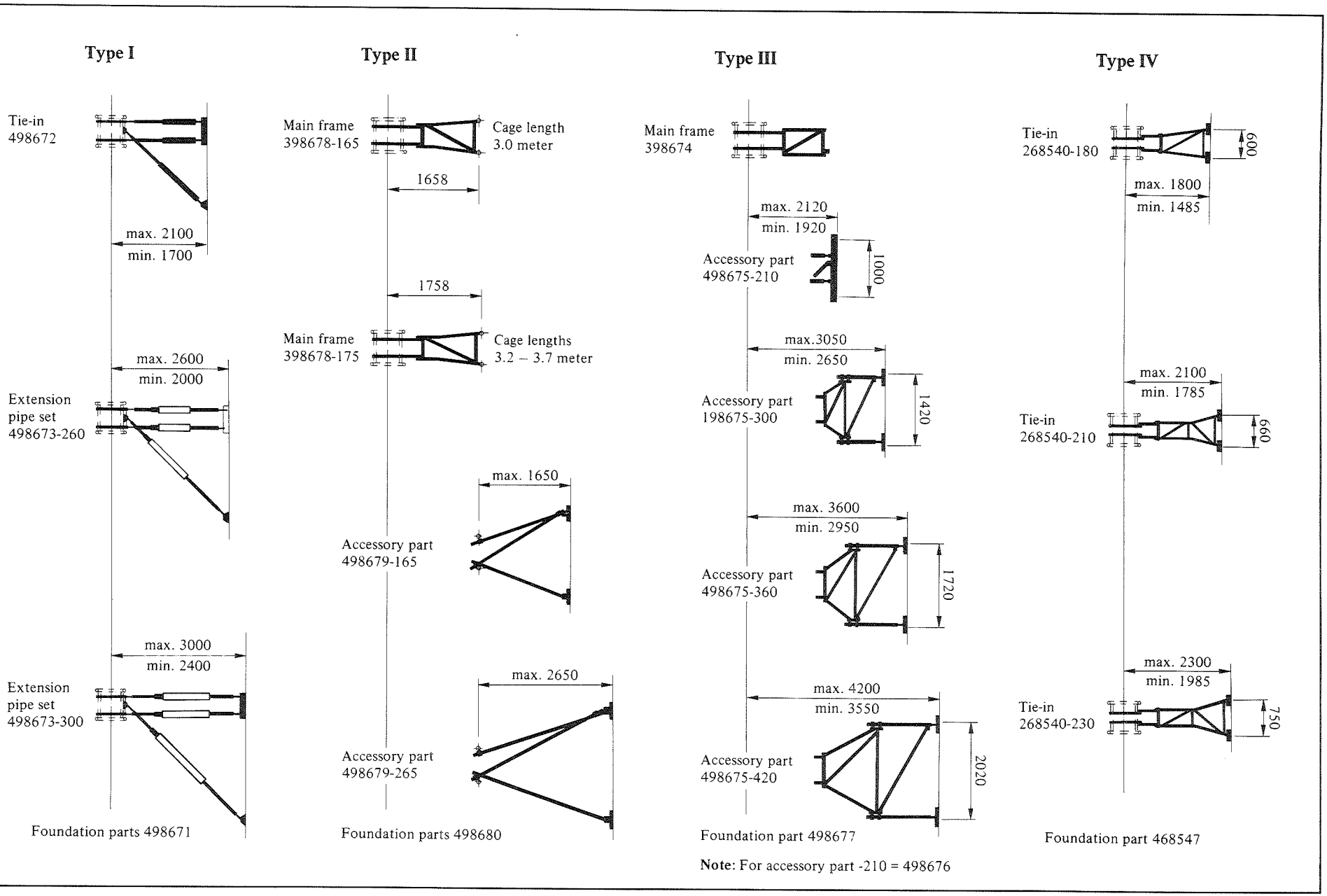
Intended for single or twin cage hoists without counterweight.
The hoist **must not be equipped with vertical pipes.**

The tie-in is **only** intended for markets according to table on the preceding side.

Note: The vertical pipes are the pipes used to support the landings.

If standard mast tie-ins cannot be used, contact the local LINDEN-ALIMAK representative.




Type I
Tie-in
498672
max. 2100
min. 1700
max. 2600
min. 2000
Extension
pipe set
498673-260
max. 3000
min. 2400
Extension
pipe set
498673-300
Foundation parts 498671
Type II
Main frame
398678-165
Cage length
3.0 meter
1658
1758
Main frame
398678-175
Cage lengths
3.2 – 3.7 meter
max. 1650
Accessory part
498679-165
max. 2650
Accessory part
498679-265
Foundation parts 498680
Type III
Main frame
398674
max. 2120
min. 1920
Accessory part
498675-210
1000
max.3050
min. 2650
Accessory part
198675-300
1420
max. 3600
min. 2950
Accessory part
498675-360
1720
max. 4200
min. 3550
Accessory part
498675-420
2020
Foundation part 498677
Note: For accessory part -210 = 498676
Type IV
Tie-in
268540-180
600
max. 1800
min. 1485
max. 2100
min. 1785
Tie-in
268540-210
660
max. 2300
min. 1985
Tie-in
268540-230
750
Foundation part 468547

ATTACHMENT OF TIE-INS

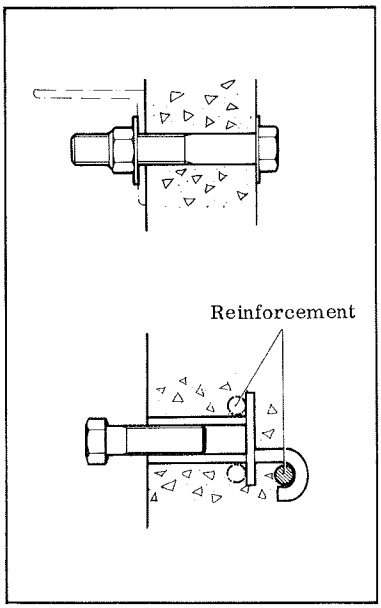
The tie-ins are fixed to the building by bolts to special, cast-in brackets or by through bolts and nuts. See illustration.

The width B must be known before the work is started.

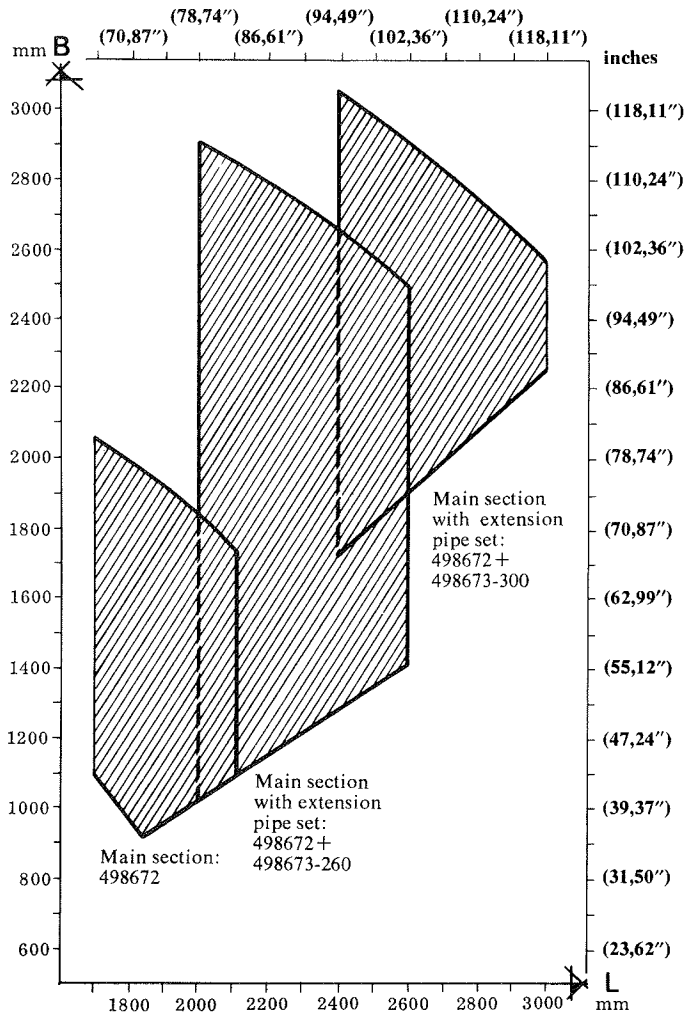
Tie-in type III is made with a **fixed B measurement** which cannot be altered.

Types I and II have given measurements for B maximum and B minimum at an optional L measurement. See diagram. "Optional measurement" means a measurement within the maximum-minimum limits for the type of tie-in referred to.

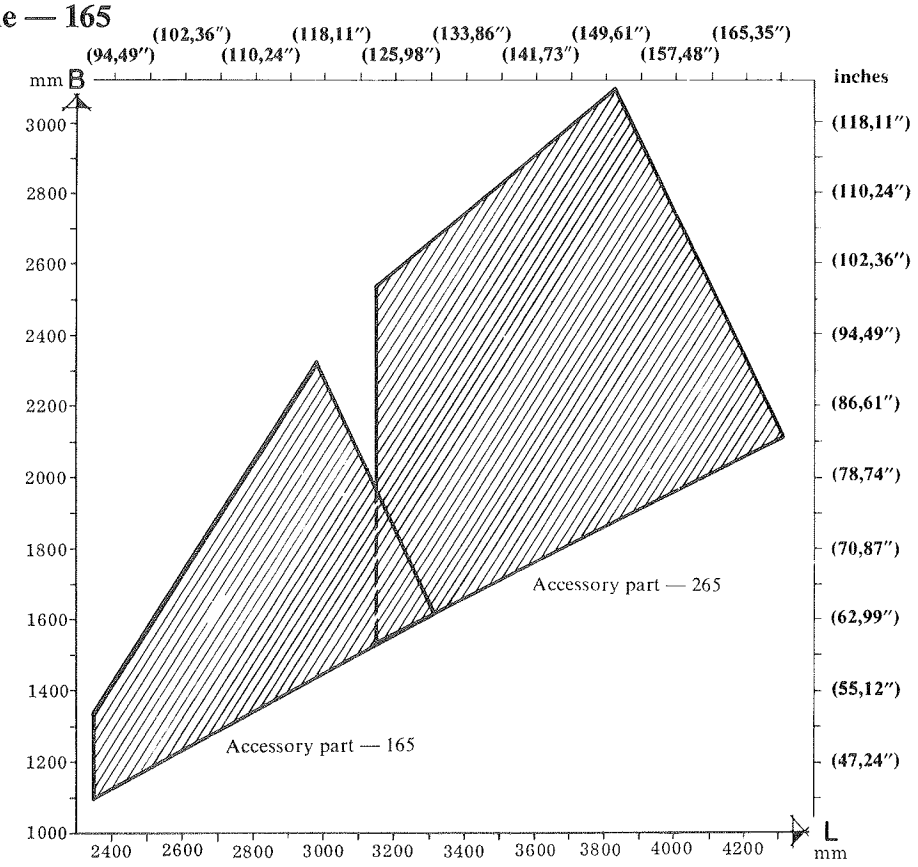
When planning for a hoist installation at a slipform, remember the extra brackets that may have to be cast into the wall for any additional tie-ins.



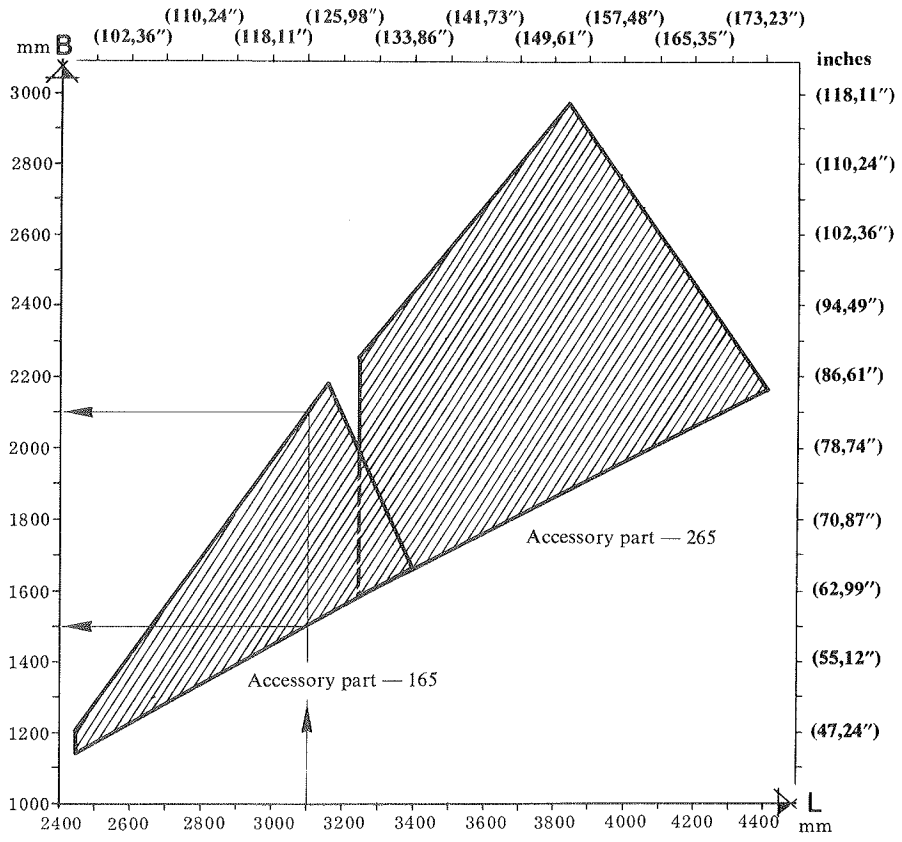
Tie-in type I



Tie-in type II, main frame — 165



Tie-in type II, main frame — 175



Example:

Tie-ins for a hoist type **SCANDO 16/32 provided with vertical pipes,** shall be chosen.

The text "**Alternative tie-ins**" says that tie-ins type II may well be used.

The dimension of the hoist cage — SCANDO 16/32 (cage length 3.2 m) indicates the choice of main frame to type 398678-175.

With regard to other equipment e.g. schaffolds at the building, the distance between centerline of the mast and the wall is fixed at 3100 mm **(122.05″)**

The dimension 3100 mm **(122.05″),** shown at the L-axes in graph above, indicates the additional part 498679-165 shall be used and that its B-dim. shall be between 1500 mm **(59.05″)** and 2060 mm **(81.10″).**

Depending on the choice of B-dim., the reactive force P on the face of the building can be calculated by the following formula:

$$P = \frac{L \times 60000}{B \times 2.05} \text{ Newton (Newton} \times 0.2248 = \text{lbf)}$$

For B = 1500 mm P is

$$P = \frac{3100 \times 60000}{1500 \times 2.05} = 60488 \text{ Newton}$$

For B = 2100 mm P is

$$P = \frac{3100 \times 60000}{2100 \times 2.05} = 43205 \text{ Newton}$$

As shown by this example, the reactive force P on the face of the building is reduced when the B-dim. is increased.

REACTION FORCE P ON THE WALL

Tie-in type I and II

If the tie-ins are installed at the distances and with the overhang specified in tables 1, 2, 3 or 4 and with the B-measurement according to the diagram, the force on the wall may be obtained from the following formula:

$$P = \frac{L \times 60000}{B \times 2.05} \text{ Newton}$$

Newton $\times$ 0,2248 = lbf (pound-force)

Tie-in type III

The force on the wall may be obtained from the following formula:

$$P = \frac{L \times 60000}{B \times 2.1} \text{ Newton}$$

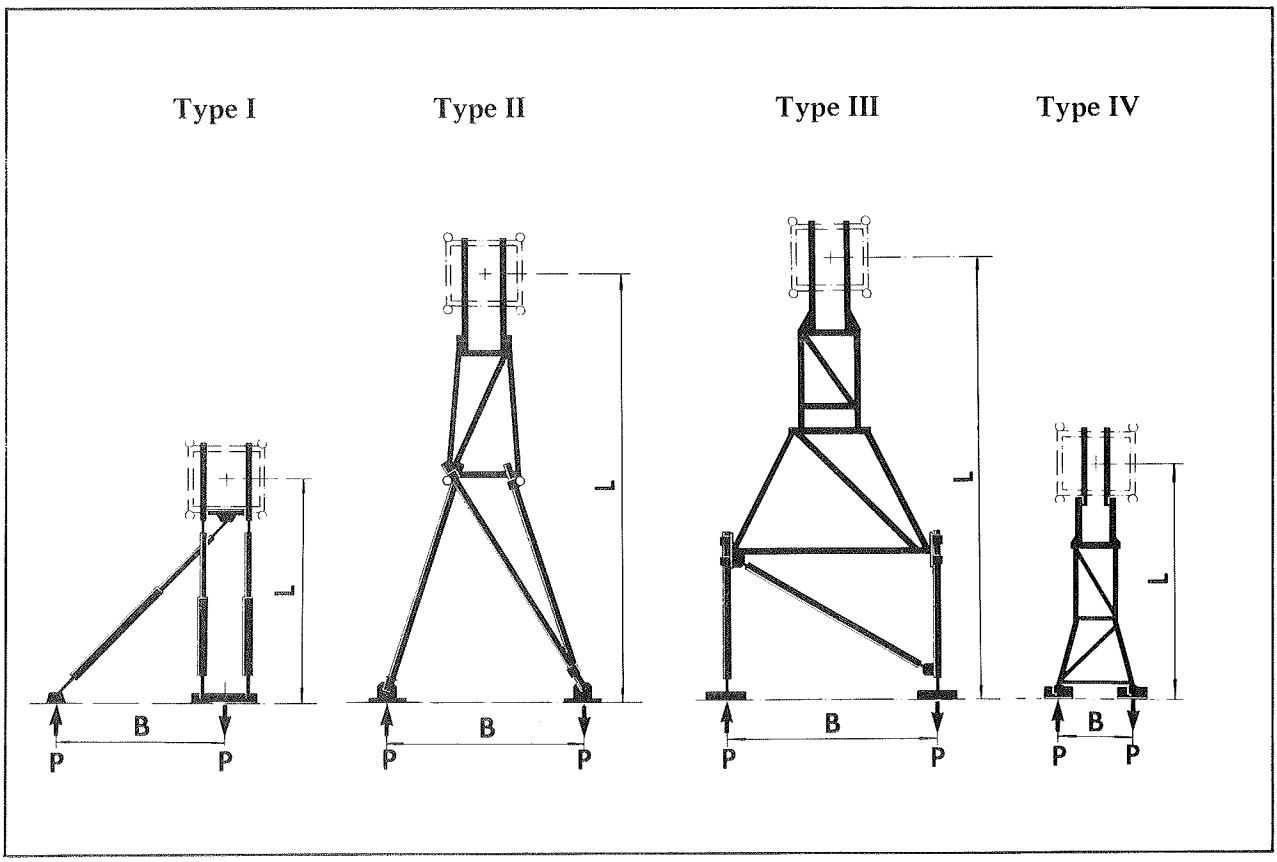
Tie-in type IV

The force on the wall may be obtained from the following formula:

$$P = \frac{L \times 36000}{B \times 2.1} \text{ Newton}$$

This value of P will only result from the upper limit of wind force (as defined by the country's regulations), and the maximum mast height for particular tie-in and overhang values, as detailed in Tables.

If the force on the wall should prove to be excessive — contact the nearest representative and ask for his advice.



Operating Instructions

PUSH BUTTON OPERATED HOIST

1. Turn on the main switch at the ground landing.
2. Close the gates. Make sure that the daily inspection has been carried out.
3. Make sure that the three phase switch in the cage is turned on.
4. Press the button with the symbol for the desired direction, and the hoist will start.
5. Stop the hoist by pressing the 0-button. At the top and bottom landings the hoist will stop automatically because of the limit cams.
6. If the hoist is equipped with cams for automatic stop at the landings, press the button for the opposite direction just before the hoist is to be stopped.
7. Operation from the landings can be carried out in the manner described above.
8. Whenever work is carried out from the cage roof, the hoist must be operated from the roof. The erection switch must be turned to "Erection".
9. If the hoist does not start, read the instructions for "Tracing Trouble" on the sign in the cage.

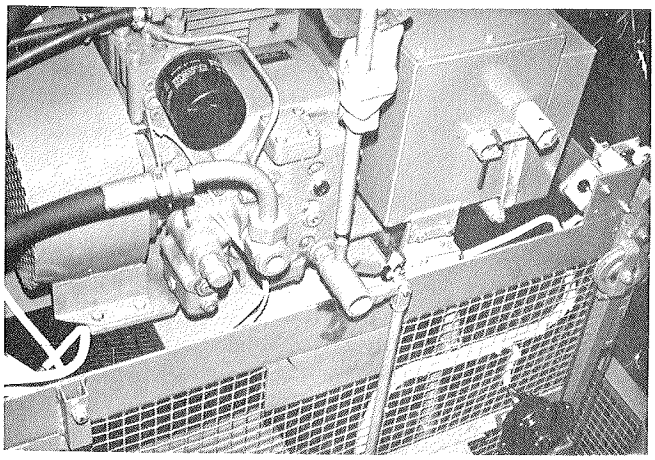
OPERATOR IN THE CAGE

1. Turn on the main switch at the ground landing.
2. Close the gates. Make sure that the daily inspection has been carried out.
3. Make sure that the three phase switch in the cage has been turned on.
4. Put the control lever in position for the desired direction.
   Hold the lever in that position.
5. The hoist will stop when the lever is released.
   At the top and bottom landings the hoist will stop automatically on the limit cams.
6. If the hoist is equipped with cams for automatic stop at the landings, the control lever must be pulled to the marked-out middle position just before the hoist is stopped.
7. On a twospeed hoist, switch over to low speed before stopping the hoist.
8. Whenever work is carried out from the cage roof, the hoist must be operated from the roof. On a twospeed hoist the erection switch must be set only in the low speed "Erection" position.
9. If the hoist does not start, read the instructions for "Tracing Trouble" on the sign in the cage.

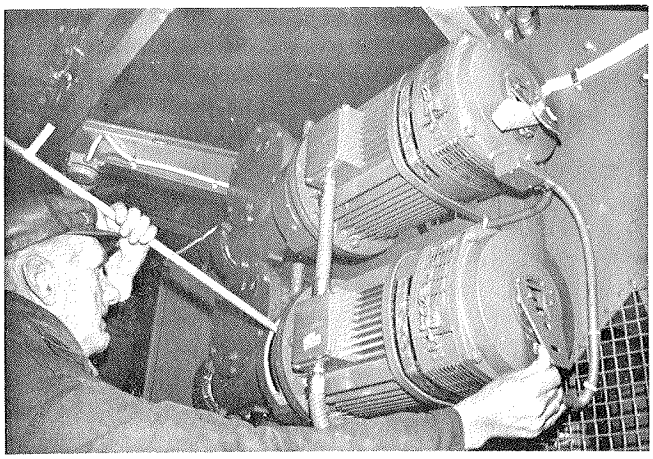
HYDRAULICALLY DRIVEN HOIST

1. Turn on the main switch at the ground landing.
2. Close the gates. Make sure that the daily inspection has been carried out.
3. Make sure that the three phase switch has been turned on.
4. Pull out the stop button. Press the start button. Wait for about three seconds and the hoist will be ready for operation.
5. Put the control lever in position for the desired direction. Adjust the speed with the lever.
6. To stop the hoist, pull the lever to the 0-position. At the top and ground landings, the lever is automatically moved to this position because of the limit cams.

7. Whenever work is carried out from the cage roof, the hoist must be operated from the roof. There are start and stop contacts on the safety railing.
   The control lever, which is attached to the cover of the hydraulic pump, is installed according to the illustration.



8. If the hoist does not start, read the instructions for "Tracing Trouble" on the sign in the cage.



CRANKING

If the hoist has been driven against the three phase cam or if the cage must be cranked during erection.

Before deciding to crank the cage, check if it cannot be lowered by gravity instead. See instructions for "Sliding down by gravity".

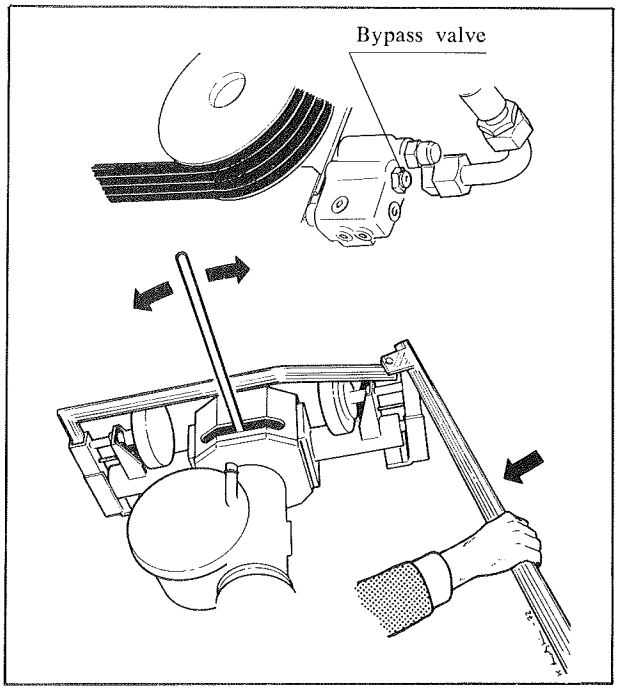
WARNING: Before starting to crank the cage, make sure that the main power is cut off. Do not stand close to the lever.

Cranking of an electrically powered hoist

1. Remove the inspection cover of the intermediate flange.
2. Release the brake of one of the motors with the special wedge.
3. Fit the cranking lever into a hole of the underlying coupling half, release the other brake in phase with the cranking action.
4. Turn the coupling half downwards to raise the cage.
   Remember to reapply the brake between each turn of the crank.
5. Remove the wedge when the cranking is finished, to reapply the brake.

Cranking of a hydraulically driven hoist

1. Open the bypass valve two turns.
2. Remove the inspection cover of the brake housing, and fit the cranking lever into a hole in the coupling half.
3. Release the brake with the brake tool and pull the cranking lever to the right to raise the cage and to the left to lower the cage. Reapply the brake between each turn of the crank. Always lock the brake lifting tool with the locking pins accompanying the tool.



After cranking

Close the bypass valve and remove the cranking lever and the brake lifting tool. Fit the inspection cover.

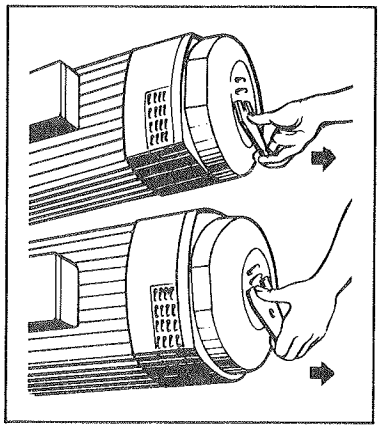
BREAKDOWN

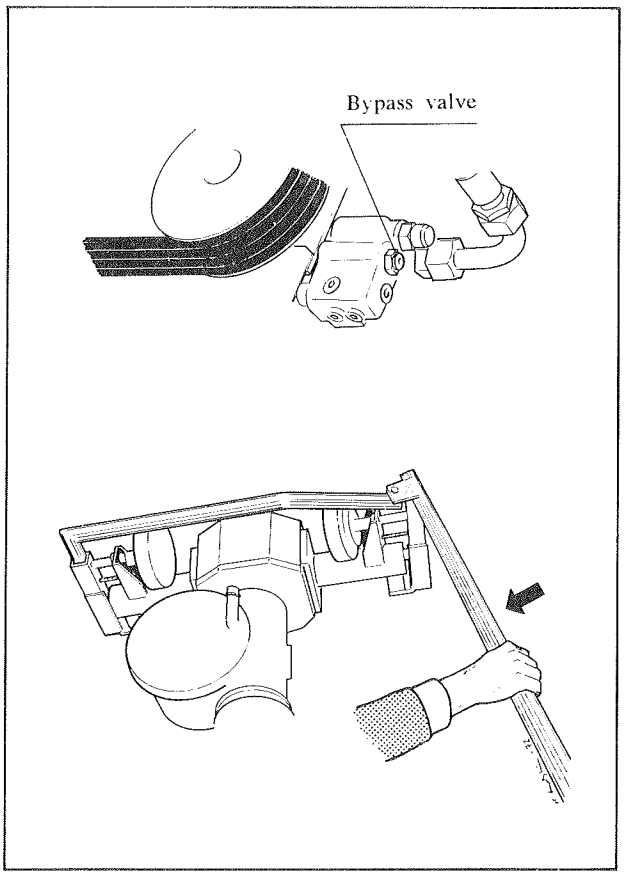
If the hoist has stopped due to a power failure or for some reason during erection, the cage can be lowered by gravity to the next lower landing.

Electrically powered hoist

Lift the brake lifter on the motor (motors) to allow the cage to slide slowly downwards.
Do not exceed the normal travelling speed or the safety device will be actuated.

Note. Stop for a minute every 20 m **(65 feet)** and let the brakes cool down.





Hydraulically driven hoist

1. Open the bypass valve two turns.
2. Release the brake with the brake lifting tool and let the cage slide slowly down to the next landing. (Be sure to always lock the brake lifting tool with the locking pins that go with the tool).

   Let go of the brake lifting tool carefully to reapply the brakes.
3. Do not exceed the normal travelling speed or the safety device will be actuated.

   Note. Stop for a minute every 20 m **(65 feet)** and let the brakes cool down.
4. If the cage is loaded so that it balances the counterweight, the cage must be cranked.

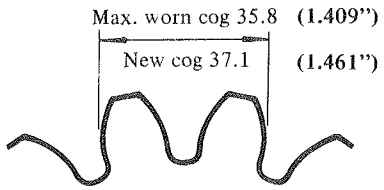
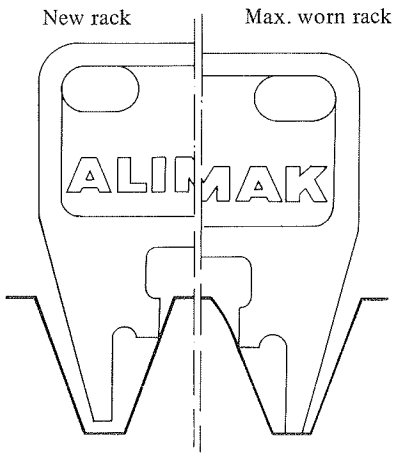
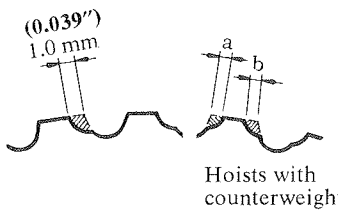
   Note. Do not forget to close the bypass valve and remove the brake lifting tool after the operation is finished.

Service and Maintenance

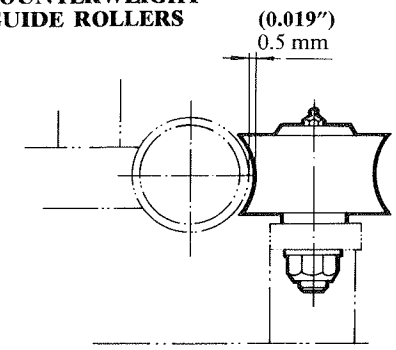
(also refers to the special maintenance instructions for hydraulically driven hoists under the heading "Hydraulic System"). ● Applies to hydraulically driven hoists only.

Weekly		1. Ensure that the daily routine inspection is carried out according to the instruction sign in the cage.
		2. Ensure that all instruction and load signs are installed and legible.
		3. Ensure that the roller assemblies and counter roller on the machinery plate are tightened. Also check the fixing screws for the machinery plate.
		4. Check the air gap between fixed- and rotating disc acc. to chapter "Brakes".
		5. Check for oil leakage and refill oil if necessary.
	●	6. Check the oil level of the hydraulic tank.
		7. Check the brakes. See Operating Instructions in the cage. See separate instruction for checking of braking torque.
	●	8. Check the tensioning of the V-belts.
		9. Check the gate and trap door interlockings, the three phase switch and the equalizer switch. — Try to run the hoist leaving the door open, then leaving the trap door open, then with the three phase switch turned off and finally with the equalizer switch turned off. The hoist must not start, but remember to check only one function at a time.
		10. Check all door interlockings.
		11. Check the position of limit and three phase cams and make sure they work properly.
		12. Check the cable guides and all plate springs.
		13. Check the position of the cable support arm in relation to the cable guides.
		14. Check all joints on mast and mast tie-ins. Also check the anchoring screws of the racks.
		15. Check the adjustment and attachment of the counterweight guide rollers. Check the rope equalizer, cathead and the brackets of the counterweight ropes.
		16. Clean the cooling flanges of the electric motor.
		17. Ensure that the power cables are undamaged.
Monthly		18. Check the wear of the pinions and the rack. See illustration.
		19. Check the wear of the worm wheels of worm gear through the inspection plug. See illustration.
		20. Lubricate according to the Lubrication Diagram.

Every three months	21. Check the play of the ball bearings and the wear of the cage and counterweight rollers. If the rollers are worn — adjust according to illustration. If the bearings are worn, change the guide rollers. 22. Check the safety device by carrying out a drop test (see "Drop Test"). For hoists with counterweight heavier than the dead weight of the hoist cage. — Check that machinery- and safety device plates are close together, without play, when the counterweight is unloaded. If necessary, use the eccentrics under the safety device plates for adjustment.
Annually	23. Check the coupling between the electric motor and the worm gear. 24. Check the ball bearings of the top pulley. Change the bearings if necessary. 25. Inspect the equipment and take necessary measures as regards possible corrosion of loadcarrying components.

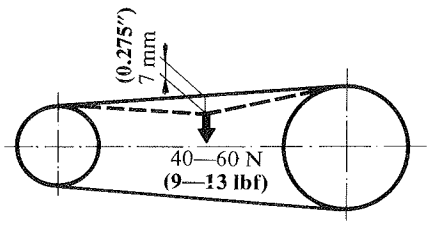
PINION 	Measure with a sliding caliper.
RACK 	Measure with Alimak rack gauge, part No. 9019 645.
WORM GEAR 	Measure with a feeler gauge through the inspection hole (plug) in the gear housing. Maximum allowable wear is 1.0 mm **(0.039 inches)** of the cog profile or, for hoists with counterweight, the sum of a + b is a maximum 1.0 mm in total.

CAGE GUIDE ROLLERS AND COUNTERWEIGHT GUIDE ROLLERS



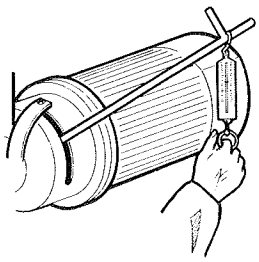
Measure with a feeler gauge. (cage without load). Adjust by loosening the lock nut and turning the excentric shaft.

V-BELT
(hydraulically driven hoists only)



Use a spring balance or weight to check the tension.

BRAKING TORQUE



120 Nm ± 25%
(88.5 lbf × ft ± 25%)

ELECTRICALLY DRIVEN HOISTS

Check with a cranking lever and a spring balance. The torque should be 12 kpm **(120 Nm)** ± 25%.

(Compensate for "cog play" by releasing the brake and turning the cranking lever upwards. Then reapply the brake and test).

WARNING: Before testing the braking torque, the cage must be lowered to rest on its buffers at the ground landing and the main power supply must be cut off.

Hydraulic System

REFILLING

Use a funnel with strainer to prevent extraneous particles and dirt from getting into the system. Fill the oil tank.

The pump housing is automatically filled through the suction pipe while air is pressed out through the exhaust line. This operation takes about 30 minutes during which time the oil level gradually decreases.

Use the same brand of oil as previously, if possible, as about 2—3 litres **(approx 3 quarts)** always remain in the lines.

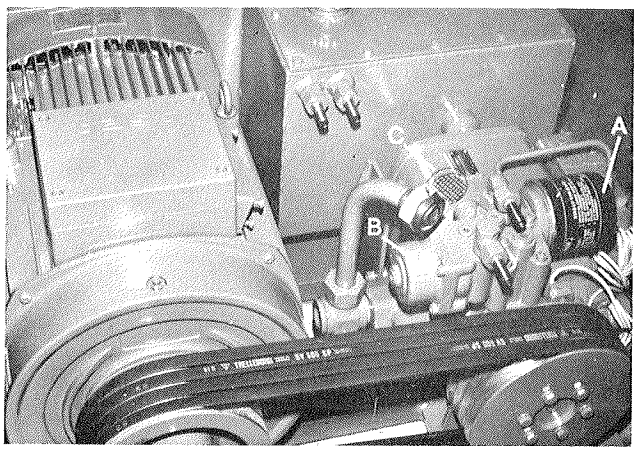
Recommended hydraulic oils

ARAL	P2096 SAE 20	MOBIL	Flowrex
BP	Energol SHF 80/Energol AX 20	SHELL	Tellus Oil T32/T37/T68
ESSO	UNIDES N48/Esstic 50/Nutoh 44	TEXACO	Rando Oil HD-B
GULF	Super Hydraulic Oil		

Shell Tellus T37 is used at the factory for initial fillings.

Oil quantity:

28 litres **(7 US gallons).**



FILTER

Exchange the Micro-Top-Oil Filter A the first time after 50 hours' operation and thereafter every 500 hours. Always clean the strainer B when refilling oil.

CHANGE OF OIL

Change oil after 2500 hours' operation.

1. Remove the drain plug and empty the tank.
2. Remove the hoses at the tank and empty the hydraulic motor by lowering the hoses below the level of the motor.
3. Fit the hoses and the plug.
4. Clean the strainer B (see "Filter").
5. Exchange the micro filter A (see "Filter").
6. Refill the tank (see "Refilling").

START

Before starting the electric motor, make sure that the oil level of the tank is not below the "Max" mark and that the control lever is in neutral position.
When the electric motor is started, the pinion pump will fill the motor and the pipes with oil. The oil level will sink, but **must not be allowed to sink below the "Min" mark.**

Drive the hoist a bit in both directions. If the oil level is not lowered further, the hydraulic system is empty of air and ready for service.

BUBBLES IN THE OIL

If air bubbles can be seen in the oil, this might indicate that:

1. the oil level in the tank has sunk so low that the return pipe is above the oil level. Fill the tank.
2. there is water in the system. Empty the oil tank and clean it.

HIGH TEMPERATURE

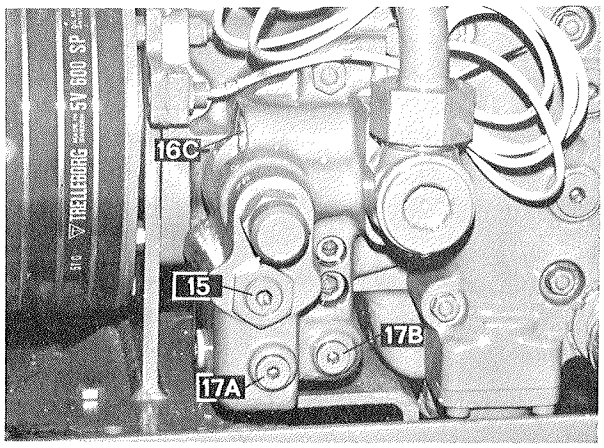
An oil temperature of 80°C **(175°F)** is considered normal.
If the temperature should rise above 80°C, check the pump and take measures as stated under the heading "Bubbles in the oil".
If the temperature is still too high, see "Breakdown".

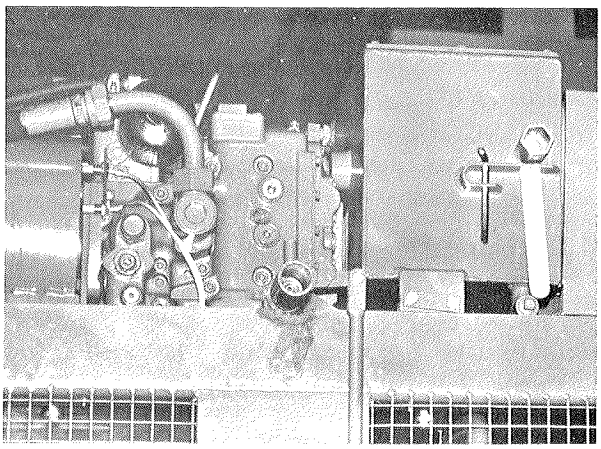
BREAKDOWN

When a breakdown occurs, have the system carefully examined by an authorized serviceman.

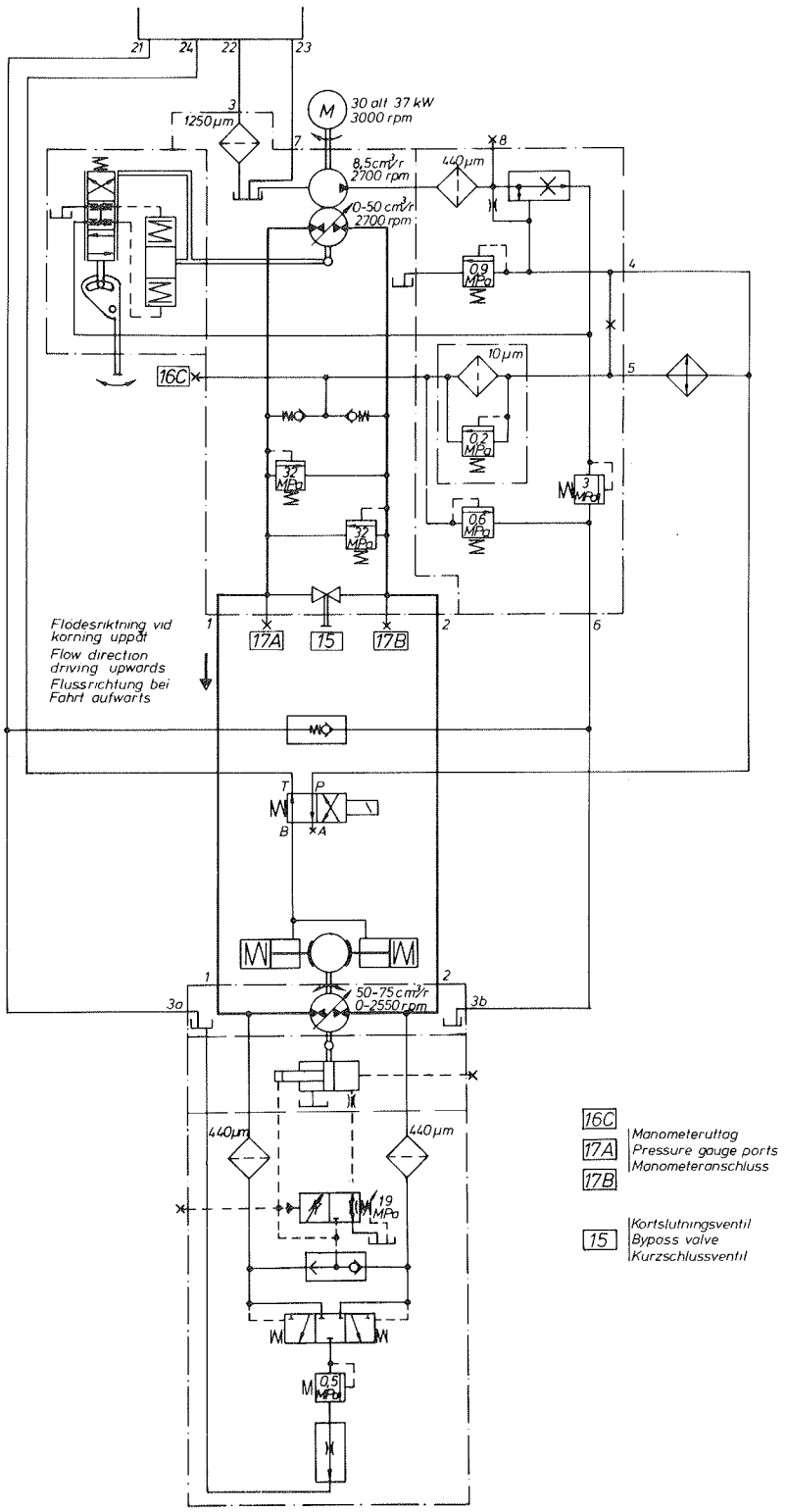
Checking oil pressure

The oil pressure is measured with special pressure gauges which can be supplied by Linden-Alimak.
To measure oil pressure at points 17A and 17B, use part No. 393521.
To measure oil pressure at point 16C, use part No. 393522.





HYDRAULIC DIAGRAM



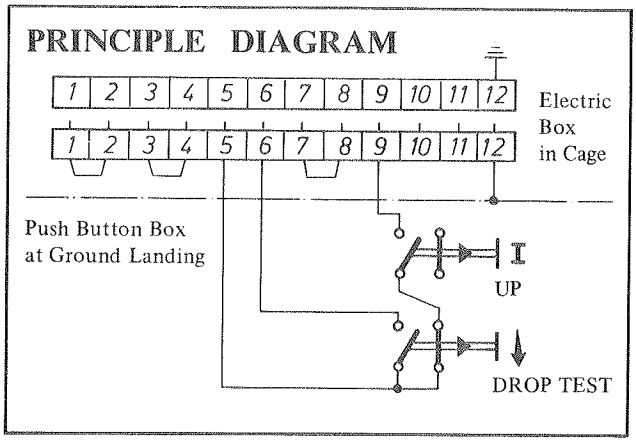
Drop Test

GENERAL

A drop test with full load must be carried out at every new installation, or in accordance with local safety regulations, but at least every 3 months.

The safety device shall be replaced by a factory overhauled unit in accordance with the date stamp on the unit.

IMPORTANT: No passengers are allowed in the cage during a drop test. Make sure before starting a drop test that the brakes are in order (see instruction sign in the cage). If the hoist is installed with a counterweight, this must be in use during the drop test.

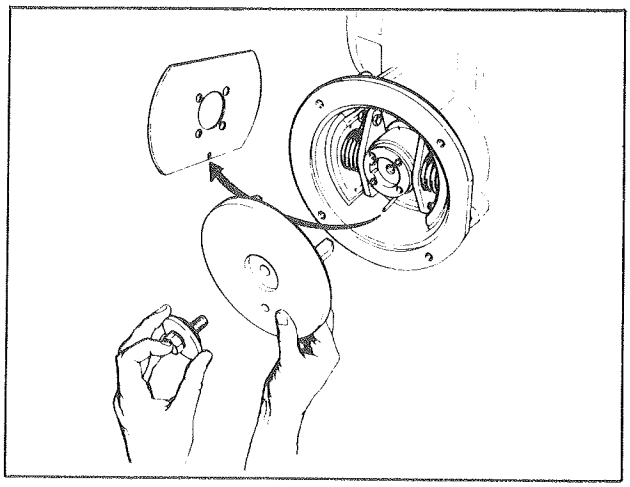


Electrically driven hoists

1. Cut off the main power supply and turn the switch of the electric box to "Erection — Inspection".
2. Fit the Alimak testing cable, part No. 489475-129 or a similar equipment working according to the adjoining principle diagram. Connect the cable to terminal marked "Drop Test" in the electric box in the cage.
3. Attach the testing cable to the cage near the electric box and pull the push button box and the cable out through the gate opening or other suitable opening and down to the ground landing. Make sure that the cable cannot get jammed or stuck during the drop test.
4. Load the cage. Turn on the main switch and drive the cage about 10 m **(33 feet)** up by pressing the "up"-button (I symbol) of the push button box on the testing cable.
5. Press the button marked "Drop Test" (↓ symbol) and keep it depressed. The electromagnetic brake will be released and the cage will fall until it reaches tripping speed and the safety device is actuated.

   Note: Release the button at once if the safety device does not stop the cage at least 3 m **(10 feet)** above the ground landing. By releasing the button the brakes will be reapplied.
6. Drive the cage to next landing and reset the safety device (see sign).
7. Remove the testing cable and turn the switch to "Normal".

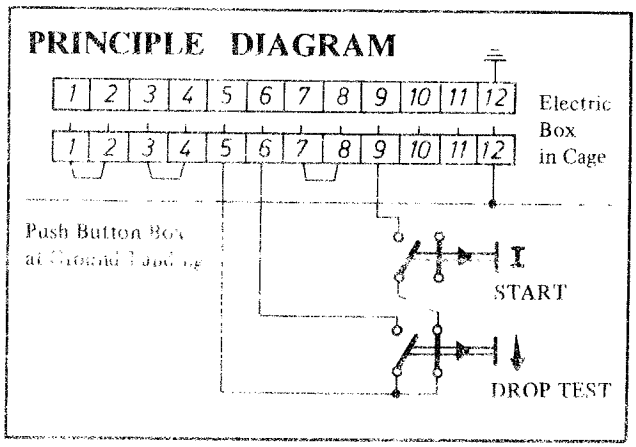
Note: If the worm gear is provided with a centrifugal brake, the centrifugal weights must be blocked with a special tool before the drop test can be carried out.
(See illustration).



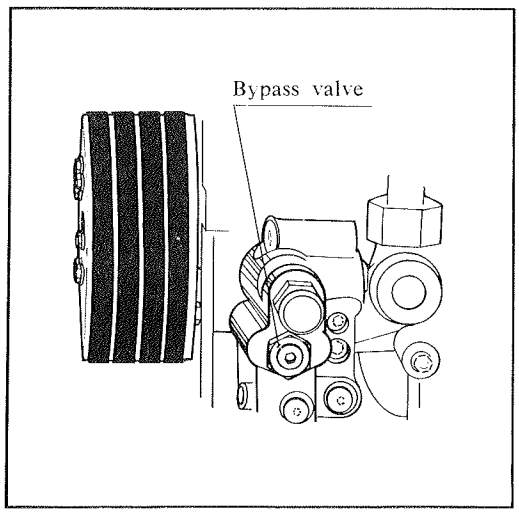
HYDRAULICALLY DRIVEN HOISTS

The viscosity of the hydraulic oil at low temperatures may affect the result of the drop test. We therefore recommend about half an hour's warming up when the temperature is below 0°C (32°F) before starting the drop test.

1. Drive the cage about 25 m **(82 feet)** upwards. Stop the cage so that it is possible to enter a landing.
2. Fit the Alimak testing cable, part No. 489475-129 or other similar equipment working according to the adjoining principle diagram. Connect the cable to the terminal marked "Drop Test" in the electric box of the cage.



3. Attach the cable near the electric box and pull the push button box out through a gate opening or other suitable opening.
   Lower the push button box to the ground landing. Make sure that the cable cannot get jammed or stuck during the drop test.



4. Loosen the bypass valve of the pump unit 4 turns.
5. Leave the cage and get down to the ground landing and to the push button box of the testing cable.
6. Press the "Start"-button (I symbol) to start the pump engine (in order to give the brakes a servo pressure).

   Press the button marked "Drop Test" (↓ symbol) and keep it depressed. The hydraulic brakes will be released and the cage will fall until it reaches tripping speed and the safety device is actuated.

Note: Release the button at once if the safety device does not stop the cage at least 3 m **(10 feet)** above the ground landing.
By releasing the push button the brakes will be reapplied.

7. Remove the testing cable.
   Tighten the bypass valve of the pump unit and reset the safety device in accordance with the sign in the cage.

Resetting the Safety Device

Before the safety device is released the cause of the tripping should be investigated and measures taken. Among others, check that:

a/ the brake is in order. (See "Checking braking torque").

b/ the worm gear and coupling are in order.

c/ the guide rollers and counter rollers are in order.

d/ pinions and rack are in order.

e/ the micro switch of the safety device works by giving a starting impulse in downwards direction. The hoist shall not start.

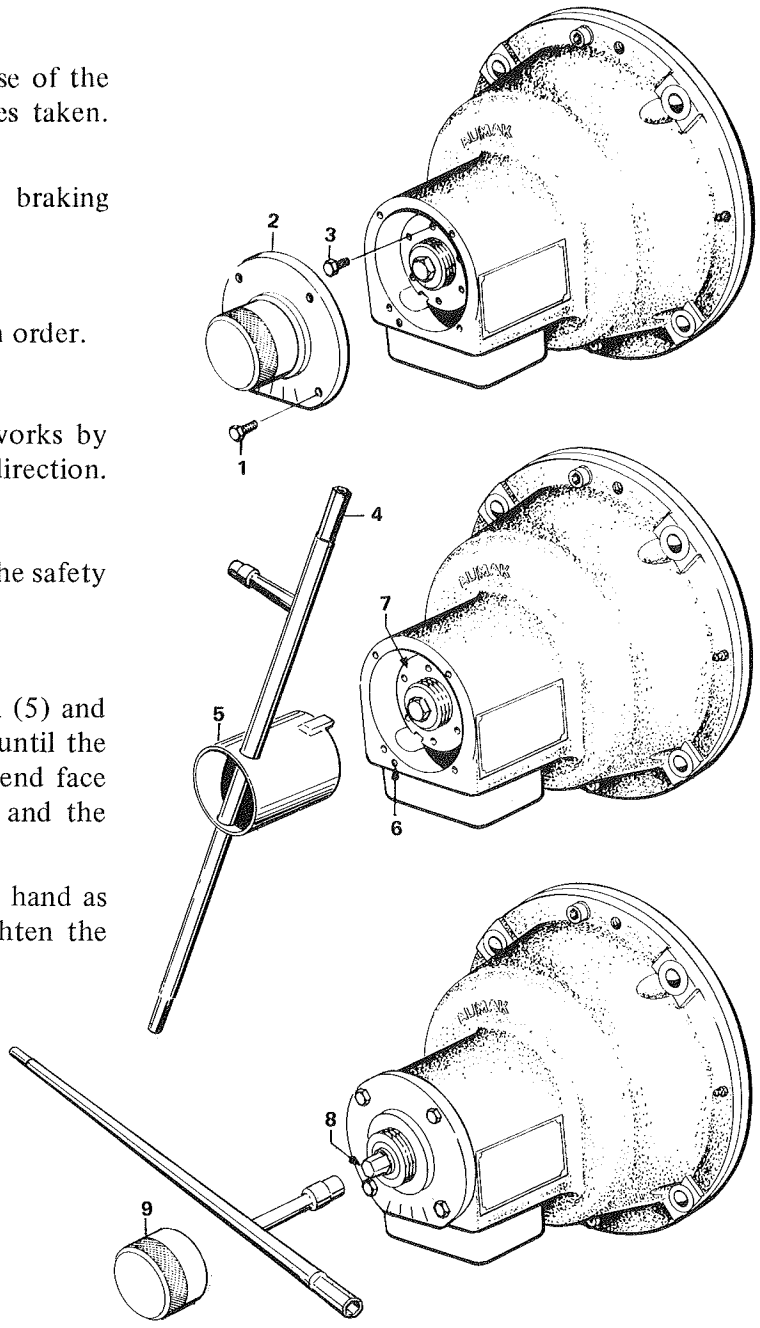
Switch off the three-phase switch and reset the safety device as follows:

Remove the screws (1) and lift the cover (2).

Remove the screws (3). Use the special tool (5) and the cranking lever (4) to screw the nut (7) until the end of the pin (6) is brought level with the end face of the safety device. Install the screws (3) and the cover (2).

Remove the cover (9). Tighten screw (8) by hand as much as possible, then use the tool to tighten the screw (8) another 30°.
Fit the cover (9).

Turn on the three-phase switch and drive the hoist about 20 cm upwards to release the centrifugal weight from the friction cone.



Resetting the Safety Device

Before the safety device is ever reset, the reason for its tripping must be determined. Ensure that:

a) the brake is in order (see Checking Braking Torque),
b) the worm gear and coupling are in order,
c) the guide rollers and counter rollers are in order,
d) the rack wheels and the rack are in order,
e) Check that the micro switch of the safety device is in order by giving a starting impulse in the downwards direction.

— The hoist must not start.

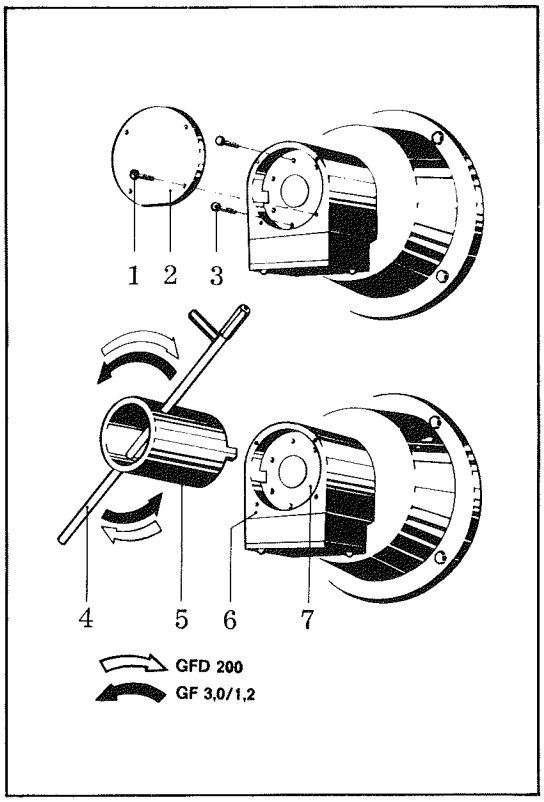
Turn off the three phase switch and reset the safety device as follows:

Remove the screws (1) and the cover (2).

Remove the screws (3). Use the special tool (5) and the cranking lever (4) to loosen the nut (7) until the end of the pin (6) is level with the end of the safety device.

Fit the screws (3) and the cover (2).

Turn on the three phase switch and drive the hoist up about 20 cm **(8 inches)** to release the centrifugal weight from the friction cone.



Lubrication Diagram

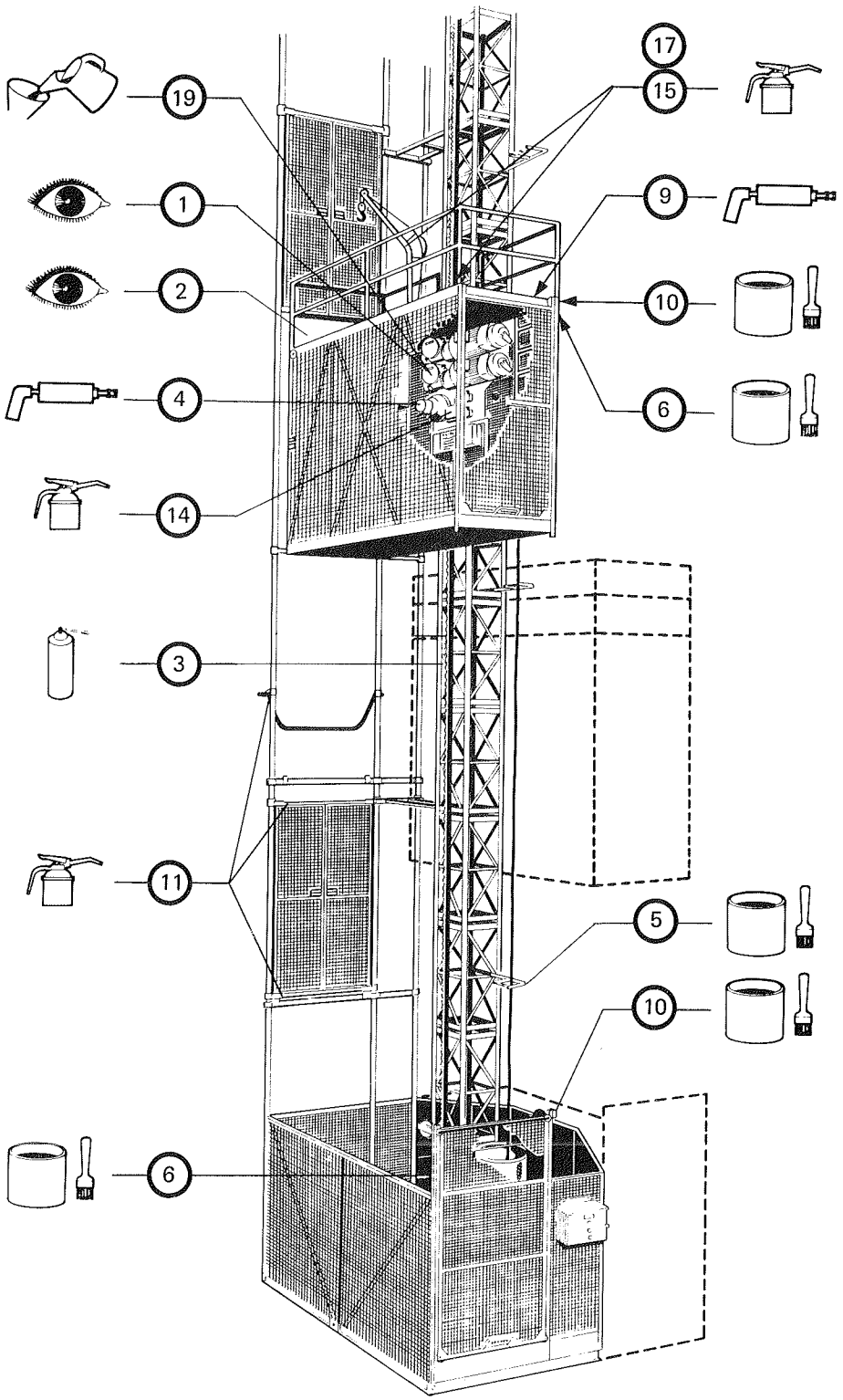
Change the oil in the worm gear after the first 25 operating hours. Also change the hydraulic oil filter, if any. Then adhere to the following schedule.

INTERVAL	ITEM	LUBRICATING SPOT	LUBRICANT	VOLUME	INSTRUCTIONS
40 operating hours – irrespective of time, *at least* once a month	1	Worm gear	Alioil		Check oil level.
	2	Hydraulic oil tank	Shell Tellus Oil T 37		Check oil level–Scando Super hoists *only*.
	3	Rack and counterweight guide rail, for side mounted counterweight, if any.	Alilube		Lubricate during descent and take hoist out of service for 2-3 hours to allow the spray to congeal.
	4	Safety device and idle gears,	Ball bearing grease		Grease nipples.
	5	Cable holder, guides and trolley. Separate guide rail for cable trolley, if any.	Ball bearing grease		Grease slide surfaces.Do not grease mast tubes – trolley might get stuck.
100 operating hours – irrespective of time, *at least* 6 times a year	6	Guide rail for gate counterweights	Ball bearing grease		Grease slide surfaces.
		Cage exit gate, lower part	Ball bearing grease		Grease slide surfaces.
		Parking brake	Ball bearing grease		Grease nipples–Scando Super hoists *only*.
	9	Guide rollers of cage and counterweight.	Ball bearing		*Note* – high pressure gun *must not* be used.
	10	Gate interlockings and ramps	Ball bearing grease		Grease bearings and slide surfaces.
	11	Landing doors/bars	Alioil or Lubricating oil SAE 10-30		Lubricate bearings and slide surfaces.
		Operating control and link system of hydraulic pump unit,	Alioil or Lubricating oil SAE 10-30		Lubricate bearing and slide surfaces.
400 operating hours – irrespective of time, *at least* 4 times a year		Trap door and el.box hinges	Alioil or Lubricating oil SAE 10-30		
	14	Shaft bearing of three phase switch	Alioil or Lubricating oil SAE 10-30		
	15	Winch and pulleys of erecting crane.	Alioil or Lubricating oil SAE 10-30		
		Bearing of counterweight wire equalizer.	Alioil or Lubricating oil SAE 10-30		
	17	Erecting crane support on cage roof	Ball bearing grease.		
500 operating hours – irrespective of time, *at least* once a year		Hydraulic oil filter			Change filter.

INTERVAL	ITEM	LUBRICATING SPOT	LUBRICANT	VOLUME	INSTRUCTIONS
1000 operating hours – irrespective of time, *at least* once a year	19	Worm gear	Alioil	1.5 lit. resp. 2.7 lit.	Change oil. 1.5 l. for Scando hoists. 2.7 l. for Scando Super hoists.
		Electric motor of hydraulic pump unit.	Ball bearing grease		Acc. to sign on the motor–Scando Super hoists *only*
		Chain coupling	Ball bearing grease		Clean and fill–Scando Super hoists *only*
2500 operating hours – irrespective of time, *at least* every two year		Hydraulic oil tank	Shell Tellus Oil T 37	28 lit.	Change hydraulic oil, and filter– Scando Super hoists *only*.

At delivery from factory above lubricating oil qualities have been used. Equal lubricants of other makes can of course be used, consult ALIMAK or Your ALIMAK Representative for information.

NOTE: If changing to other oil than *Alioil,* the gear and air filter must first be *carefully* cleaned. Only ALIMAK recommended substitute oil shall be used.


19
1
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Tracing Trouble — Electrical System

GENERAL ADVICE

Any procedure for tracing trouble must always be influenced by the function and conception of the hoist and the place of equipment in question and also by local conditions such as erection, past maintenance history and previous problems.

The following points contain the main principles of trouble tracing on the electrical equipment.

Use a testing lamp or preferably a voltmeter — a universal instrument if possible.

1. Look at the circuit diagram! It describes the function of the electrical equipment, how it is built and connected.

1 a. Make sure that the stopping circuit is not broken, i.e. that the thermal relays and phase failure relays have not been actuated and the contacts of the switches for safety device, slack rope and trap door are closed. Ensure that the stop buttons and the push buttons on the landings are not depressed. When the stopping circuit is unbroken the main contactor, if it is installed, will be actuated.

1 b. Make sure that the top and bottom limit switches for "up" and "down" work properly.

2. Connect the voltmeter/testing lamp between the zero terminal and terminal as indicated on the circuit diagram and make sure there is power where it should be. Try terminal after terminal and work methodically so that the circuits which are in order may be eliminated and the defect found.

3. Start checking at the ground landing that there is power on all three phases of incoming line voltage.

4. Check that there is power in the outgoing cage cable when the main switch is turned on.

5. Start tracing trouble in the cage by checking that voltage really comes through.

6. Check in the control box that all three phases of the incoming cable from the ground landing are energized.

7. Check that the "up" and "down" impulses from push buttons and control devices reach the electric box properly.

8. Make a trial run with the cage and make sure that the coil of the "up", "down", "highspeed", "lowspeeed" contactors is energized and actuated.
Also ensure that the brake contactors is actuated and that the brake coil is energized so that the brake lifts.

9. If the defect does not concern the operation of the hoist but the lighting or signalling system, trace the trouble as above, i.e. check the circuits methodically one by one until the defect has been located.

Experience proves that many problems result from specific causes, such as follows:

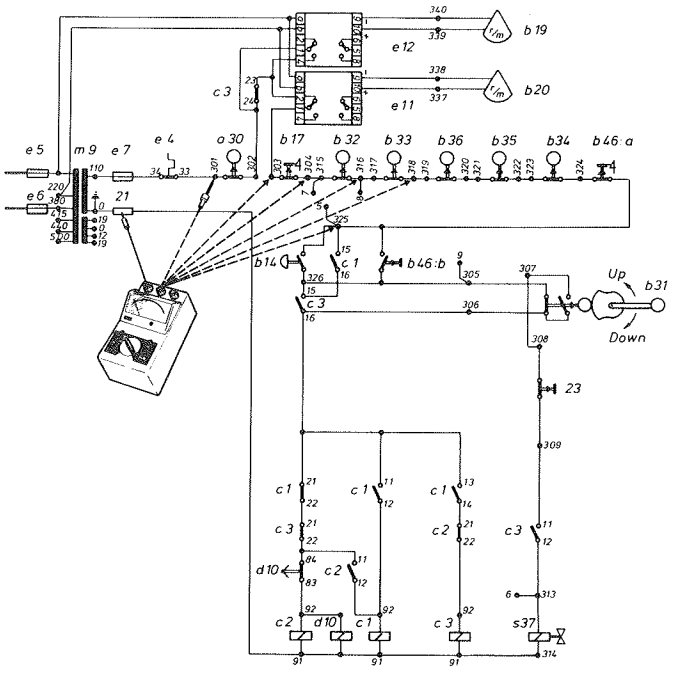
Example:

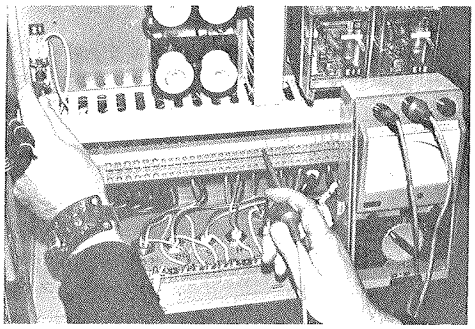
Problem	Probable Causes	Probable Defect
a) Control fuse releases immediately.	Short circuit, equipment grounded.	Damaged control cable, damaged push button, limit switch, etc. located "outside", usually at the landings.
b) Fuse releases after a short time.	Equipment partially grounded, overload.	Damp or water in limit switch, connection box, push button box, door lock, etc. due to damaged electrical installation. Improperly connected new equipment.
c) Hoist stops suddenly or is impossible to start.	Limit switch of stopping circuit has tripped/been actuated, blown fuse.	Push button depressed, gate open, thermal relay actuated due to overload or careless operation, trap door open, * safety device switch actuated, loss of voltage of supply net. See also a) and b) above.
d) Hoist does not come when called for.	Broken interlocking circuit.	Gate not properly closed, emergency stop button depressed.
e) Hoist stops can be restarted, but then stops again.	Switch actuated in the stopping circuit.	Slack rope switch, gate switch too close to the cam.
Specific for hydraulic hoist:		
f) Motor starts but stops.	The relay for Y-D coupling improperly set. Speed governor for low speed does not close.	Time relay not set at about 3 seconds. See detailed separate instruction for defects of the governor.
g) Hoist motor stops or V-belts skid.	Brake does not lift.	Electro-magnetic valve. Switch at controls.

* The switch is set at the factory and must not be adjusted. Check if the safety device is properly reset.

EXAMPLE
Testing of stopping circuit/control voltage 110 V

(The terminal numbers listed below apply to the illustrative diagram only. The principles for testing electrical installations with different terminal numbers are the same, however).





1. Turn on the main switch and close the gates.
2. Ensure that the three phase switch is turned on.
3. Get the circuit diagram and parts lists (available in plastic envelops in the electric box).
4. Test between the zero terminal and the terminals of the electric junction box with a voltmeter or testing lamp as follows:

TEST	RESULT	CONCLUSION
between zero terminal and last terminal of stopping circuit. (terminal 325 on the above diagram).	no reaction	break located in the stopping circuit

Test every terminal of the stopping circuit starting from the transformer.

between zero terminal and terminal 301	reaction	circuit in order to and incl. terminal 301
» » 303	reaction	» » » » 303
» » 304	reaction	» » » » 304
» » 316	reaction	» » » » 316
» » 318	no reaction	circuit not in order between 316 and 318 Probable defect — element b33 (the apparatus list shows that b33 is a slack rope switch — a piece of outside equipment located on the cage roof.

REASON

The switch may have been actuated because of

— an extraneous object between switch and cam
— unbalanced counterweight ropes
— a loosened line

REMEDY

Check the switch and its connection.
Adjust the counterweight ropes if necessary.

Brakes

The main components of the disc brake are a d.c electromagnet, a brake spring, a rotating brake disc with brake pads that are free to move axially, two fixed brake discs, one of which is the armature of the electromagnet, and an automatic setting mechanism that is self-adjusting for wear.

This is a passive brake: the braking torque is applied when the electromagnet coil (3) is not energised. The brake spring (7) presses the brake friction pads (10) against the fixed brake disc (17) via the armature (5), which is free to move axially. The brake action is released when the electromagnet coil is energised.

The brake is self-adjusting. It is adjusted continuously as the brake pads (10) wear, by the armature (5) and electromagnet housing (4) automatically moving closer to the rotating brake disc (8). The distance between the electromagnet and the armature is always constant.

The brake pads must be replaced when they are worn but this is the only maintenance that is required on the brake.

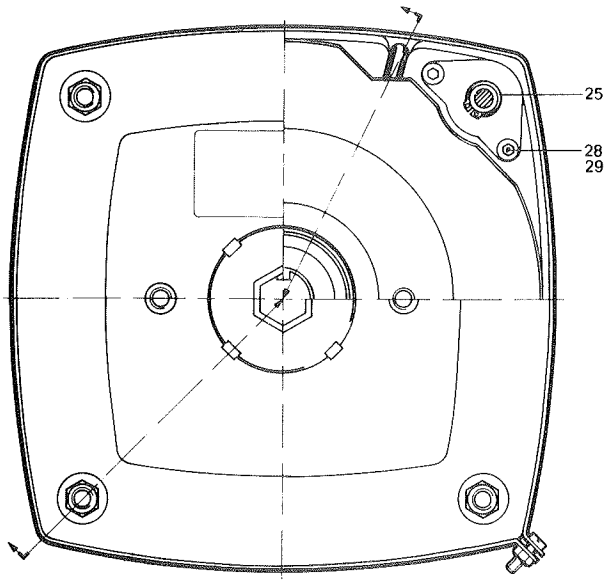
Manual release

The brake can easily be released by unscrewing the adjusting sleeve (6) until brake spring (7) no longer applies force to armature (5).
The brake can also be released by means of a special handle. When the handle is pulled, the brake is released.

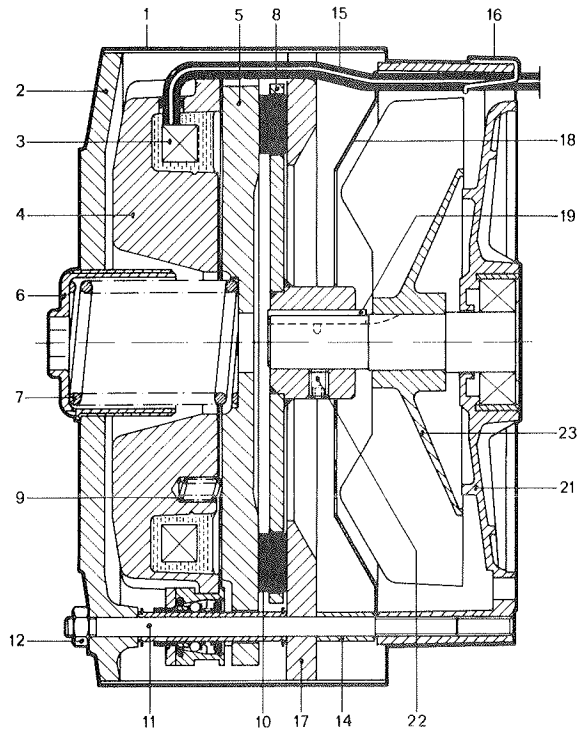
Braking torque

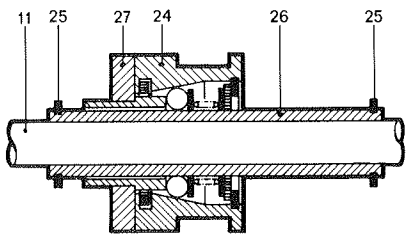
As despatched from the factory, the brake is set for the braking torque that suits the machine best. This torque should normally not be changed.
If a change of braking torque is required to achieve any particular purpose, the table below shows how the braking torque is affected in relation to the movement of the adjusting sleeve.

Braking torque, % of max. braking torque	**75%**	**50%**	**25%**
Dimension **B**, in millimetres, on adjoining sketch	9	18	27



1. Protective screen
2. End bracket
3. Magnet coil
4. Electromagnet housing
5. Armature
6. Adjusting sleeve
7. Brake spring
8. Rotating brake disc
9. Compression spring
10. Brake pad
11. Bolt
12. Nut
13.
14. Spacer
15. Coil cable
16. Cable clip
17. Fixed brake disc
18. Fan screen
19. Key
20.
21. End shield
22. Stop screw
23. Fan
24. Cone
25. Circlip
26. Tube
27. Carrier
28. Spacer
29. Screw



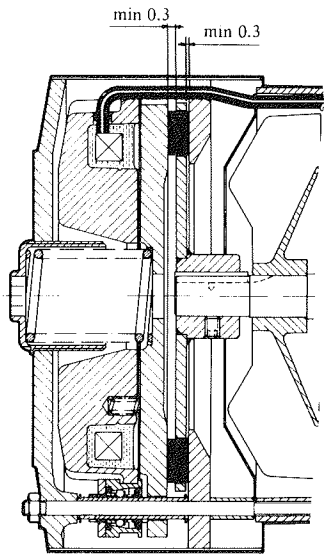


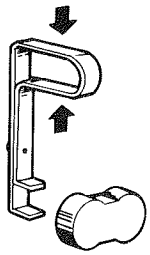
Changing the brake pads

The pads (10) must be replaced *before* the gap between armature (5) and rotating disc (8) is less than 0.3 mm.

Pad changing procedure:

1. Remove protective screen (1).
2. Measure and make a note of the position of the adjusting sleeve so as to make sure that it is refitted in the *same* position after the pads have been changed. Note, however, that the brake will have to be applied a number of times before it starts to work normally.
3. Unscrew and remove adjusting sleeve (6) and take out brake spring (7).
4. Slacken nuts (12) and run them back as far as the end of the bolts.
5. Slide end plate (2) back as far as the nuts.
6. Slide electromagnet housing (4) back against the end plate.
7. Fit new pads (10). There is a special tool which makes this operation easier. See fig.
8. Push electromagnet housing (4) back along the bolts so that armature (5) comes up against the new pads (10).
9. Push back end plate (2) and tighten nuts (12).
10. Refit brake spring (7) and screw in adjusting sleeve (6) to the position according to point 2 above.
11. Operate the brake a few times to check that it is working properly.
12. Fit protective screen (1).





Pliers for brakepads
Part No. 3000 272–499

If the brake cannot be released, check:

– that the rectifier is in order and energised.
– that the brake contactor is in order.
– the voltage via the magnet coil (nom. 195V D.C.)
– the resistance of the coil (nom. about 465 Ohm for brake BXLF 35 and about 348 Ohm for BXLF 100 at 20° C).

Replace electromagnet housing with coil if the coil turns out to be defective.

Replacement of electromagnet housing and coil

1. Remove protective screen (1) and mechanical release handle, if any.
2. Disconnect cable (15). Remove cable clip (16).
3. Measure and make a note of the position of the adjusting sleeve (6) to make sure that it is refitted in the same position.
4. Unscrew and remove adjusting sleeve (6) and take out brake spring (7). Suitable Allen key size for the adjusting sleeve is 19 mm.
5. Unscrew and remove nuts (12) and withdraw end plate (2) from fixing bolts (11).
6. Withdraw electromagnet housing (4) from the fixing bolts.
7. Stand the electromagnet on its edge.

8. Push tubes (26) up against carriers (27) and remove screws (29).
9. Place electromagnet housing (4) with armature (5) facing upwards on a clean surface.
10. Remove the four upper circlips (25). *Do not lift the electromagnet housing after the circlips have been removed.*

IMPORTANT

Do not pull the tubes (26) out of the cones (24).

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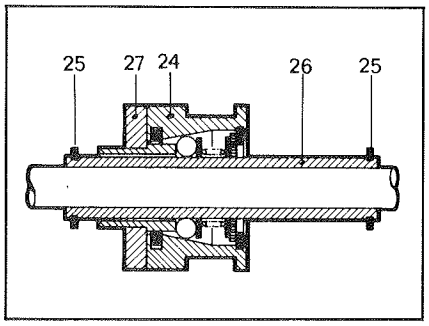
11. Lift off armature (5) and remove springs (9).
12. Remove spacers (28).
13. Take out adjusting unit cones (24), moving them radially away from electromagnet housing (4). *Be careful so that the tubes do not fall out of the cones.*
14. Fit the adjustment units to the new electromagnet housing which should be placed on a flat, clean surface with the coil facing upwards in the same way as the old electromagnet housing.
15. Fit springs (9).
16. Position armature (5) with its corner recesses towards electromagnet housing (4) and with the cable notch in line with coil cable (15).
17. Fit circlips (25).
18. Keep armature (5) pressed against electromagnet housing (4) and position the electromagnet with the armature facing downwards on a clean spacer block thick enough to keep tubes (26) clear of the surface.
19. Press electromagnet housing (4) against armature (5) to close the air gap and fit spacers (28) and carrier screws (29).
20. Check that tubes (26) can move easily in both directions when the electromagnet housing is no longer pressed against the armature.
21. Make sure that the air gap between armature and electromagnet housing is correct when the springs (9) press the electromagnet housing and cones (24) against the carriers (27). The air gap should be 1.4± 0.1 for BXLF 35 and 1.6±0.1 for BXLF 100 and the same all around.
22. Fit electromagnet housing (4) with coil (3), armature (5) and automatic adjustment mechanism (13) to fixing bolts (11). Position the cable notch in line with the notch in fixed disc (17).
23. Using nuts (12), mount end plate (2) on fixing bolts (11). The holes (20) for a mechanical release mechanism must be in line with the holes in electromagnet housing (4). Tighten the nuts little by little so that the housing and the armature do not tilt on the screws.
24. With the aid of adjusting sleeve (6), fit brake spring. Fit the adjusting sleeve *in the position as per item 3.*
25. Connect coil cable (15) and fix it with cable clip (16).
26. Operate the brake a few times to check that it is working properly.
27. Fit protective screen (1), positioning the unperforated area to give the brake the best possible protection from dirt etc.
28. Fit the release handle, if any.

Replacement of automatic adjustment unit



1. Dismantle the brake as described in items 1–7 of the section headed "Replacement of electromagnet housing and coil".
2. Remove screws (29) from the carrier of the adjustment unit to be replaced.
3. Remove circlip (25).
4. Release tube (26) by pressing carrier (27) against cone (24).
5. *Without pulling the tube out of the cone,* pull tube (26) back *through armature (5),* but not further.

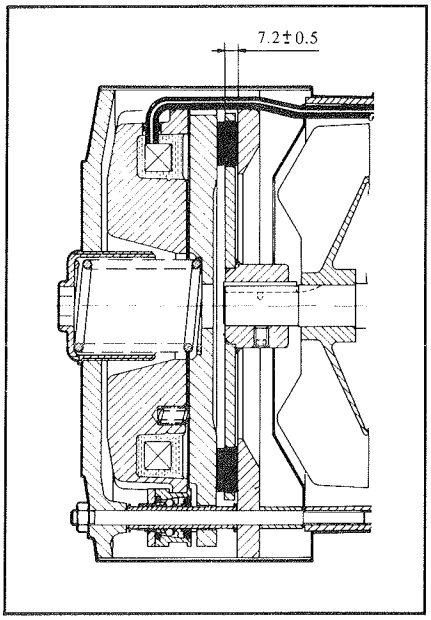
IMPORTANT

Do not pull the tubes (26) out of the cones (24).

---

6. Take out adjusting unit cone (24), moving it radially away from electromagnet housing (4).
7. Release tube (26) on the new adjustment unit by pressing carrier (27) against cone (24). Move the cone to its stop against circlip (25).
8. *Without withdrawing the tube from the cone,* release the carrier and remove circlip (25).
9. Position the adjustment unit in the electromagnet housing. It must be easy to fit the unit.
10. Push the tube through the armature and fit circlip (25).
11. With spacers (28) in position between carrier and armature, tighten the carrier fixing screws.
12. Check that the tube moves easily in both directions.
13. Install the electromagnet and other components as described under the heading "Replacement of electromagnet housing", items 21–28.

Replacement of rotating brake disc



1. Remove the protective screen (1).
2. Remove the coil cable from the motor terminal box.
3. Measure and make a note of the position of the adjusting sleeve so as to make sure that it is refitted in the same position.
4. Unscrew the adjusting sleeve (6) and take out brake spring (7).
5. Remove nuts (12) and take out end plate (2), electromagnet housing (4) with armature (5) and brake pads (10).
6. Remove stop screw (22) from the nave on the inside of the rotating brake disc. Use a puller to take the brake disc off the shaft. *The puller must absolutely not be applied to the brake disc itself – only to its nave.*
7. Heat the new brake disc to approx. 100° C and fit it to the shaft in accordance with the specifications given in the figure below.

IMPORTANT

Do not heat it too much or it may buckle.

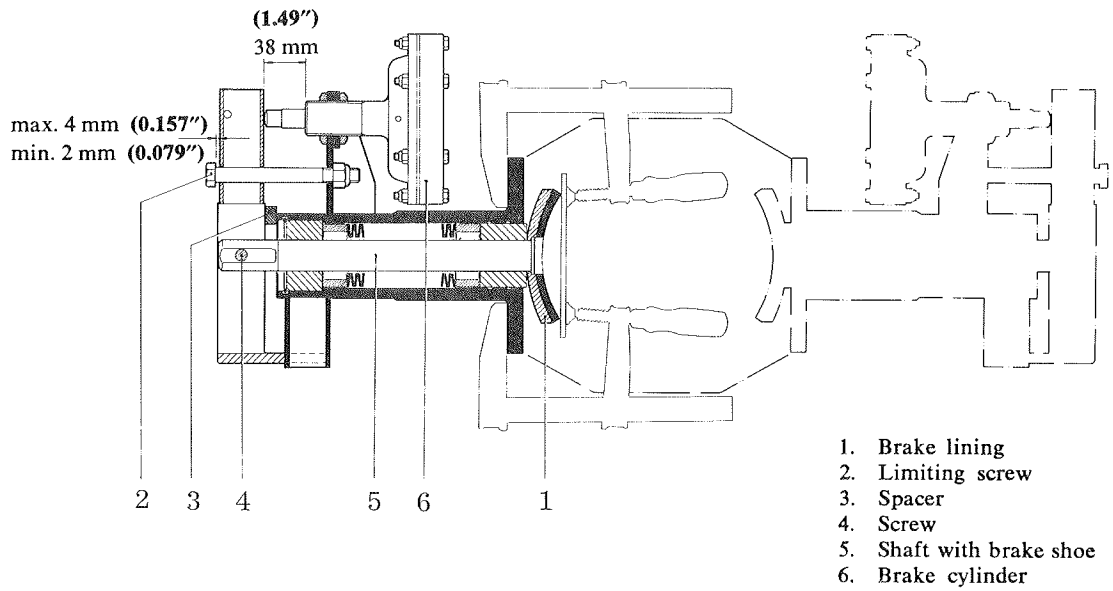
---

8. Refit stop screw (22) and tighten and secure it by beating once with a punch at the periphery.
9. Install electromagnet housing with armature and end plate on the bolts. Make sure that the cable notch of the fixed brake disc is in line with that of the electromagnet housing.
10. Fit the nuts (12) and tighten them little by little one at a time so that the electromagnet housing and armature do not tilt on the bolts.
11. Install brake spring (7) and adjusting sleeve (6) *which should be positioned as measured in item 3.*
12. Install mechanical release mechanism, if any.
13. Connect the coil cable (15) to the terminal box.

Replacement of the whole brake unit

Follow the instructions given under the heading "Replacement of rotating brake disc" but *replace the fixed brake disc (17) as well.*

HYDRAULIC BRAKE



WARNING: Before interfering with the hydraulic brake, the cage must be driven to rest on the buffer springs at the ground landing and the main power supply must be cut off.
The counterweight must be removed.

Adjustment

The brake lining (1) will wear due to the braking operations and thus the inside diameter of the brake cylinder will increase. The maximum allowable air gap is 4 mm **(0.157 inches)** and the minimum 2 mm **(0.079 inches).** Adjust with the limiting screw (2).

Exchange of brake shoe

Check the wear of the brake lining through the inspection opening on the brake housing. The minimum allowable thickness is 3.5 mm **(0.138 inches).**

When the distance indicated as 38 mm **(1.49 inches)** on the diagram above has been reduced to 31 mm **(1.22 inches)** the brake shoe must be changed in the following manner:

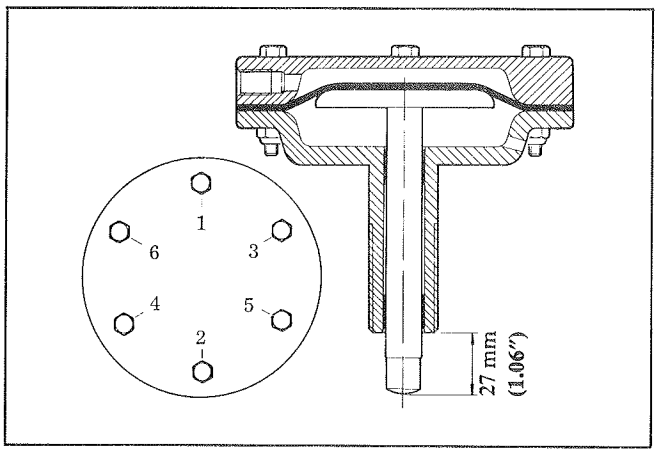
1. Loosen the brake cylinder pipe, being sure to plug the end so as not to lose hydraulic fluid.
2. Fit a spacer (3) (of 8 mm or **0.31 inches** solid steel) between the arm and the spring housing as illustrated above to remove the spring pressure from the brake cylinder.
3. Dismount the brake from the housing.
4. Lift the brake down.
5. Apply two C-clamps as illustrated and loosen the screw (4).
   Release the clamps in pairs until the spring force disappears. Be careful! The springs are under tension of about 5000 N **(1125 lbf).**

6. Pull out the brake shoe with shaft (5).
7. Note that the pressure plate, the distance pipe and the cup spring are loose. Be careful to keep them in place and put them back if they do fall out.
8. Remove the worn out brake shoe and replace it with a new one.
9. Install the new brake shoe by following the preceding directions in reverse order.
10. Clean the brake housing and the brake drum and grease the shaft before assembling the unit. Do not forget to remove the spacer and adjust the limiting screw (2).

Exchange of membrane (diaphragm)

If the brake cylinder leaks, the rubber membrane must be exchanged.
Always replace it with an original spare part in order not to jeopardize the operation.

1. Loosen the pipe from the brake cylinder.
2. Plug the end.
3. Remove the cover and the membrane.
4. Check the movement of the piston rod and grease the bushings with thin grease (Shell Aerogrease).
5. Exchange the membrane (diaphragm).
6. Reassemble the unit in reverse order.



(Note that the piston must be in the illustrated position when refitting the cover).

7. Fill the brake cylinder with hydraulic oil before attaching the pipe. Tighten the bolts to a tension of 10 Nm **(7.37 lbf×ft)** and in the order as numbered on the sketch.

Removing trapped air from the brake cylinder

1. Turn on the main power supply and start the pump motor.
2. Loosen the pipe connection of one of the brake cylinders a few turns.
3. Pull the control lever carefully to the "up" position. Entrapped air will be forced out of the cylinder.
4. Tighten the pipe connection and repeat the procedure with the other brake cylinder. (Work on only one cylinder at a time).
5. Check the oil level in the hydraulic tank and refill if necessary.

WARNING: If oil is indicated at special draining holes on housing marked "Oil indicator" the hoist must not be used until the leakage has been eliminated.

Reason for this is that oil might come on brake linings and reduce brake torque.

Measures

Hydraulic motor has to be repaired or replaced with overhauled unit.

Other Repairs

WARNING: Before starting any repair work on the drive unit, cage or counterweight, cut off the main power supply to prevent accidental operation. If a counterweight is installed, it must be taken off before starting to repair the drive unit and the cage must rest on its buffers at the ground landing. This latter precaution is unnecessary if the hoist is provided with two drive units and one is engaged with the rack at all times.

DISMOUNTING OF COUNTERWEIGHT AND LOWERING

1. Turn the switch to "Erection".
2. Drive the cage to the mast top. Remove the cams (mark them to simplify the refitting).
3. Drive further up — until the counterweight ropes slacken. Take the load off the ropes with the special ropes and remove the rope bracket.
4. Drive the cage to the ground landing and then let it slide down to the buffers or other support. (See instruction "Sliding down by gravity").
5. Cut off the main power supply of the feeding electrical central.

PINION

Change of pinions on the base unit when the mast is not erected

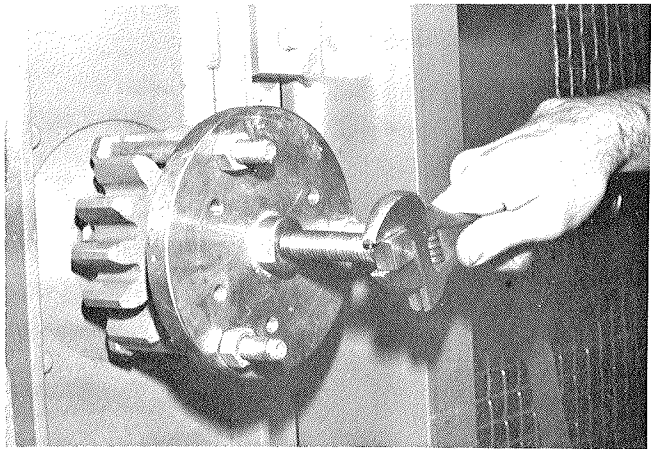
Check the wear of the pinions before each installation as it is easier to change them before the hoist is erected. This will not be necessary before the first installation of a new hoist.

We recommend that worn pinions be changed even if the wear has not reached its maximum allowable amount but is likely to do so shortly, in order to eliminate the necessity of changing them when the hoist has been erected and taken into service.

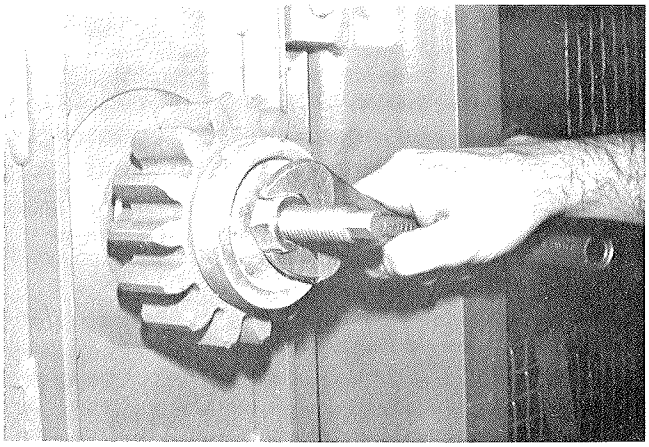
Note that on hydraulic hoists all three pinions must be changed at the same time even if only one shows wear.

Change the pinions in the following manner:

1. Position the cage on its transport supports on the bottom frame (with no buffer installed).
2. **Fasten** the erecting crane and attach the mast section by using the lifting yoke. Remove the mast bolts.
3. By cranking (see separate instruction) the drive unit in the opposite direction (corresponding to travel downwards), the pinions will move the mast section upwards so that it disengages. Keep the erecting crane wire tensioned during the entire operation.



4. Put the mast section on the cage roof.
5. Remove the groove ring and dismount the pinion by using the Alimak puller, Part No. 393154.
6. Remove the wedges and clean the shaft.

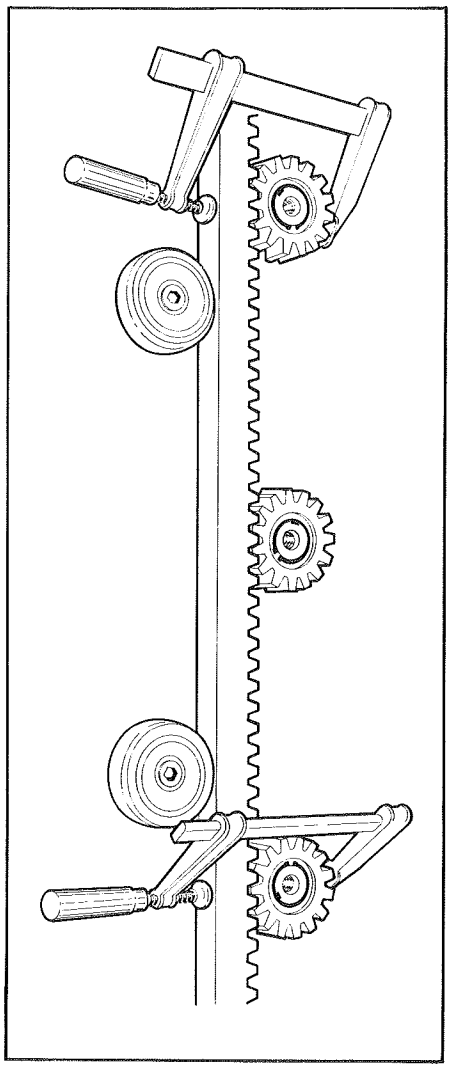


7. Fit one of the wedges and oil the shaft with Shell Retinax A grease. Install the new pinion with the Alimak fitting tool, Part No. 473796.

8. Fit the other wedge and the groove ring.
9. Install the mast section. Watch the fit of the pinion in the rack opening, especially when engaging the lower pinion in the rack.

   Note: On hydraulically driven hoists, the mast section must be **cranked** all the way.
10. Slacken the erecting crane wire and crank the mast section to stop.
11. Install the mast bolts and tighten them to a torque of 350 Nm **(258 lbf×ft).**
12. Reset the drive unit and the brake after cranking.

Synchronization of engagement on hydraulic hoists



The engagement of a chain coupling or a worm gear must be synchronized each time one has been changed.

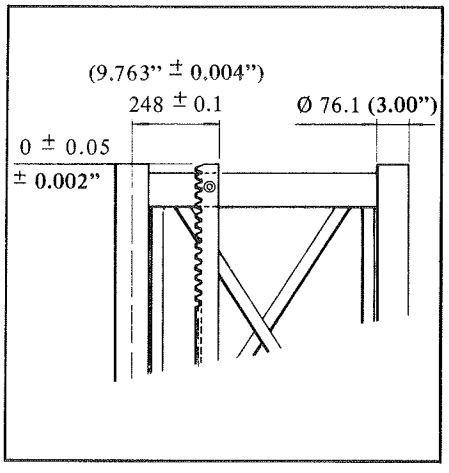
Such synchronization is not required for new pinions because **all three of them must be replaced at the same time.**

If only one gear is replaced, the old pinion must be fitted to the new gear. If the replaced gear is badly worn, replace the other two as well, otherwise the new gear will have to absorb disproportionate load, despite correct synchronization.

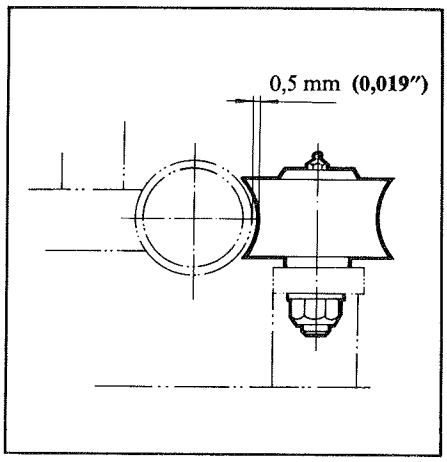
1. Put supports under the cage so that the pinions are not under load.
2. Remove the covers and the chains of the two chain couplings.
3. Hold the top and bottom pinions against the rack with C-clamps.
   During this operation the brake must be released so that the top pinion will be fully engaged. In some cases it might be necessary to turn the gear with the cranking lever until the pinion is in complete engagement with the rack.
4. Start with the chain of the upper coupling. If the teeth do not correspond to each other, turn one of the coupling halves the shortest way, until the teeth correspond and the chain can be fitted. Repeat this procedure with the lower coupling.
5. Grease the chains and fit the covers of the couplings.
6. Remove the C-clamps.
7. Make a trial run with the hoist. A great difference in temperature between the gears may result from bad synchronization.

RACK

Exchange of rack on a mast section



1. Take off the worn or damaged rack.
   Heat the rack with a torch if necessary to loosen the bolts.
   Clean the threads of the brackets.
2. Apply locking liquid Loctite No. 242, or similar to the screws and then install the new rack according to sketch.
   The measurement 248 mm must be kept at both ends of the mast section.
   Tightening torque: 195 Nm **(144 lbf×ft).**



GUIDE ROLLER

Exchange of guide roller (side roller)

1. Lock the cage with a slamp to loosen the roller which is to be replaced.
2. Remove the roller.
3. Install the new guide roller allowing for the play indicated on the adjoining sketch. Adjust the play by turning the eccentric shaft of the roller.
   Use the Alimak special key, Part No. 390757.
   Tightening moment (dry surface): 200 Nm
   (148 lbf×ft).

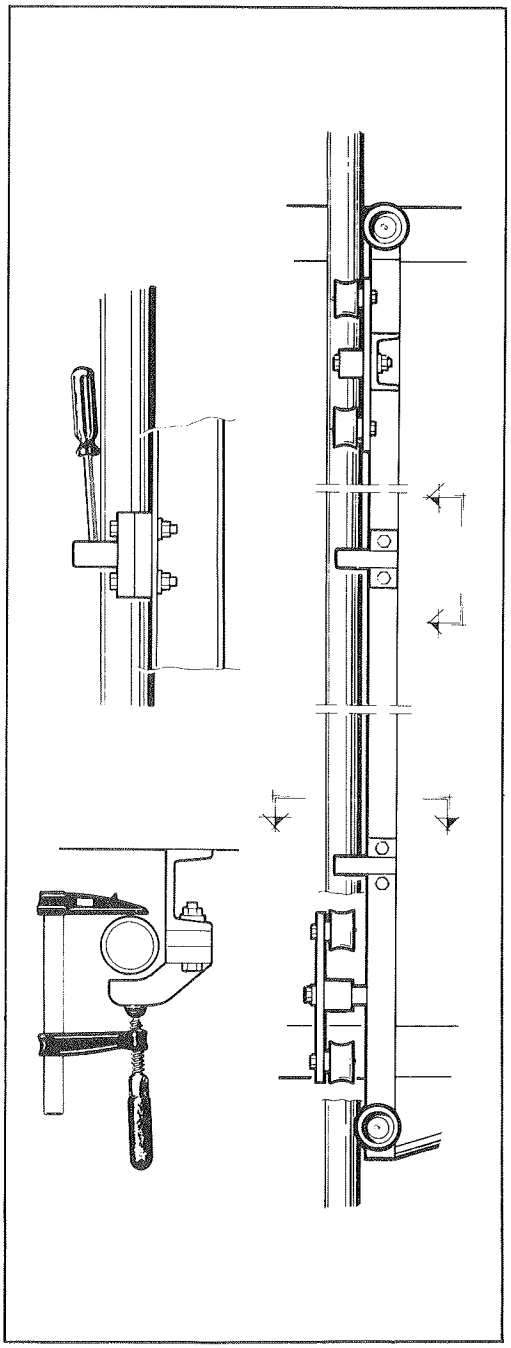
COUNTER ROLLER

Exchange of counter roller

1. Hold the pinions against the rack with two clamps in order to loosen the counter rollers.
2. Ensure that the eccentrics of the rollers are welded to the rollers. If not, mark out the position of the eccentric to facilitate refitting.
   Remove the roller.
3. Install a new roller and remove the clamps.
   Tightening moment (dry surface): 300 Nm **(221 lbf×ft).**

ROLLER ASSEMBLY

To facilitate exchange of upper roller assembly — make sure that the actual roller assembly is halfway between two frames in the mast.



Exchange of upper roller assembly

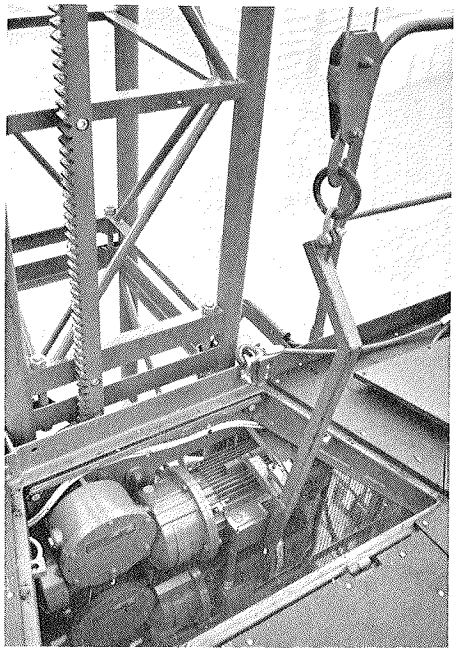
1. Lock the position of the cage at the mast by placing an object (e.g. a big screw driver) between upper counterpart and mast tube. The object should be enough thick to ensure that the hoist does not move during the dismantling of the roller assembly.
2. Loosen the fixing screws of the guide rollers and remove the eccentrics to get appropriate play between roller/mast tube.
3. Dismount the roller assembly.
4. Erect a new roller assembly.
   The fixing screws of the guide rollers should be loose. Adjust the eccentric shafts of the guide rollers until the screw driver falls off.

Exchange of lower roller assembly.

1. Put a vice on the lower counterpart and mast tubes, but not more tightly than necessary to hardly discharge the guide rollers from the mast tubes.
2. Loosen the fixing screws of the guide rollers and remove the eccentrics.
3. Dismount the roller assembly.
4. Erect a new roller assembly. The fixing screws of the guide rollers should be loose.
5. Adjust the guide rollers until the vice falls off. Then tighten the fixing screws of the guide rollers.

Tightening moment (dry surfaces): Fixing screw for roller assembly 300 Nm **(221 lbf×ft).**
Fixing screw for guide roller 200 Nm **(148 lbf×ft).**

ELECTRIC MOTOR



Exchanging of electric motor in cage

(this instruction does not apply to changing the pump motor on a hydraulic hoist).

1. Remove the door above the motor and install the erecting crane over it.
2. Cut off the electrical power to the motor. Disconnect the electrical cables from the motor and label them to facilitate refitting.
3. Put a lifting yoke, suitable wire or the Alimak lifting tool, Part No. 393466 around the electric motor and hook to the erecting crane hook. Apply tension to the wire.
4. Remove the screws around the flange and lift out the motor.
5. Loosen the lock bolt and pull out the coupling half from the electric motor by using the Alimak puller, Part No. 393154.
6. Oil the shaft of the new motor with Molycote and fit the coupling half with the Alimak fitting device, Part No. 393156. Tighten the lock bolt. (Do not hammer on the coupling when installing it).
7. If the rubber elements of the coupling must be changed, the guide edges can be graded 2×45°. Use soapy water as lubrication when installing rubber parts.
8. Lift the electric motor brake by putting a wedge under the brake lifter.
9. Lift up the motor. Fix the coupling so that it coincides with the couplinghalf of the gear. Install the motor by keeping a constant pressure on it and by turning the coupling half a little until the motor fits in.
10. Connect the electric cables and fit the cover over the motor. Remove the wedge under the brake lifter.
11. Turn on the main power supply and make a trial run with the hoist. Make sure that the brake works. (See instruction sign in the cage).
12. Ensure that the hoist starts in the correct direction in relation to the labels on the push button box or control box.

IMPORTANT: Never replace a motor with one of a different type.

WORM GEAR

Exchange of worm gear

(This instructions does not apply to hydraulic hoists).

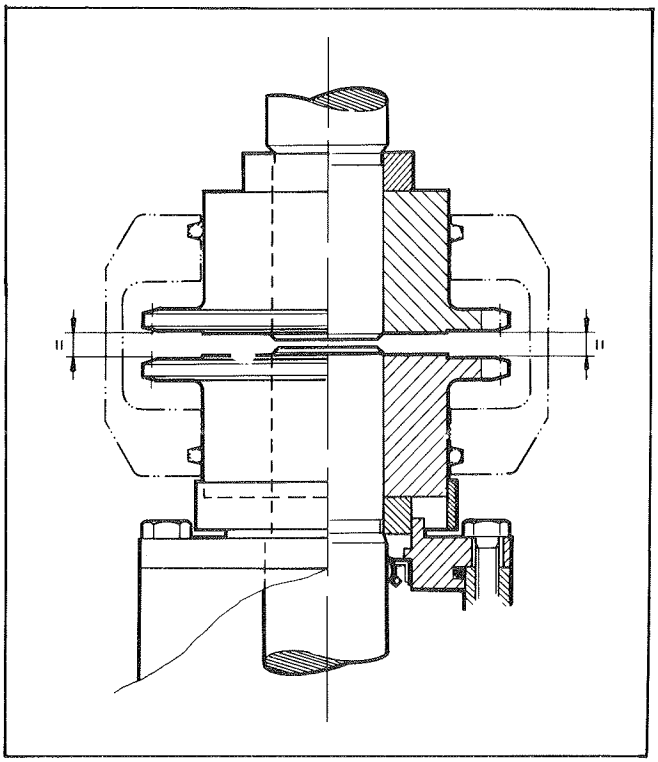
1. Remove the motor and gear from the cage in accordance with the instruction "Exchange of electric motor". Use the Alimak special key, Part No. 260148.
2. Loosen the gear from the electric motor. Loosen the stop screw and remove the coupling by using the Alimak puller, Part No. 393154.
3. Empty the gear of oil and loosen the intermediate flange.
4. If the pinion is to be fitted to the new gear, follow the instruction "Exchange of pinions by dismantling gear with motor".
5. Remove the intermediate flange sealing ring and install a new ring.

6. Oil the shaft of the new gear with Molycote and install the coupling half. Secure the stop screw.
7. Install the gear on the motor.
8. Lift up the gear and motor and fasten to the machinery plate. Tightening moment 190 Nm **(140 lbf×ft).**
9. Connect the electric cables to the motor and check the engagement.
10. Install the air filter and fill the gear box with oil.
11. Make a trial run with the hoist.

Exchange of worm gear and chain coupling (hydraulic hoists only)

If all three gears must be exchanged, we suggest dismantling the whole machinery plate with the gears.

1. Remove the cover and the chain of the chain coupling and loosen the gear/gears. Use the Alimak special key, Part No. 260158.
2. Loosen the stop screw and pull off the pinion/pinions or shaft coupling with the Alimak puller, Part No. 393154.
3. If the old pinion is to be used on the new gear, follow instruction "Exchange of pinion by dismantling gear with motor", paragraphs 2-5.
4. Install the chain wheel/wheels and coupling, if any, with the Alimak puller Part No. 393156.
5. Lift up the gear and fasten the screws.



6. Adjust the gears so that the shafts are in alignment. See illustration. The alignment may be checked with parallel rules or by measuring the distance between the chain wheels between four opposite points. The distance must be the same between all poinst.
7. Tighten the gear to the machinery plate with a tightening moment of 190 Nm **(140 lbf×ft).** Install the air filter and check the oil level.
8. Synchronize the cog engagement according to instruction "Synchronization of engagement".

IMPORTANT: If the machinery plate or safety device plate has been dismantled, do not forget the rubber washers when reinstalling the plate.

SAFETY DEVICE

A drop test with full load must be carried out at every new installation, or in accordance with local safety regulations — but at least every 3 months.
The safety device must be replaced in accordance with the date on the sign of the safety device.

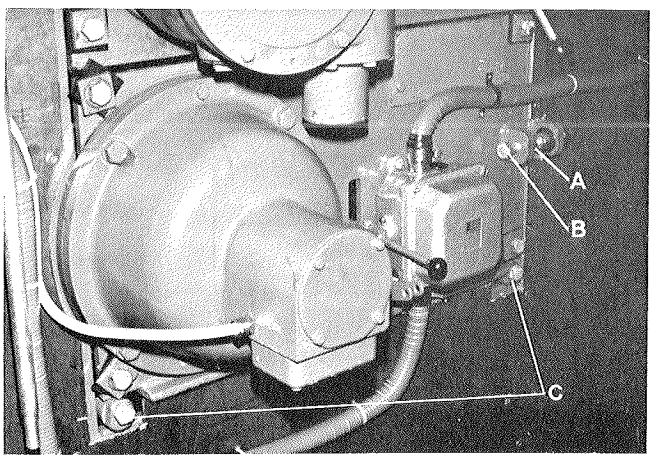
Exchange of safety device type GF 3.0/1.2

1. Open the cover under the safety device and disconnect the electrical cable to the micro switch.
2. Loosen and remove the safety device.
3. Install the new safety device. Make sure that the flange of the housing touches the machinery plate all the way round before securing it with screws.
   Do not hammer on the safety device!
4. Connect the electric cable and make a drop test.
5. Reset the safety device and lubricate according to the "Lubrication Instruction".
6. Tighten the screws. Tightening moment 100 Nm **(74 lbf×ft).**

Exchange of safety device type GFD 200

1. Open the cover under the safety device and disconnect the electrical cable to the micro switch.
2. Loosen and remove the safety device.
3. Check the wear of the bearings on the intermediate gears.
4. Check and adjust the distance between the counter parts on the back of the plate and the rack. The play should be 3 mm **(0.118 inches).** (See instruction below concerning the adjustment).
5. Install the new safety device. Make sure that the flange of the housing touches the plate all the way round before securing it.
   Do not hammer on the safety device.
6. Connect the electric cable and make a drop test.
7. Reset the safety device and lubricate according to the Lubrication Instruction.
8. Tighten the screws. Tightening moment 100 Nm **(74 lbf×ft).**

Adjustment of play between rack and counter parts (safety device type GFD 200 only)

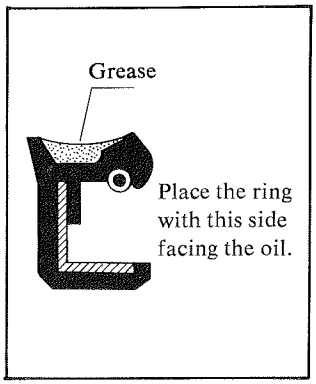


1. Loosen the screws of the plate slightly.
2. Remove the protecting cover and loosen the nut (A).
3. Adjust the play on the adjusting screw (B). The play should be 3 mm **(0.118 inches).** To reduce the play — tighten the screw. If the play increases drive the cage upwards a little and then check the play again. If the play varies from counter part to counter part, adjust with the eccentrics (C).
4. Tighten the nut and install the protecting cover.
5. Tighten the screws. Tightening moment 9-10 kpm (90-100 Nm).

SEALING RINGS

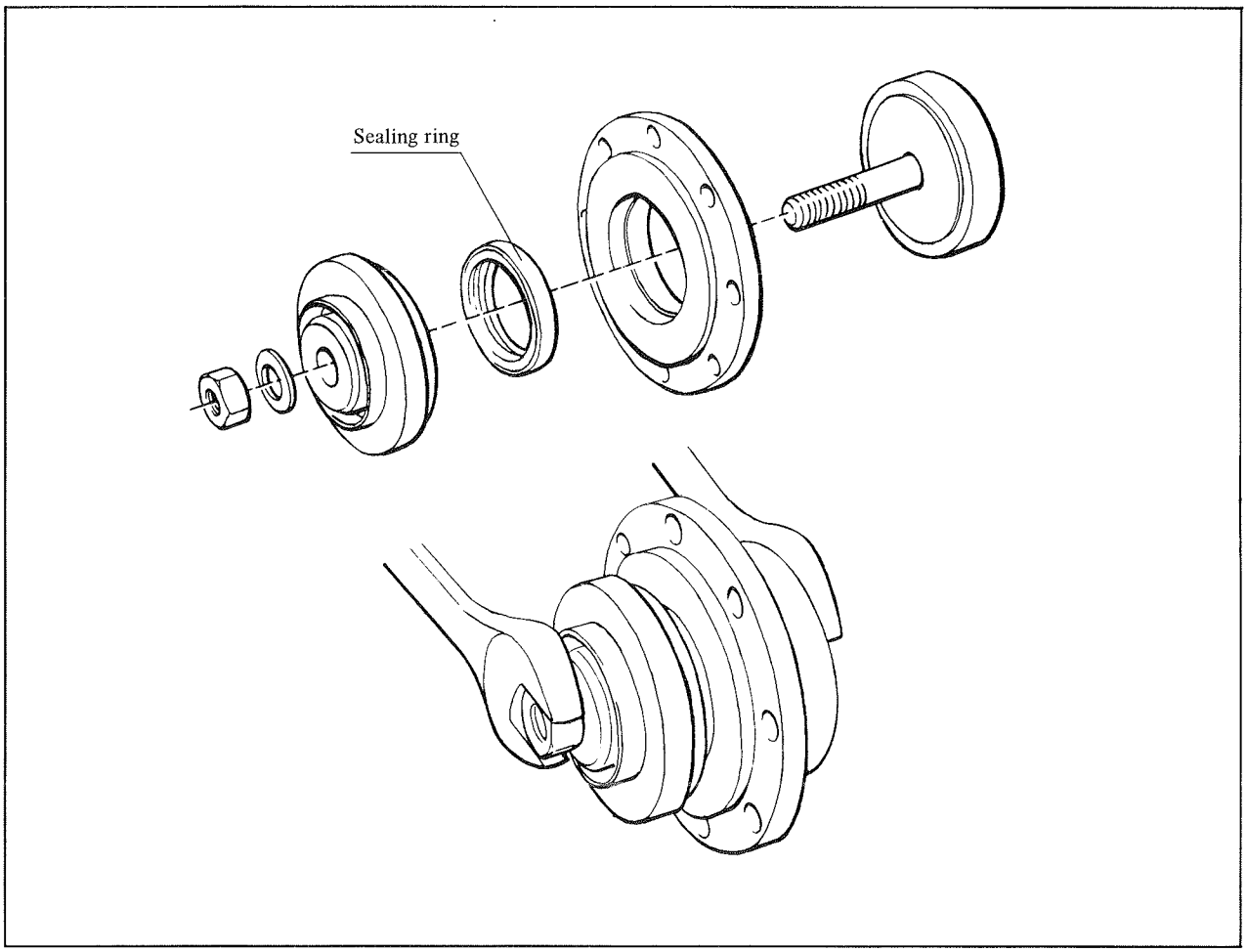
If there is an oil leakage in the worm gear, the primary shaft sealing rings must be changed.

Use the Alimak fitting device, Part No. 460058 when installing new sealing rings.



Sealing ring with dust collector must be filled with grease all around the ring before it is installed, as shown on the illustration.

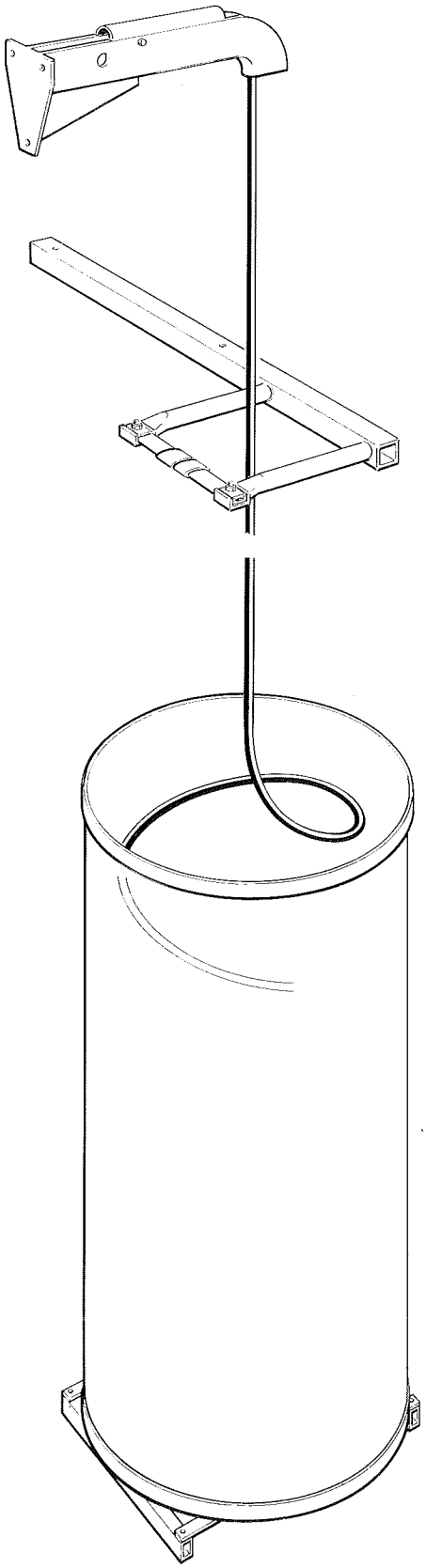
IMPORTANT: Do not use a hammer and mandrel to force fit new sealing rings as there will be an oil leakage if the rings are not properly installed.



HOIST CABLES

Installation of cable guiding device with cable basket

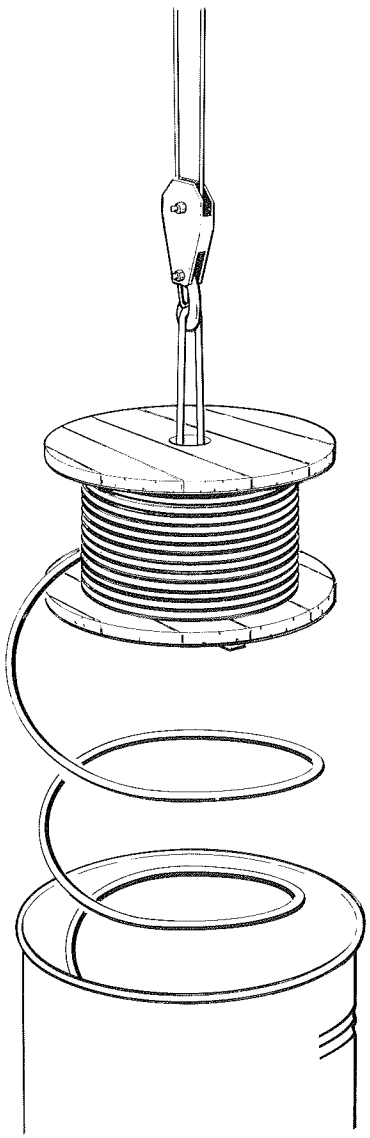
To ensure proper functioning, the cable must have the right preset torsion, i.e. it must be twisted so that it falls down by itself in spirals inside the walls of the basket.



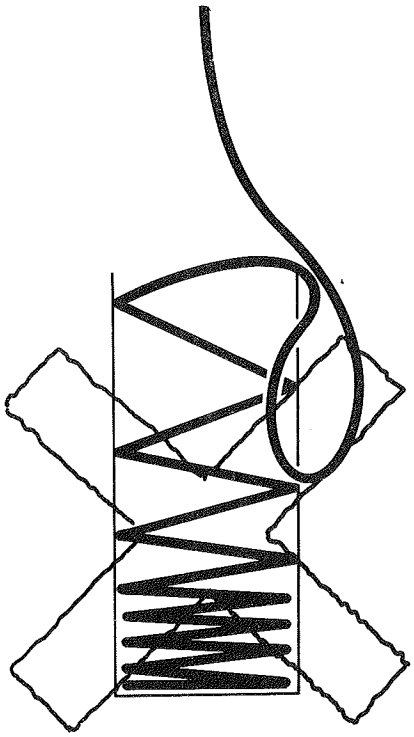
Exchange of power cable

1. Suspend the cable drum by means of a simple "swivel"– e.a. a rope and a board – in the erection crane above the cable basket.
2. Cut the wrapping and unwind about 2.5 m of cable for connection to the electric box.
3. Pull the cable through the bottom of the basket and further to the electric box – *but do not connect it yet!*
4. Put the cable into the cable basket, *layer by layer, clockwise rising as shown in the picture.*

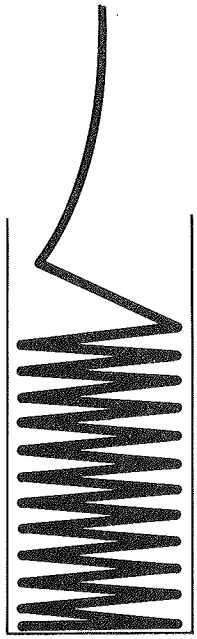
   Try to make all layers equally big, and with a somewhat smaller diameter than the inside dimensions of the cable basket.



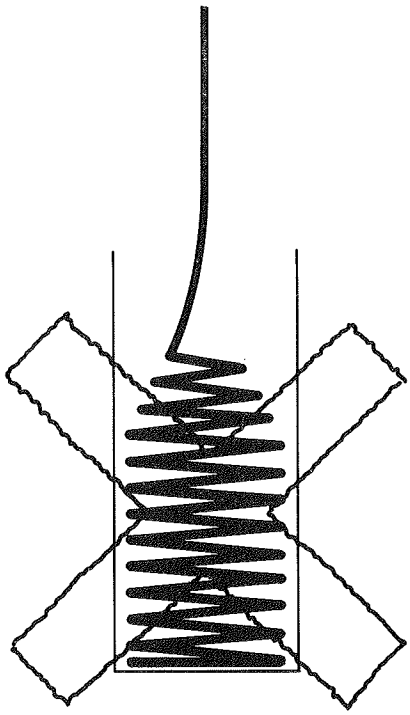
5. Pull the cable through the cable support arm and mount attachment and cover.
6. Mount a socket in the cable end and connect it to the outlet at the cable support arm.
7. Connect the cable to the electric box/main switch at the ground landing and run the hoist to check how the cable reels/unreels itself (see picture below).



Not twisted enough – the cable "climbs' up the walls of the basket and falls out.



Proper twisting with proper functioning.



Too twisted – the cable may knot and be broken.

If necessary, loosen the cable and adjust – run the hoist once more to check the function.

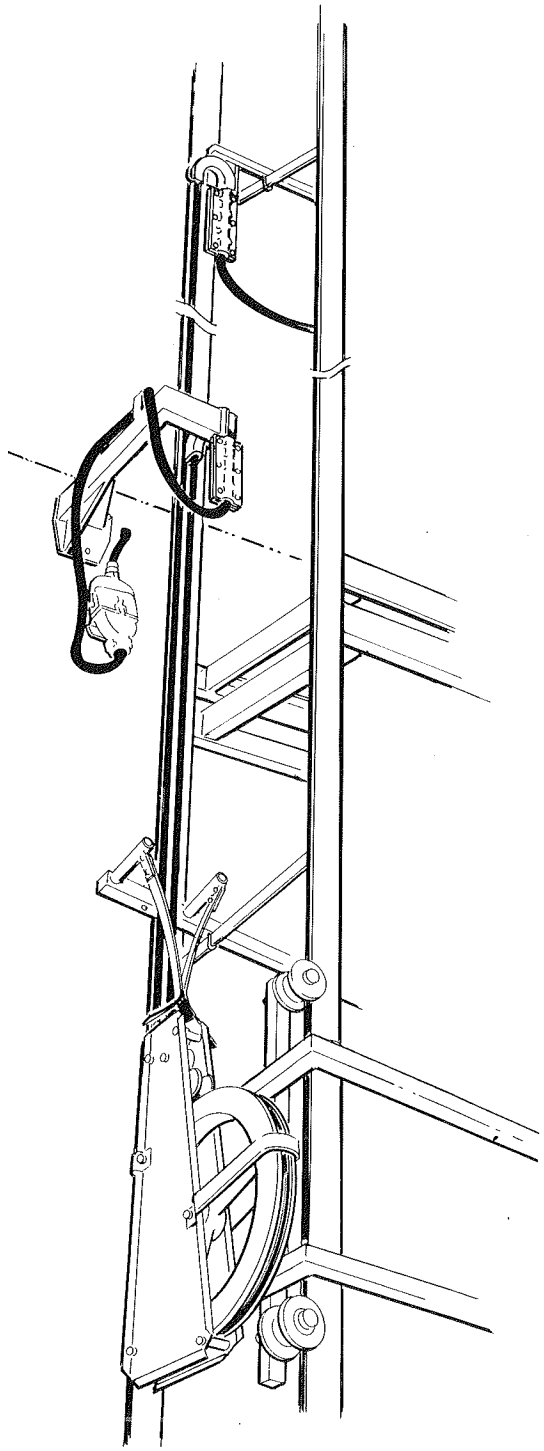
WARNING!

Make sure that the equipment is dead before connection.

The characteristics of the cable may change

After some time of operation, the characteristics of the cable may have changed. If so, the cable must be adjusted again according to the instructions above.

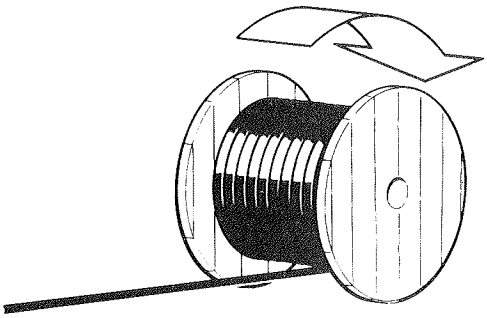
Installation of cable guiding device with trolley



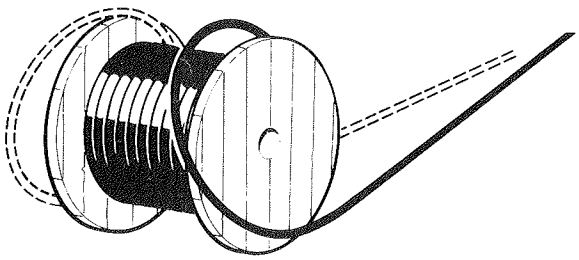
The cable must not be twisted.

This is very important!

It is wound off the reel . . .



. . . or put over the gables of the reel, changing from one gable to the other every time, in order not to twist the cable.



Cable guiding device with trolley is also available in a design where the trolley is guided direct on the hoist mast under the cage.
The cable must not be twisted in this version either.

The characteristics of the cable may change

After some time of operation, the characteristics of the cable may have changed. If the cable becomes twisted between the cable support arm and the cable trolley or between the cable attachment in the hoist mast and the cable trolley – unwind the respective cable end.

WARNING!

Make sure that the equipment is dead before the connection.

Lubrication

Surfaces exposed to wear on cable support arm. trolley and blade springs in the cable guides should be greased regularly with *ordinary lubricating grease.* To ensure the best possible functioning of the cable guiding device, this is to be done every 40 hours of operation, or at least once a month.
The hoist cable itself, however, does not need lubricating. The EPDM rubber quality used nowadays does not require any special treatment for protection against ultraviolet radiation and ozon.

Preparations before installation

To install the hoist as quickly as possible and at lowest cost, it is important that the following preparations be made before the installation is started.

1. Make sure the erection place meets the requirements set out by safety and inspection authorities and that their permission, if necessary, to install the hoist has been obtained.

2. Make sure there is electric power, light, lifting equipment and tools at the erection place and that roads and the yard are prepared to receive the hoist transport.

3. If possible, prepare the casting of tie-ins and landing accessories such as supports, bridges and railings. Suitable places for attaching the tie-ins are vaults, balconies or other concrete or steel structures.
   Remember that these structures must be strong enough to absorb the reaction forces of the tie-ins.

4. Prepare the foundation with the parts required for fixing the base plate of the hoist mast.
   Try to install the hoist as close to the building as possible to simplify the installation of tie-ins and landings. This is particulary important if the face of the building is plain, e.g. of slipform construction.

Erection Alternative 1

Cast a concrete slab if local regulations do not specify a safety space under the cage at the ground landing.
Fit the foundation parts so that the plastic plugs in the holes are level with the finished concrete surface.
Note that the hooks of the foundation parts must hook into the steel mesh reinforcement of the base plate and that the foundation must be drained.

If the ground is level, the hoist may be installed directly on the ground without a foundation, providing min. 2 mast tie-ins, of which the first on max. 4.5 m **(15 feet)** height and the total lifting height does not exceed 40 m **(130 feet).**
Note: Contact the local authorities to get their approval of the installation.
Acceptable base for the installation: steel, wooden foundation, crossties, asphalt, concrete. The reaction forces specified on the foundation drawing must be taken into account.

Erection Alternative 2

If a safety space is required under the cage at the ground landing a foundation pit usually must be built. It is sometimes possible to erect a steel scaffold for this enclosure. If a steel scaffold is used it is only necessary to cast a concrete slab as foundation in accordance with Alternative 1.
(Remember to drain the foundation pit).

IMPORTANT: Make sure before casting the foundation that the distance measurement (L) between the centre foundation frame and the wall corresponds to the tie-ins to be used.

5. Check the delivery against shipper lists and look for transportation damage. Should there be any damage, report the same to the responsible transportation insurance company within 7 days counted from the date of arrival of the goods. Other claims should be made within the same period.

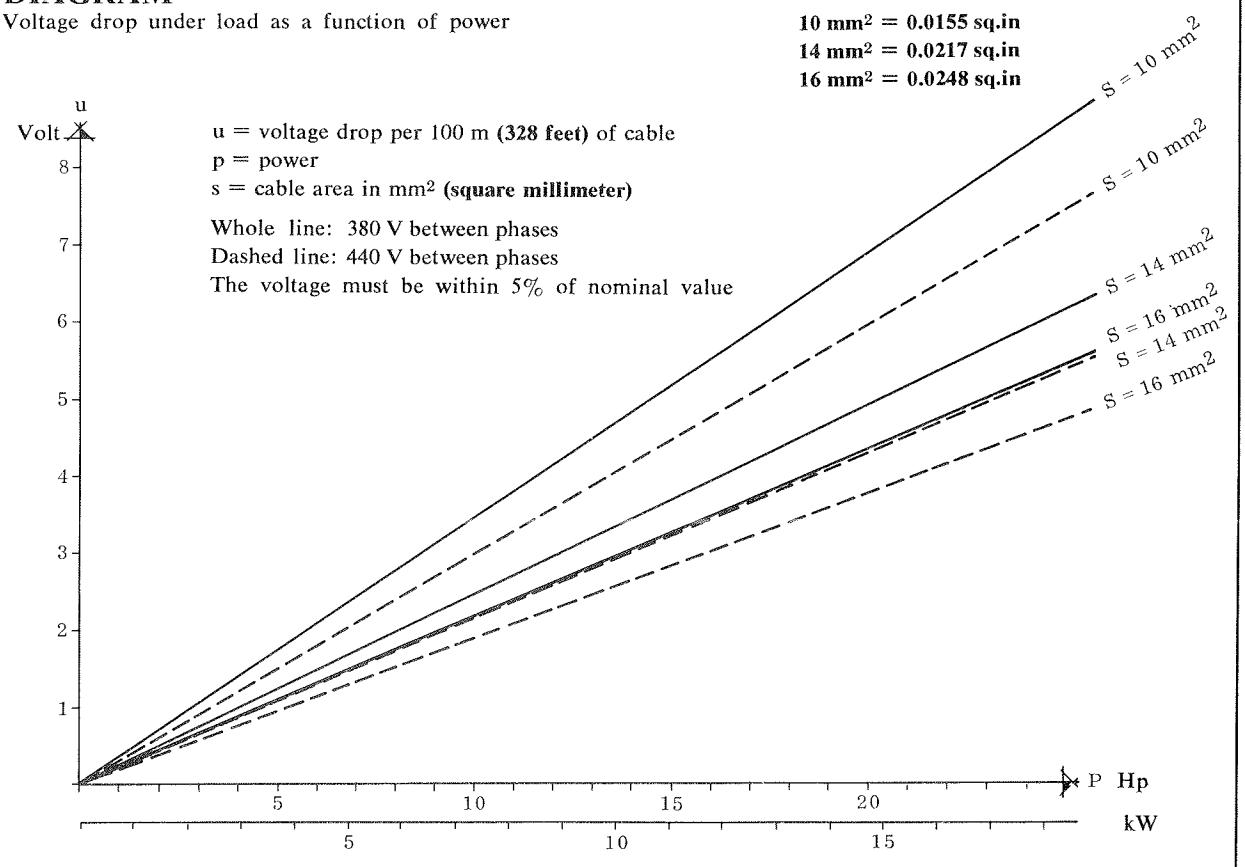
6. Prepare for the power supply and pull a cable to the erection place. Make sure that the power outlet is dimensioned so that the voltage drop is minimized. See diagram.

   Minimum cable dimensions and fuse specifications are indicated in the table below.

No. of motors on same power outlet	Cable dimension sq. mm	Fuse Amp. delay action
1 x 7.5 kW	4 x 10	35
2 x 7.5 kW	4 x 16	63
3 x 7.5 kW	4 x 25	80
1 x 30 kW (Super Scando)	4 x 25	80
1 x 37 kW (Super Scando)	4 x 25	80

DIAGRAM

Voltage drop under load as a function of power



The diagram applies to a three phase system with copper conductors.

If aluminium conductors are used, the cable cross sectional area must be increased by a factor of 1.57

Installation

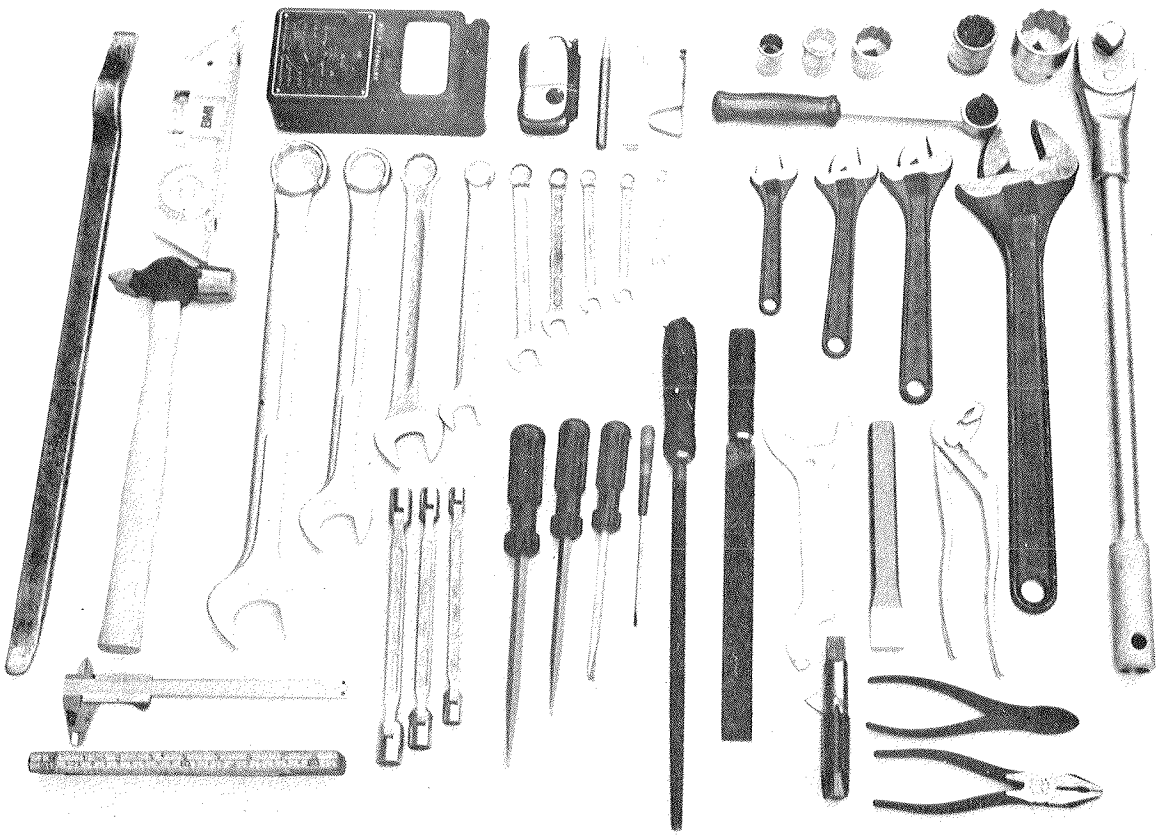
GENERAL

The person responsible for installation must carry out visual inspections of all components installed during all operations.
Should any part have been damaged during transport, storage or erection it **must** be replaced.

I M P O R T A N T: Keep the erection place fenced in during installation of the hoist.

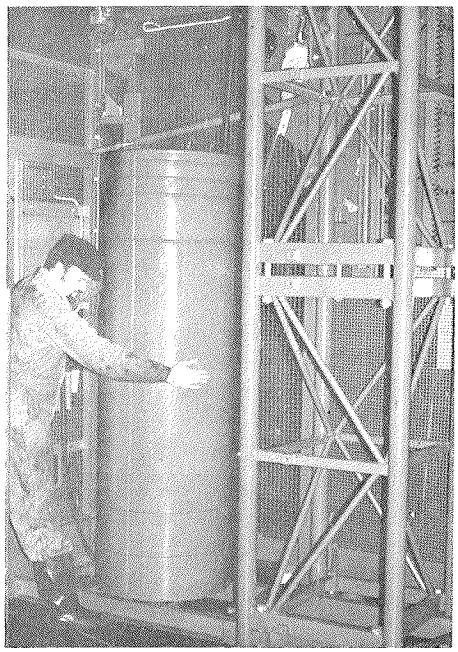
TOOLS

The installer should have at his disposal the tools shown on the picture below. When ordering tools, please use references indicated on the last page of the spare parts manual.



BASE UNIT

If the hoist has been used before, check according to paragraphs 2-6, 15-19, and 21-24 of "Service and Maintenance".
If the safety device is due for replacement in the near future (replacement is required at least every 3 years), change it at this time to avoid having to do so after the hoist has been erected. There is a sign on the safety device showing when it must be changed. If the sign is missing, check when the hoist was manufactured and presume that the safety device is at least as old as the hoist.



1. **Installation on concrete slab, alternative 1**

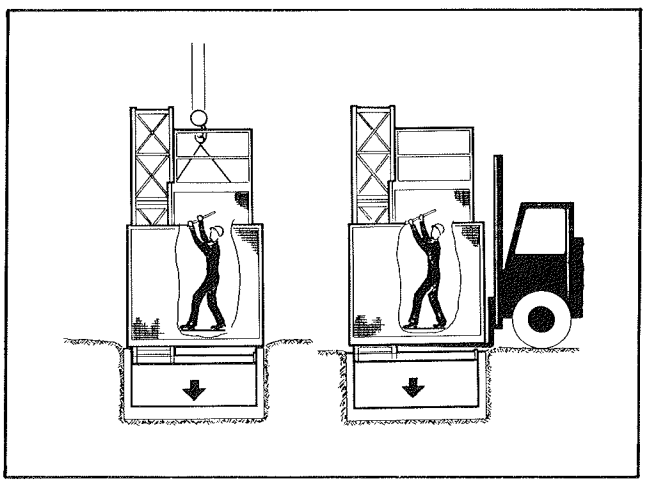
   Sweep the concrete slab clean and remove the plastic plugs on the foundation parts.
   Grease the threads on the bolts.
   Remove the enclosure on the mast side and move the cable basket so that the holes of the bottom frame are easy to reach.

   Lift the base unit in position by a crane or a fork-lift truck.

Installation in a foundation pit, alternative 2

Remove the whole enclosure and prepare the foundation according to the above instructions. Lift the cage and the bottom frame down into the pit.

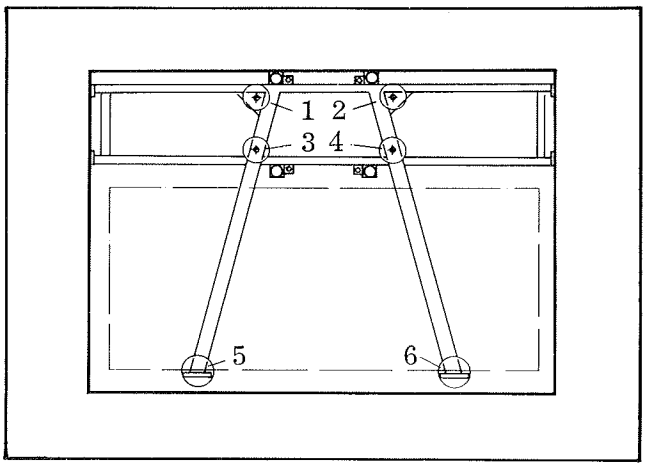
Note: If the cage can be lifted over the foundation pit as shown on the figure, the bottom frame and the mast can be cranked down into the pit by installing one mast section, removing the bottom frame from the ground enclosure and removing the tie-in between the mast and the enclosure front. See Operation Instructions "Cranking".

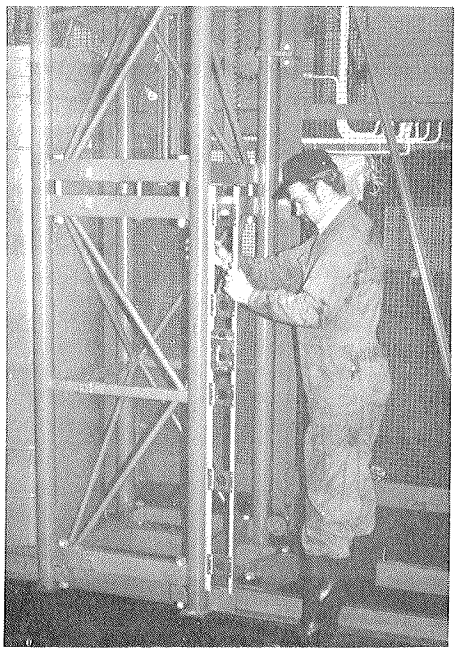


IMPORTANT: Use the lifting yoke when lifting the base unit with a crane. Make sure the lifting device is intended for the load to be lifted and that the lifting yoke is correctly fitted. Do not walk under hanging load.

2. Make sure the base unit is in exact position.
Fasten the screws (1″ UNC × 140 mm **[5.51 in]**) and the square washers to the foundation frame but do not tighten them.

Adjust the hoist mast by putting solid steel washers between the bottom frame and the foundation. Put the washers as close to the mounting points 1, 2, 3, and 4 as possible. See figure.





Check the straightness with a water level or plumb line in two directions.

Tighten the screws and check again.

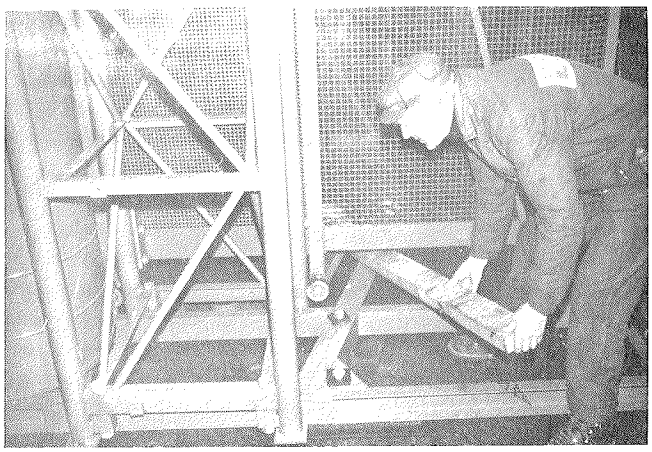
When the mast is absolutely straight, tighten the screws with a tightening moment of 700 Nm **(516 lbf×ft).**

Put supports under points 5 and 6.

3. Remove the lifting yoke.
Install the safety railing and the erecting crane on the cage roof.

If the hoist is provided with a transport mast section (the second mast section), dismount it and install two new mast sections as follows:
Attach the wire rope of the erecting crane to the transport mast section and keep the rope under tension during the whole operation.
Loosen the transport mast section and jerk at it with the erecting crane until it pulls free of the hoist.

Install the new mast section in reverse order.
(The rack of the transport mast section can be used on a mast which is delivered without a rack. See "Other Repairs, Exchange of Rack" as to the fastening of the rack).



4. Crank the cage upwards a short distance and install the buffers under the cage.

   Remove the wooden beams (used during transportation only).

WARNING: Put a support under the cage to keep it from falling before installing the buffers. Remove the support after the operation is finished.

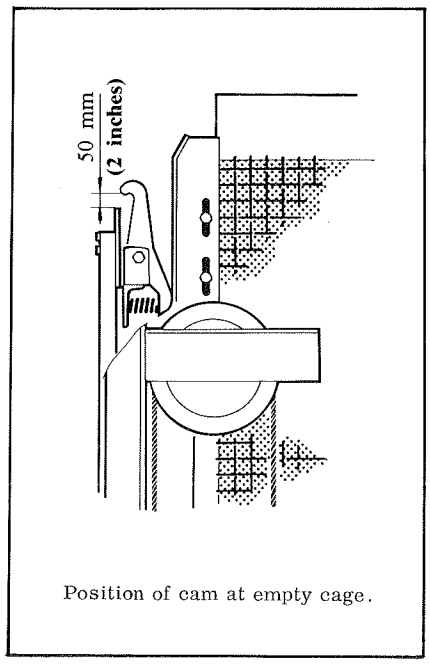
5. Move the cable basket to its mounting holes on the bottom frame and fasten it with bolts.

   If the ground enclosure has been removed, install it now but leave the section on the mast side open if the hoist is to be equipped with a counterweight.

   If the hoist is supplied with a cable guiding device with a trolley, install it according to instructions under "Cable Guiding Device".

   Remove and install the electric junction box and the main switch on the outside of the enclosure.

6. Install the retaining mechanism on the enclosure front. See figure. Adjust the enclosure front by putting supports under the corners until the gate guide rail is parallel to the hoist mast.



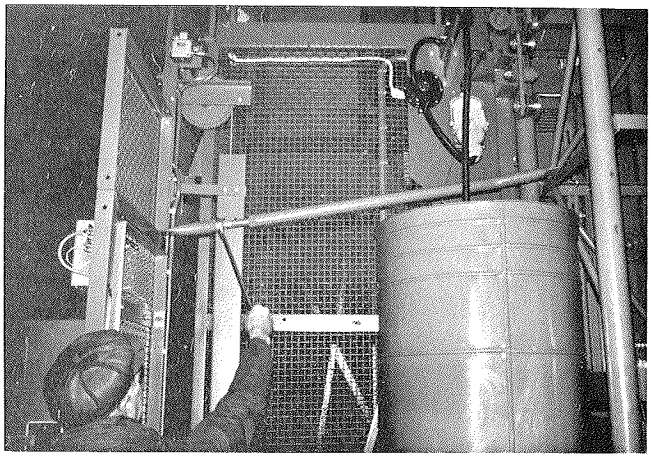
Position of cam at empty cage.

Check the straightness by opening the gates. Watch the hinges connecting the enclosure to the cage gates.

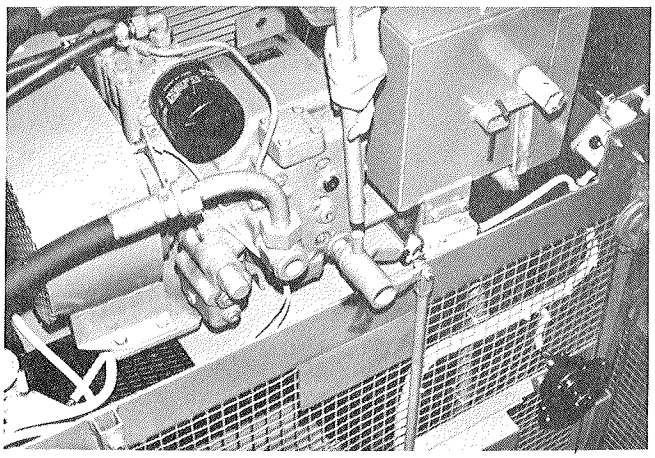
If the adjustment is correct, these hinges will not move individually, either sideways or in depth.

Should they more in depth adjust the tie-in to the mast.

Make sure that the gate lock works after the adjustment.



7. Crank the cage upwards so that it is possible manually to actuate the three phase switch (the switch provided with a lever) on the machinery plate.
8. Move the lever on the switch in the electric junction box to "Erection" (if such exist). Bring the control lever up to the cage roof.



On hydraulically driven hoists: Install a lever on the pump unit to allow operation from the cage roof. Disengage the control lever in the cage.

Make sure that the oil level is up to the "Max" mark in the tank on the cage roof.

IMPORTANT: During erection, dismantling, service and maintenance, the hoist must be operated from the cage roof.

9. Connect the power cable to terminals R, S, T and ground in the electric junction box or the main switch on the ground enclosure.

   Turn on the main control switch and check it by giving a short starting impulse. Make sure that the hoist moves in the correct direction in relation to the mark on the push buttons or the control box, i.e. "up" or "down".

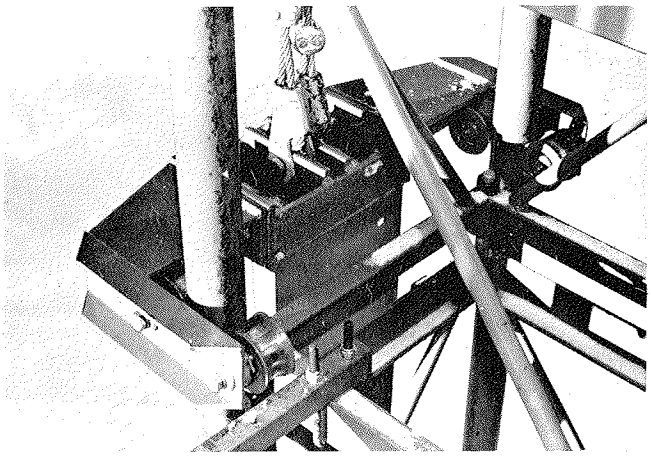
   If the hoist is provided with a phase failure relay there will be no starting impulse if the phase sequence is incorrect. A light will light to indicate wrong phase sequence.

   If the cage starts to move in the wrong direction or if there is no starting impulse, cut off the power of the **feeding** power central and reverse the cable connection at terminals R and S in the main switch/electric junction box.

   Note: On hydraulically driven hoists it is only necessary to start the pump engine to check the phases. If the motor rotates according to the arrow of the belt cover, the sequence is correct. Otherwise reverse the connections at terminals R and S.

WARNING: Make sure the main switch is really dead before changing connections.

10. Install and adjust the bottom limit cams. See "Limit Cams".



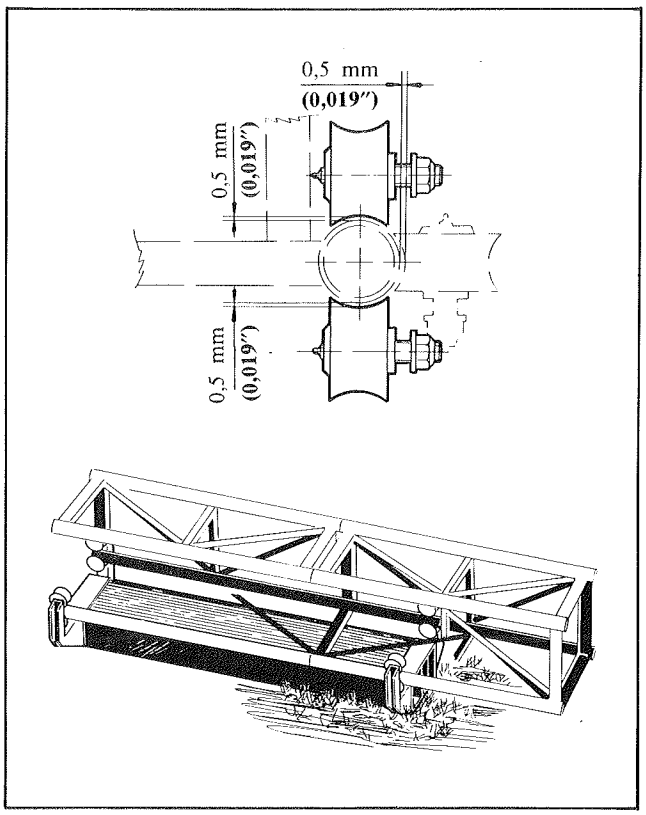
COUNTERWEIGHT EQUIPMENT

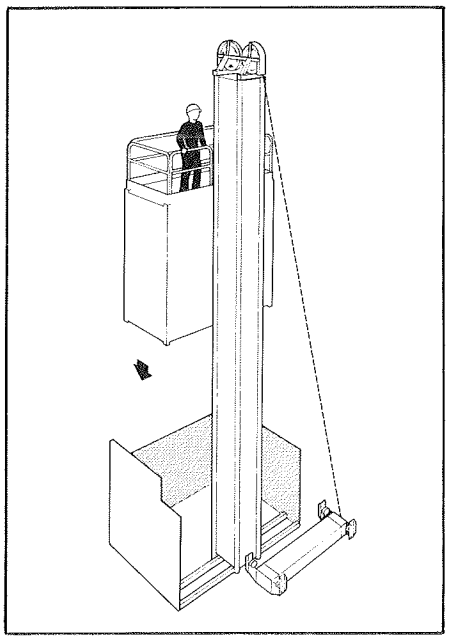
If the hoist is to have a counterweight, it must be lifted in position before starting to erect the mast. This goes for the counterweight guide rail as well, if the hoist is provided with a side mounted counterweight.

Install cathead, ropes and brackets after the mast has been erected to the desired height.

Installation of counterweight

1. Fit the counterweight buffers at ground landing.
2. Assemble the roller assemblies and guide rollers to the counterweight.
   If the counterweight is provided with rope drums, wind on the rope and secure it temporarily.
   When changing or installing the guide rollers on the counterweight, check the rollers by using two assembled mast sections to make sure there are no internal stresses.
   Adjust all four lower rollers so that they touch the pipes. Then adjust the upper rollers to a total play of 1 mm **(0.039 inches).**
3. Lift up and lower the counterweight onto the back corner pipes of the mast.





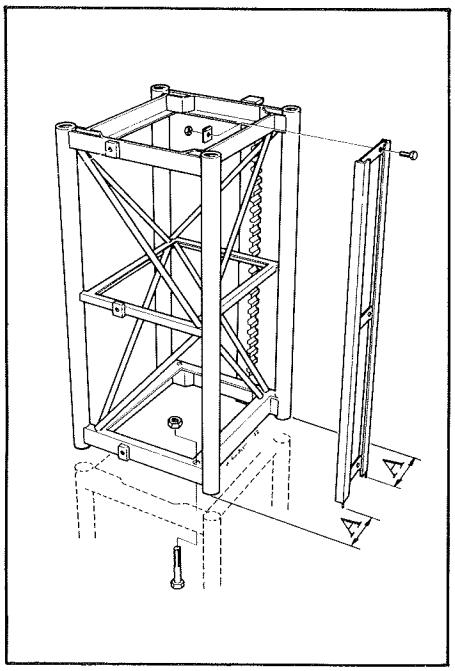
4. Install the enclosure on the mast side.

   Note: If there is no lifting device available, the counterweight can be brought to the top in the cage according to the sketch, provided that at least three mast sections are installed and that the outer counterweight rollers and the side rollers, if any, are removed.

   Remember to allow the +0.5 mm **(0.019 inches)** play when refitting the guide rollers.

WARNING: Make sure the lifting device is intended for the load in question.
Do not walk under hanging load!

Installation of counterweight guide rail

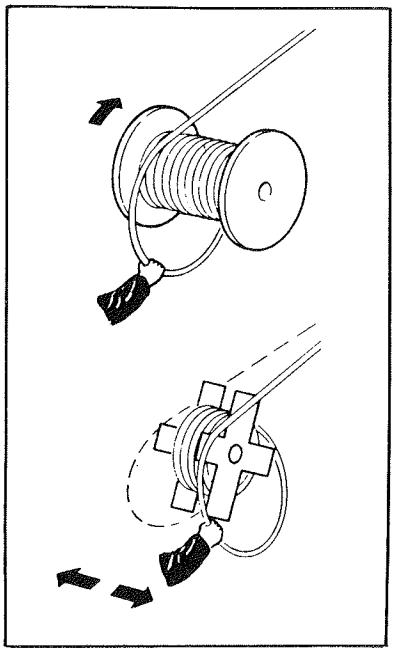


If the counterweight is a side-mounted one, the guide rail must be bolted to the mast before assembling the mast sections.

Make sure when installing the guide rail that

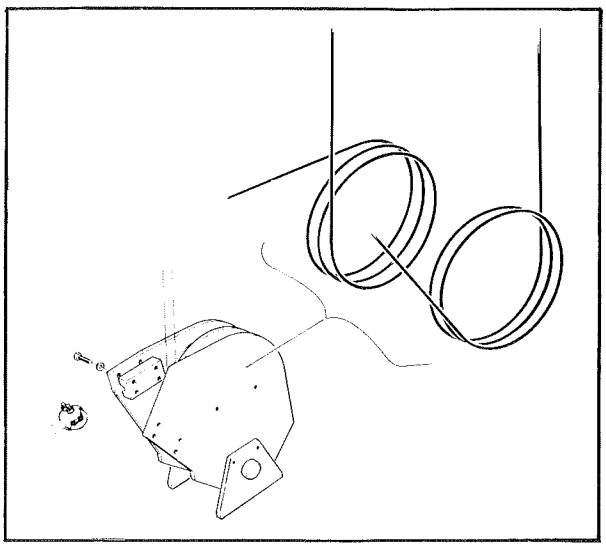
1. the distances A are the same.
2. the lower guide rail ends are exactly level with the pipe ends of the mast (not the ends of the guiding cones).
3. Use a templet to avoid readjustments.
4. Adjust the joints, if necessary, after the mast has been erected.

Note: If the guide rail has not been properly adjusted, the counterweight guide rollers will wear down too quickly.

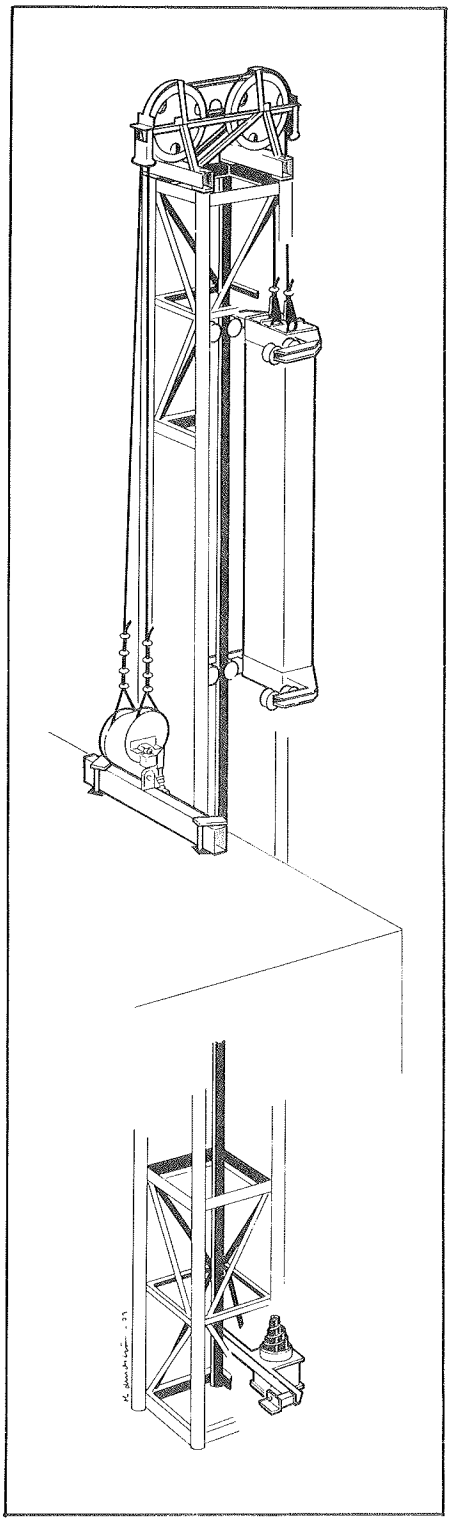


Counterweight wire rope

Note that the rope must be wound off, or laid off, storage drums or reels in the manner as shown on the adjoining sketch to avoid twisting which might cause breaks.



Note: Wire rope installation in accordance with illustrated for this type of equalizer.



Counterweight equipment type cathead on the mast top

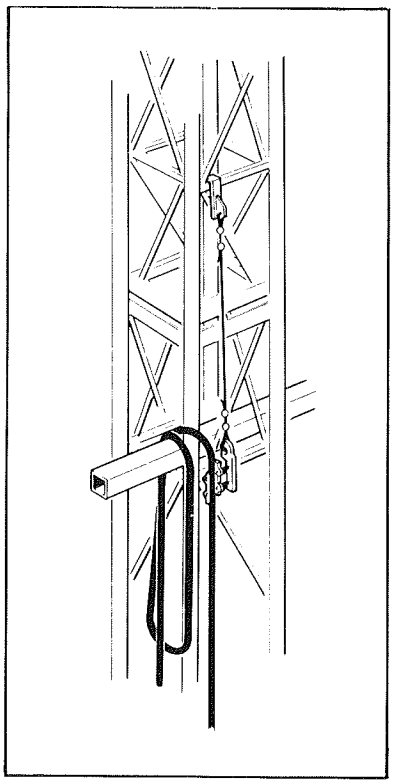
Installation of cathead and counterweight ropes

1. Lift the cathead, rope bracket and counterweight ropes onto the cage roof.
2. Drive the cage up to 500 mm **(19.68 inches)** under the mast top, lift the cathead onto the top and fasten with screws. Use the erecting crane.
3. Pull the ropes over the pulleys of the cathead and lower to the counterweight on the ground. See instructions for "Unwinding of rope".

   During installation in severe weather conditions with high wind velocities, fit a guiding rope from the mast top to the ground landing to guide the counterweight rope down to ground landing.
4. Install bracket and ropes on the cage roof.
5. Attach the rope to the counterweight with the assistance of a man on the ground. (Secure with wedge locks and extra cable clamps). Use the number prescribed in the local regulations.
6. Adjust the ropes so that the rope equalizer switch is in the middle of the cam.
7. Install the limit cams. See "Limit Cams".
8. Make sure that the counterweight way is free.
9. Make sure that the distance between counterweight and cathead is 300 mm **(11.81 inches)** when the cage touches its buffers and that the distance between the cage and the cathead is also 300 mm **(11.81 inches)** when the counterweight touches its buffers.

WARNING: **Press the emergency stop button on the cage roof to prevent accidental starting of the hoist during work.**

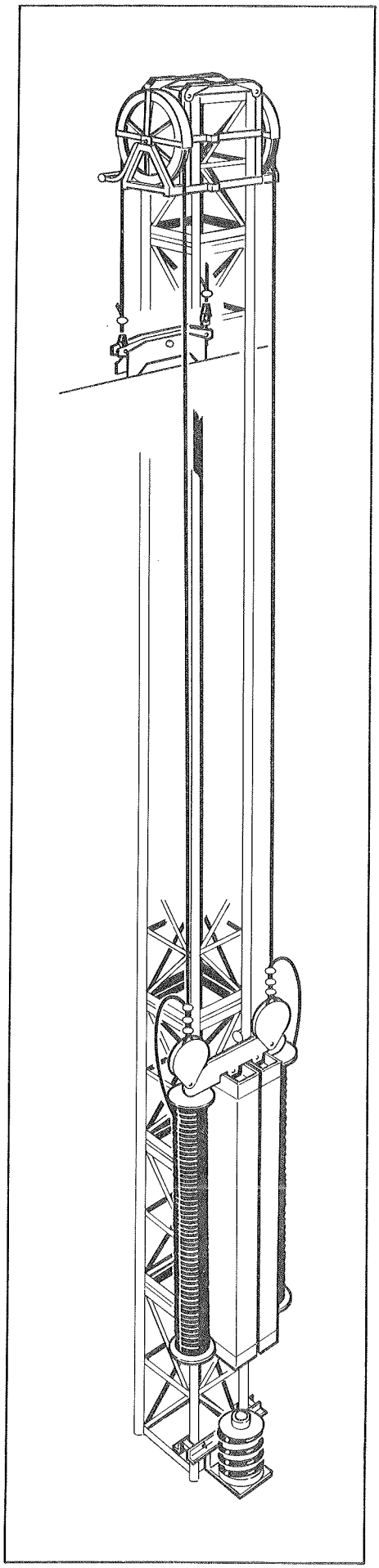
Extending of the mast



1. Bring the necessary number of mast sections, tie-ins and cable guides to the top landing.
2. Make necessary arrangements for operation of the hoist from the cage roof (see page 7, paragraph 8).
3. Drive to the top with three mast sections on the cage roof.
4. Remove the limit cams and drive carefully with the counterweight on its buffers at the ground landing. Balance the counterweight rope weight by using the Alimak unloading rope, Part No. 390212.
5. Remove the wire guards of the cathead and take the ropes off the equalizer.
   Hang the ropes on the mast or, if convenient, put them on top landing.
6. Loosen and remove the cathead with the erecting crane.
7. Install the necessary number of mast sections, tie-ins and cable guides.

   Pay attention to the counterweight ropes in the mast when driving the hoist up and down.
8. Install the cathead on top of the mast.
9. Drive down and get the counterweight ropes. Wind off the required length of rope to correspond to the extended mast height. Pull the excess rope onto the cage roof. Secure the counterweight ropes to the cage and remove the unloading ropes.
   Drive carefully to the top of the mast.
10. Put the counterweight ropes over their pulleys and attach them to the equalizer on the cage. Use the unloading ropes to balance the counterweight rope weight, if necessary.
    Install the rope guards on the cathead.
11. Adjust the counterweight ropes so that the rope equalizer switch is in the middle of the cam.
12. Make sure that the counterweight way is free.
13. Install the limit cams (see "Limit Cams").
14. Make sure that the distance between counterweight and cathead is 300 mm **(11.81 inches)** when the cage touches its buffers and that the distance is the same between cage and cathead when the counterweight touches its buffers.
15. Tighten all mast bolts to a tightening moment of 350 Nm **(258 lbf×ft).**

WARNING: Look out for the counterweight ropes in the mast when driving up or down.



Counterweight equipment type cathead with pulleys on the side of the mast

Installation of cathead
(Cathead with pulleys on the side of the mast)

1. Remove the pulleys and the safety clamp from the cathead frame and lift all parts onto the cage roof.
2. Drive to the mast top. Lower the cathead frame over the mast with the erecting crane.
   Make sure that the top beams are thoroughly tightened.
3. Fit the pulleys and the safety clamp with the erecting crane.

Installation of counterweight ropes on cathead with pulleys on the side of the mast
(counterweight with rope wound on a drum)

Follow these instructions for the original installation and the first rope change:

1. Pull the auxiliary ropes over their respective pulleys and lower down to the counterweight at ground landing. Attach the ends of the auxiliary ropes to the mast top.
2. Drive down to the ground landing and wind off the necessary rope length from the counterweight rope drums. Connect the auxiliary and counterweight ropes with a cable stocking.
3. Drive to the mast top and stop 500 mm **(19.68 inches)** under the cathead frame.
   Put the equalizer horizontal by putting a spacer under it and set the tension screw in its middle position (screw the tension screw halfway in).
4. Pull the counterweight ropes over the pulleys. Put tension on them and attach them to the equalizer.

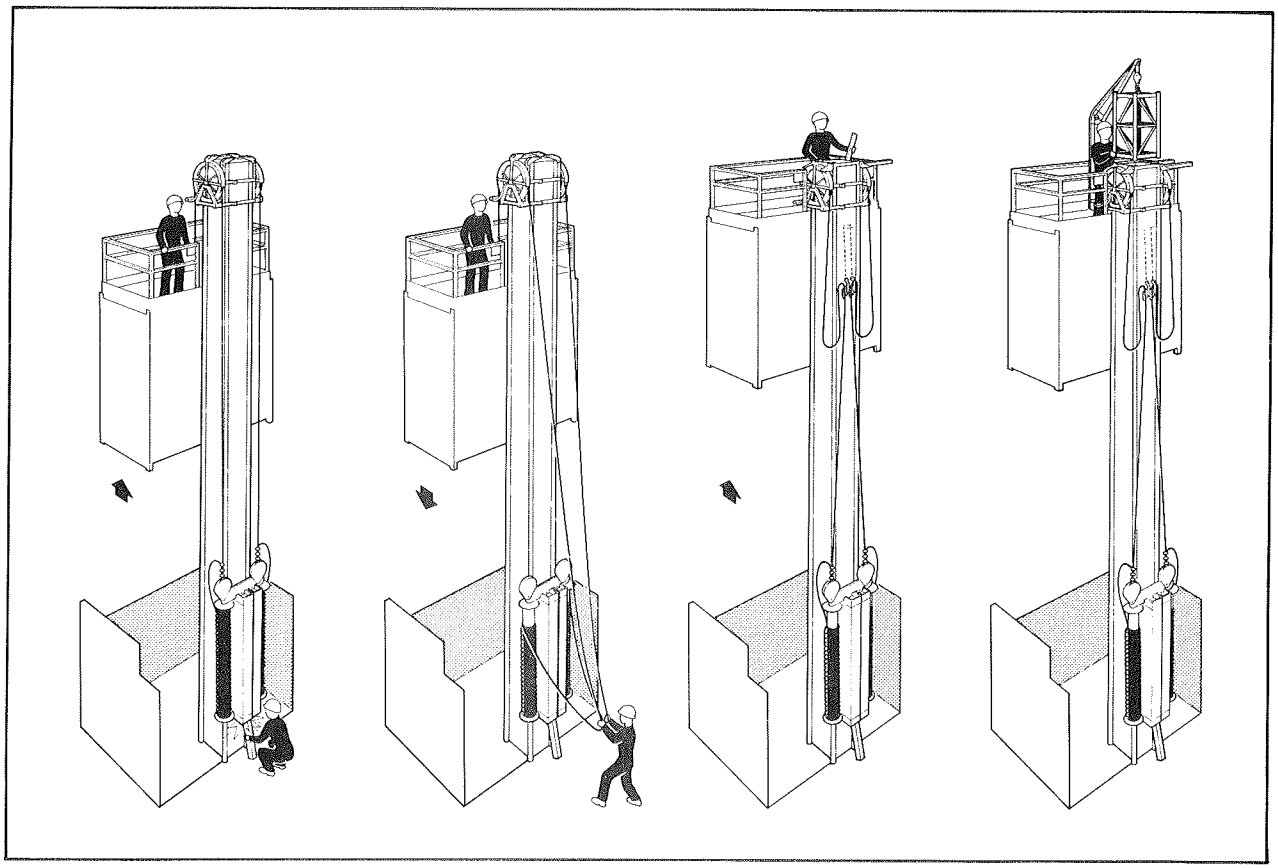
   The counterweight ropes must be brought up in the hoist if the lifting height is 50 m **(approx. 160 feet)** or more. By attaching the auxiliary ropes to the cage and driving down to the ground landing, the rope splices (auxiliary/counterweight ropes) will be brought to the mast top.
   Secure the auxiliary ropes at the ground landing and drive the hoist to the top. Attach the counterweight ropes with unloading ropes to the mast top and loosen the auxiliary ropes. Put tension on the ropes and secure them to the equalizer. Remove the unloading ropes by driving the cage down so that the counterweight ropes are placed under tension and the unloading ropes slacken, at which time they can be loosened.

5. Remove the spacer under the equalizer and apply tension to the ropes by driving down about half a meter **(1,6 feet).** Check that the equalizer switch is in the middle of the cam. If not, adjust the rope with the tension screw. Tighten all cable clamps.
6. Install the upper three-phase and limit cams. See "Limit Cams".
7. Make sure that the counterweight way is free.
8. Make sure that the distance between counterweight and cathead is 300 mm **(11.81 inches)** when the cage touches its buffers and that the distance is the same between cage and cathead when the counterweight touches its buffers.

W A R N I N G: Press the emergency stop button on the cage roof to prevent accidental operation during work.

Extending the mast

1. Bring the necessary number of mast sections, tie-ins and cable guides to the top landing.
2. Make necessary arrangements for operation of the hoist from the cage roof (see page 7, paragraph 8).
3. Drive to the top with the mast sections in the cage. Do not exceed the maximum allowable load during erection.
4. Remove the limit cams and drive carefully until the counterweight rests on its buffers at the ground landing. (If the buffers are provided with a switch, some kind of support must be installed so that the counterweight does not touch the buffers).
5. Use the assistance of a man on the ground to loosen the cable clamps on the counterweight and pull out the necessary length of rope.



6. Drive the cage carefully downwards exactly the number of sections by which the mast should be extended. Make sure that the counterweight ropes are properly tensioned and that the cable clamps are installed at ground landing.
   Do not forget to lock the counterweight rope drums.
7. Fit the unloading ropes opposite the upper tie-in. (Alimak unloading rope Part No. 390212).
8. Drive the cage carefully to the cathead. Loosen and lower the top beams so that extension of the mast can start.
9. Install the necessary number of mast sections, tie-ins and cable guides.
   Pay attention to the limited distance to drive due to the unloading ropes.
10. Fold back the top beams and secure with screws. If the rope extension has been made correctly, the equalizer will be in exactly the same position as before the extension. Make any adjustments with the tension screw.
11. Remove the unloading ropes.
    Make sure that the safety guard over the cathead is in order.
    Tighten all mast bolts and cable clamps.
12. Drive downwards a short distance and install the limit cams. See "Limit Cams".
13. Make sure that the counterweight way is free.
14. Make sure that the distance between counterweight and cathead is 300 mm **(11.81 inches)** when the cage touches its buffers and that the distance is the same between cage and the cathead when the counterweight touches its buffers.

MAST

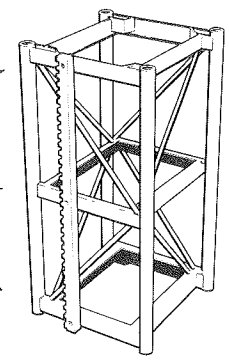
Store the mast sections on dry firm ground close to the erection site.

Mast sections to be placed on dry and solid ground next to place of installation.

Possible reinforced mast sections should *always be mounted first* - i.e. at the bottom.

In order to be identified, the mast sections have been marked in colours as follows:

Tube dimension 76/68	Tube dimension 76/63	Tube dimension 76/60
without marking	without marking	without marking
–"–	Blue	Yellow
–"–	without marking	without marking

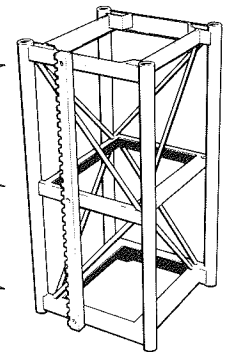


Dimension 76/68 relates to outer diameter Dy = 76 mm and inner diameter di = 68 mm.

Mast sections of tube dimension 76/60 are consequently the strongest ones and should therefore be mounted at the bottom - always.

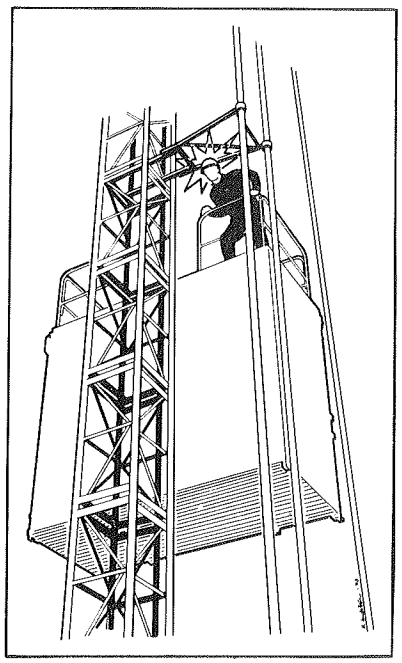
Between mast sections of different tube dimensions, special intermediate sections are used. These sections are marked as follows:

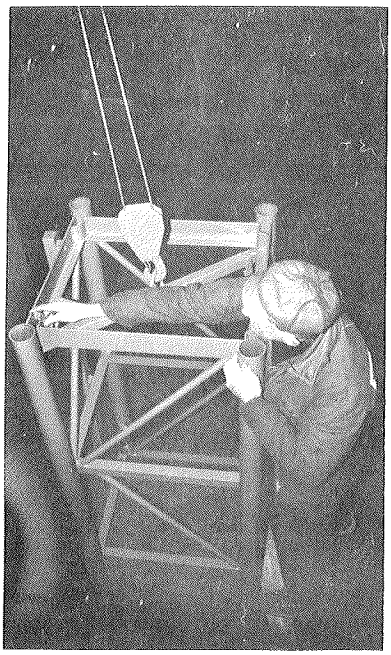
Tube dimension 76/60–76/63	Tube dimension 76/63–76/68
Blue	without marking
without marking	–"–
Yellow	Blue



NOTE that reinforced mast sections are mainly used for two-cage hoists with capacities of 2500 kg and more, and are therefore not very common.

W A R N I N G: Pay attention to the risk of crushing when passing tie-ins or pipe supports. During erection, the hoist must be operated from the cage roof only.





Erection of the mast

1. Install the erecting crane on the cage roof. Swing out a section of the safety railing and wind down the hook. Attach a mast section with the special tool for this purpose and lift the section on to the cage roof.
   Lift the remaining sections in the same way. Close the safety railing.

   On certain types of hoists, mast sections can be loaded in the cage and hoisted up through the trap door.
   Do not exceed the maximum allowable load during erection.

2. Drive the cage as close to the mast top as possible and press the emergency stop button on the cage roof to prevent accidental operation.

   Note: There must be no mast section hanging in the erecting crane when the hoist is travelling.

   Lift one mast section and grease the guiding cones. Swing the section over the mast top, lower and bolt. Loosen the lifting yoke, swing in the crane and drive down to a comfortable working position to tighten the bolts. Tightening moment: 350 Nm **(258 lbf×ft).**

   Check the rack bolts and adjust if necessary.
   See "Installation of Rack".

3. Continue as above until the final mast height has been reached — do not forget the tie-ins.

   If the hoist shall be used without a counterweight, fit the covers on the corner pipes of the top sections.

   Tighten all mast bolts.
   Tightening moment 350 Nm **(258 lbf×ft).**

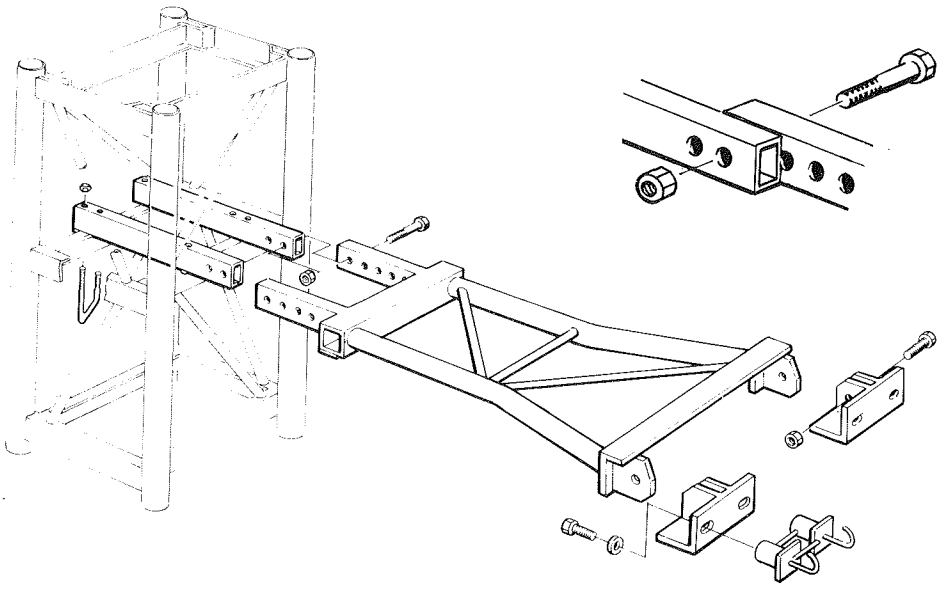
   If a suitable lifting device is available on the site, 3-4 sections can be assembled on the ground and lifted up to the mast top.

WARNING: When removing mast sections — be sure to connect the erecting crane to the cathead before taking out the mast bolts and make sure that the upper cage roller assembly is below the joints of the section to be removed.

Installation of mast tie-in type IV

1. Install the brackets in the hoist mast. Make sure that the brackets are placed symmetrically in the mast.
2. Install the remaining tie-in parts with a lifting device or erection platform on the building.
3. Straighten up the mast. See "Uprightness of the Mast". If the mast must be displaced laterally, the wall brackets must be moved.
4. Tighten all screws and make sure that the cage do not touch the tie-in.

IMPORTANT: The maximum allowable horizontal inclination of the mast tie-in is $\pm$ 8°, i.e. 144 mm/m or 1.85 inches/ft.



WARNING!

Remember that the "Emergency Stop" button must always be pressed during installation work in the mast.
Other arrangements for attaching the tie-in to the mast, are not allowed.

Installation of vertical pipes

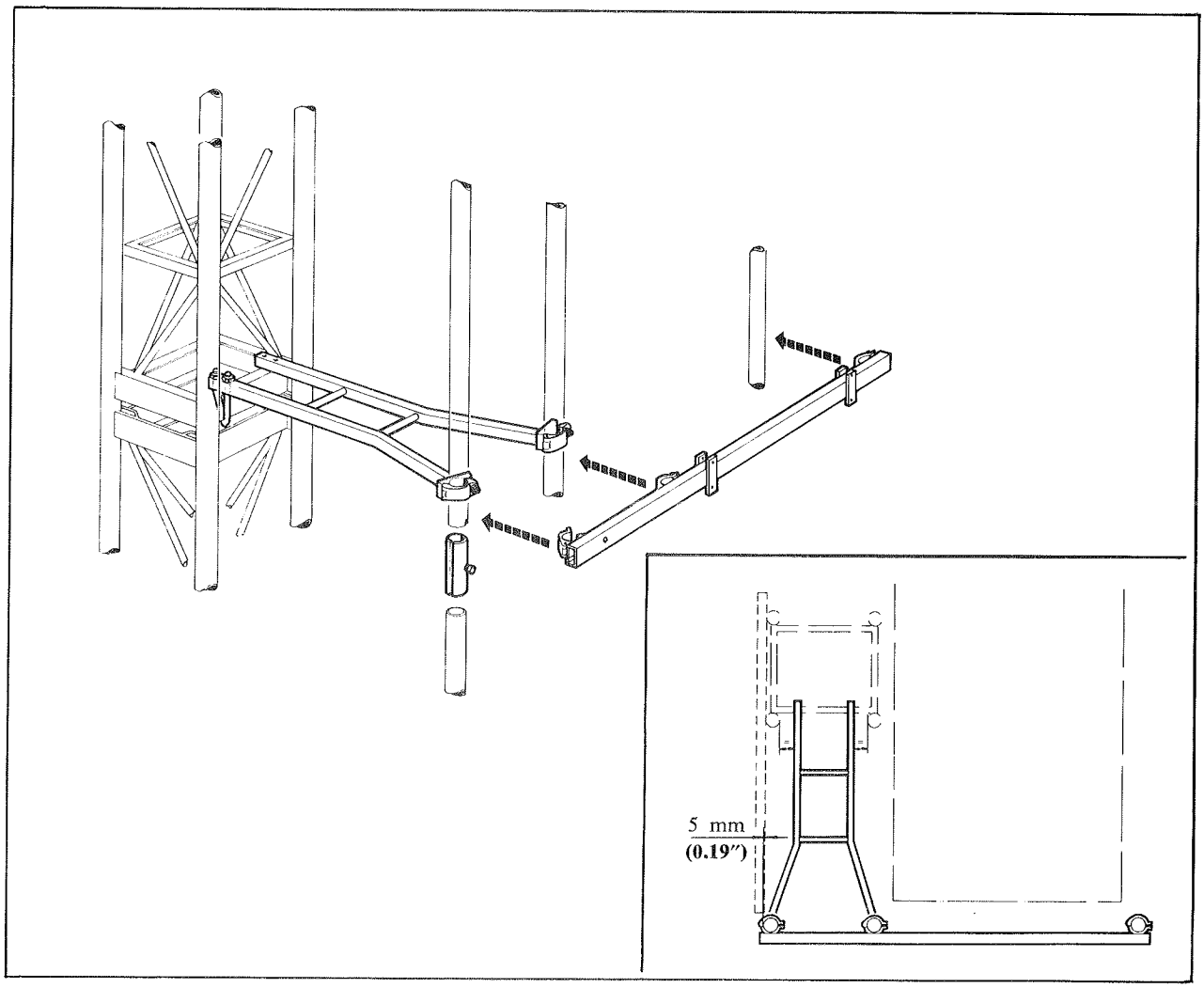
If the hoist is supplied with vertical pipes supporting the landings, these must be installed in phase with the extension of the mast.

Note that the vertical pipes **must** be tied every 3 m **(approx. 10 feet)** with pipe supports and landing beams. Install the landing beam near the pipe support. If the landing beam is to be equipped with a landing bridge, the beam may be placed anywhere between the pipe supports, but at maximum intervals of 3 m **(approx. 10 feet).**

1. Install the vertical pipes.
   Make sure that the pipe end which is tapped to receive the pipe clamp screw, is turned downwards.
2. Install the pipe support bracket symmetrically on the mast. Tighten up the support and attach it to the vertical pipes. See figure below.

   The support must be straight to ensure proper function of the mechanical cage interlocking device.
3. Use a water level to ensure that the beam is horizontal and secure it.

IMPORTANT: If the final lifting height of the hoist is considerable, and reinforced sections are supplied together with the standard sections, the sections with thicker corner pipes must be installed at the bottom of the mast.



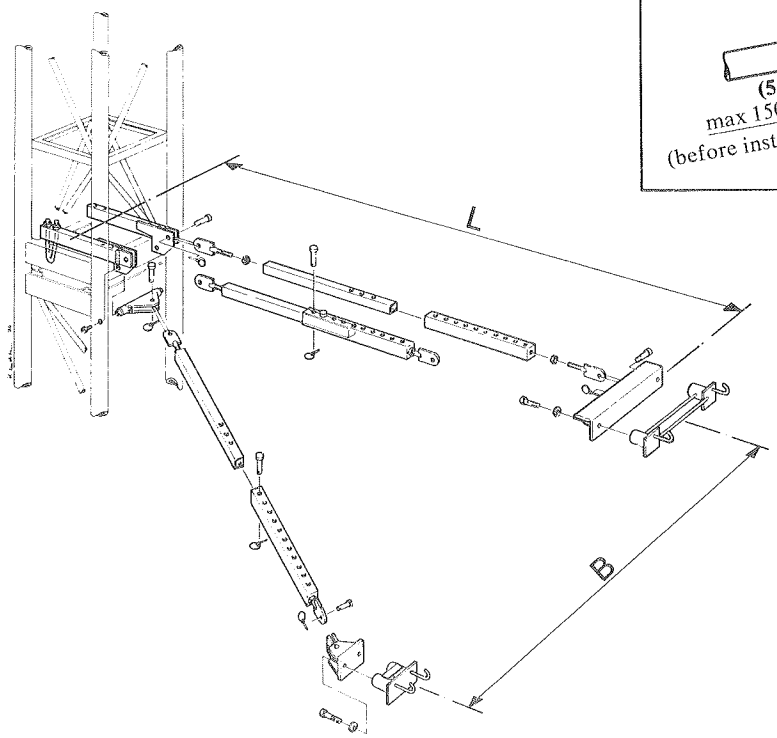
MAST TIE-INS

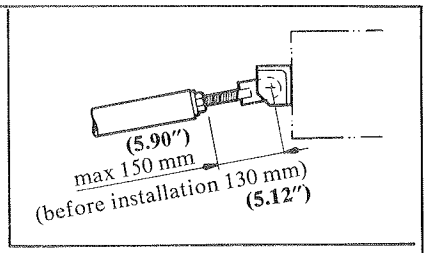
The type of tie-in must be chosen to suit the installation in question.
Distances between the tie-ins as well as the measurements L and B (see illustration below) are shown in the instruction "Tying of the mast".
All foundation parts should be installed before starting to erect the hoist. Grease screws and pins before installing them. (See instruction on lubrication for type of grease).

Installation of tie-in type I

1. Fit the brackets to the mast. Make sure that they are placed symmetrically in the mast.
2. Bolt the wall brackets.
3. Adjust the length of the tie-in pipes and install them. The pipe adjusting screws must be screwed out to a length of about 130 mm **(5.12 inches)** before installation (see illustration below).
   Maximum length 150 mm **(5.90 inches).**
4. Straighten up the mast. See "Uprightness of the mast". By shortening or lengthening the tie-in pipes, the mast can be turned or moved sideways, changing its vertical inclination.
5. Tighten all screws and make sure that the cage and counterweight do not touch the tie-in.

IMPORTANT: The maximum allowable horizontal inclination of the mast tie-in is ± 8°, i.e. 144 mm/m or 1.85 inches/ ft. The tie-in may only be attached to the upper or lower end frame of the mast section.





If ± 8° is not sufficient to cover a certain area on the horizontal plane, special "mast tying sections" may be used. These sections have a reinforced centre frame to which the tie-in may also be attached.

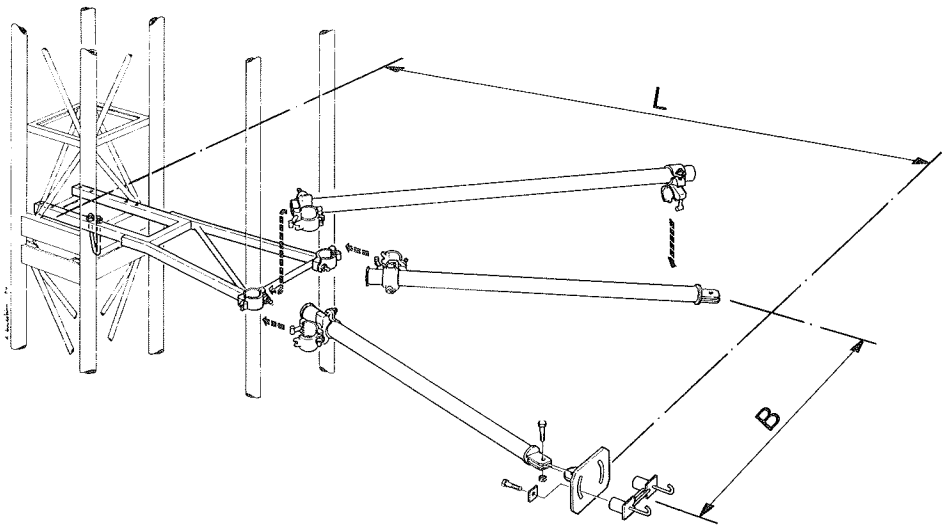
Installation of tie-in type II

1. Install the tie-in part between mast and vertical pipes. Do not mistake it for the thinner pipe support of the vertical pipes.
   Make sure that the tie-in part is placed symmetrically in the mast.
2. Fasten the wall brackets.
3. Install the tie-in pipes.
4. Straighten up the mast. See "Uprightness of the Mast".
   By shortening or lengthening the tie-in pipes the mast may be turned or moved sideways, changing its vertical inclination.

   This type of tie-in should be adjusted with a suitable tightening device such as a turnbuckle and rope.
5. Tighten all screws and make sure that the cage and counterweight do not touch the tie-in.

IMPORTANT: The maximum allowable horizontal inclination of the mast tie-in is ± 8°, i.e. 144 mm/m or 1.85 inches/ft. The tie-in may only be attached to the upper or lower end frame of the mast section.

The pipe clamps must be fitted as close to each other as possible on the vertical pipes.



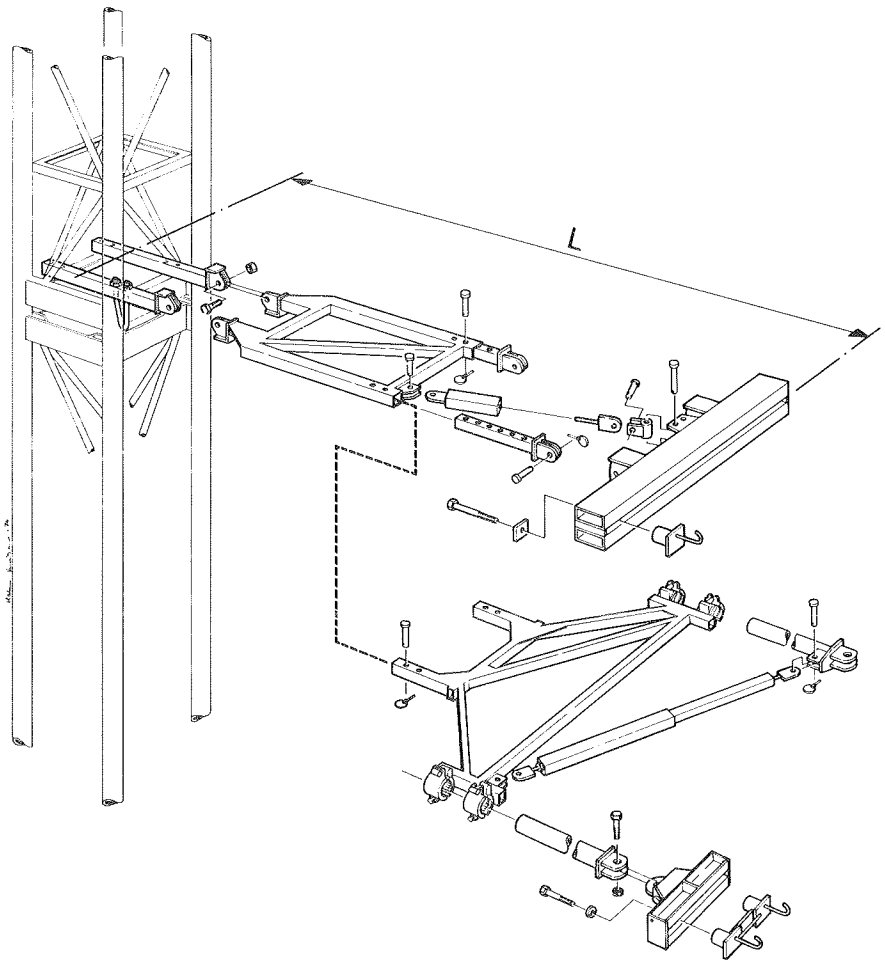
If ± 8° is not sufficient to cover a certain area on the horizontal plane, special "mast tying sections" may be used. These sections have a reinforced centre frame to which the tie-in may also be attached.

Installation of mast tie-in type III

1. Install the brackets on the hoist mast. Attach the intermediate section to these brackets. Make sure that the brackets are placed symmetrically in the mast.
2. Install the remaining tie-in parts with a lifting device or erection platform on the building.

   If there is a lifting device available, all tie-in parts may be assembled before they are lifted up to the foundation brackets on the building face.
3. Straighten up the mast. See "Uprightness of the Mast". The mast may be turned by shortening or lengthening the tie-in legs. If the mast must be displaced laterally, the wall brackets must be moved.
4. Tighten all screws and make sure that the cage and counterweight do not touch the tie-in.

IMPORTANT: The maximum allowable horizontal inclination of the mast tie-in is ± 8°, i.e. 144 mm/m or 1.85 inches/ft. The tie-in may only be attached to the upper or lower end frame of the mast section.



If ± 8° is not sufficient to cover a certain area on the horizontal plane, special "mast tying sections" may be used. These sections have a reinforced centre frame to which the tie-in may also be attached.

Uprightness of the Mast

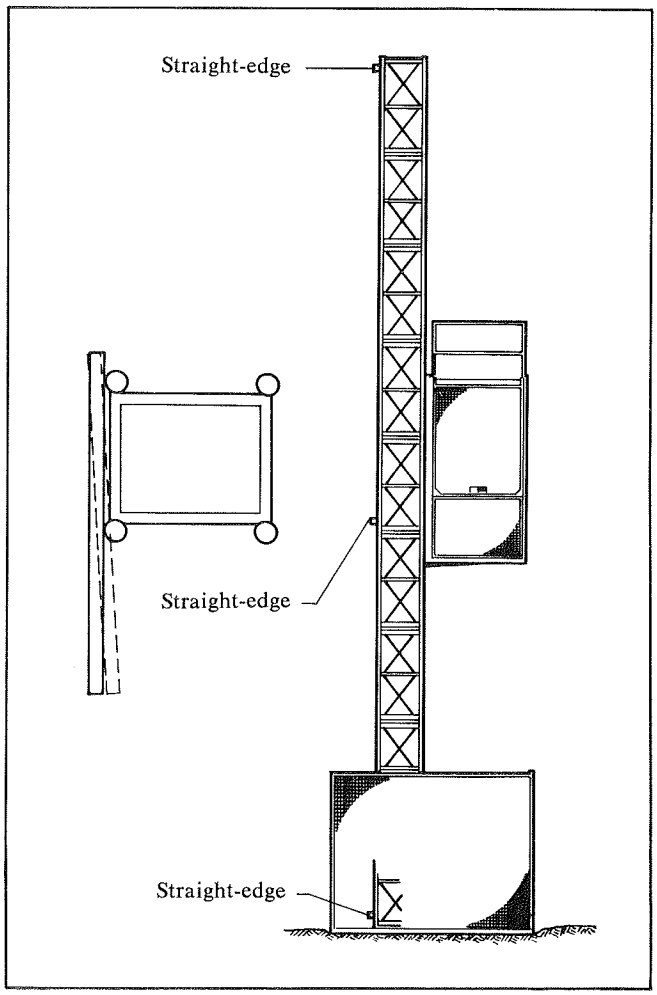
1. Check the uprightness of the mast with a water level or theodolite when installing the first tie-in.

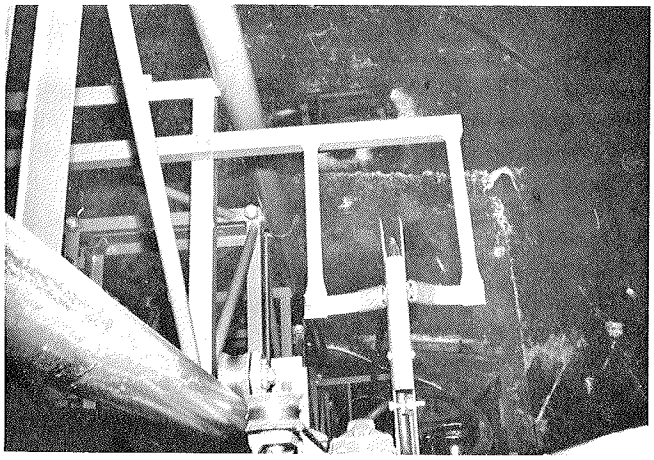
   At the installation of the other tie-ins, check the erectness with a straight-edge rule fitted to the mast at suitable distances but only opposite tie-ins.

   Use a theodolite if desired but never use a level above the first tie-in.

   Move the straight-edge when required. Its length should be 1.5 m **(approx. 5 feet).**

   The use of a straight-edge will also indicate if the mast is twisted.





CABLE GUIDING DEVICE

Install the cable guides as the mast extension progresses.

Do not place the cable guides near a landing so that the plate springs are kept open by the cable holders when the cage has stopped at the landing.

Adjust the position of the cable guides so that the cable holder of the cage passes **just between** the plate springs.

Installation of cable guiding device with guides

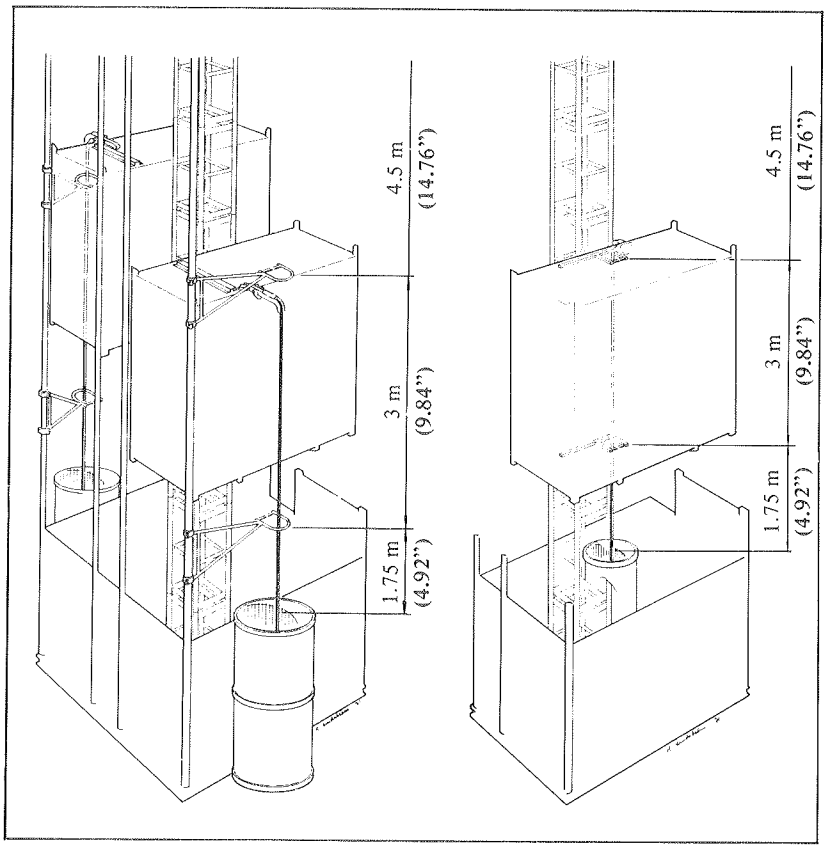
Fit the first cable guide 1.75 m **(4.92 feet)** above the cable basket, the second after another 3 m **(9.84 feet)**, the third after another 4.5 m **(14.76 feet)** and the remaining guides at 6 m **(19.68 feet)** intervals.

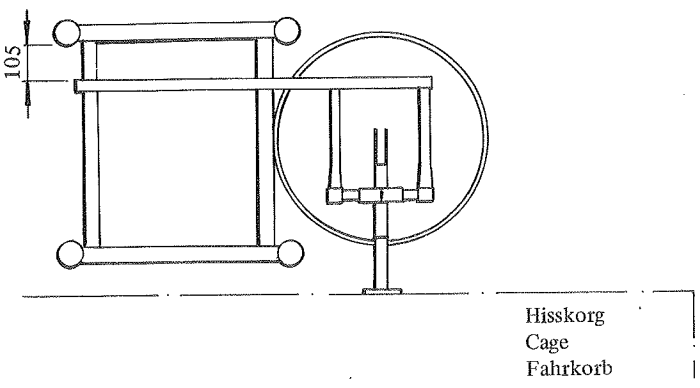
When erecting at windy places – the distance 6 m must be reduced.

Make sure that the cage and counterweight do not touch the cable guide.

Grease plate springs and power cable according to recommendations in the lubrication diagram.

Note that the rubber of the cable is not oil resistant.





Installation of cable guiding device with trolley

1. Wind off all the electric cable from the cable drum or cable ring at ground landing.

2. Connect the motor contactor to one cable end and connect the other end to the electric junction box on the safety enclosure. Be sure to cut off the main power of the feeding electric central first.

   Connect the motor contact to the socket in the cage. Cut a 3 m **(10 feet)** length of cable and fit it into the cable holder. Leave the cable hanging in a loop on the safety railing.

3. Hang up the first guide rail section with the two brackets.

   Make sure that the section does not rest on the foundation or bottom frame. See illustration.

   Let the trolley slide down with the cable wheel turned towards the cage.

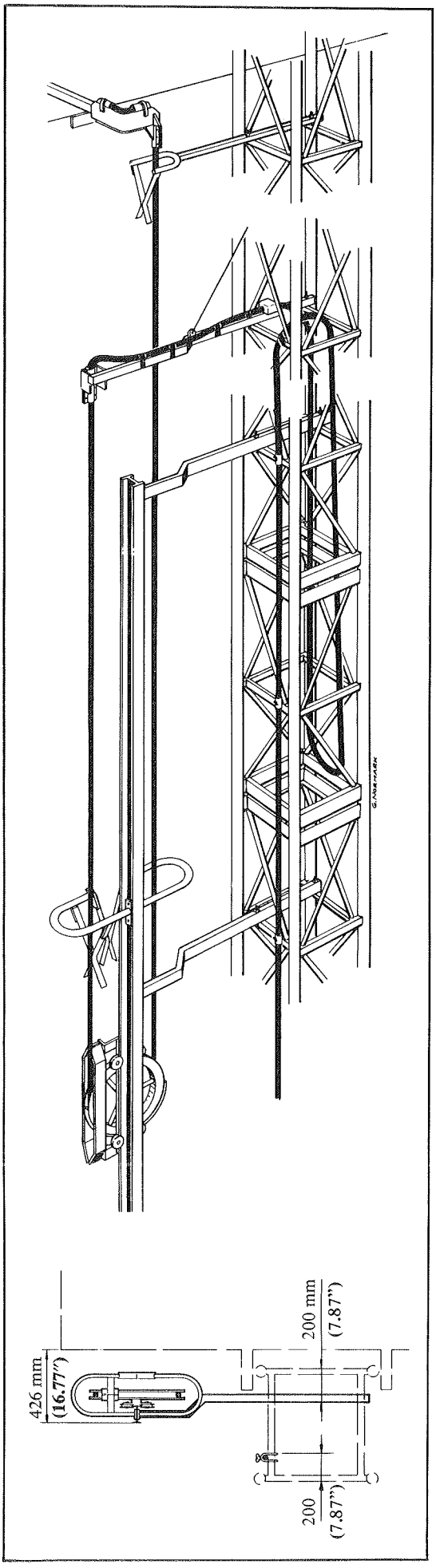
4. Install the mast, mast tie-ins and guide rail sections in the ordinary way. See "Mast" and "Mast Tie-ins".

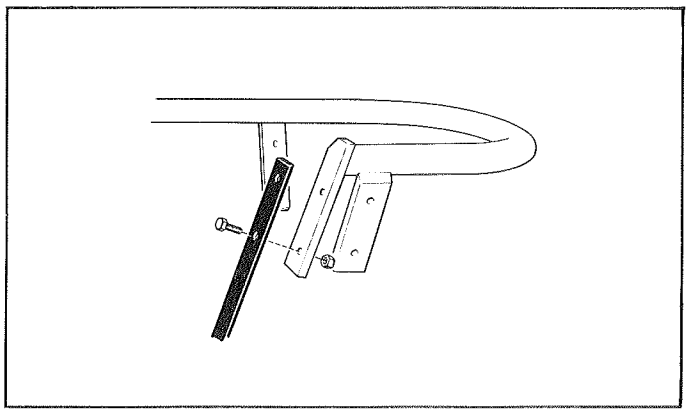
   Hang the guide rail sections up and connect them to the section below. Check the tolerance between the guide rail ends, which should be minimum 1 mm **(0.039 inches)** and maximum 4 mm **(0.157 inches)** before bolting them together.

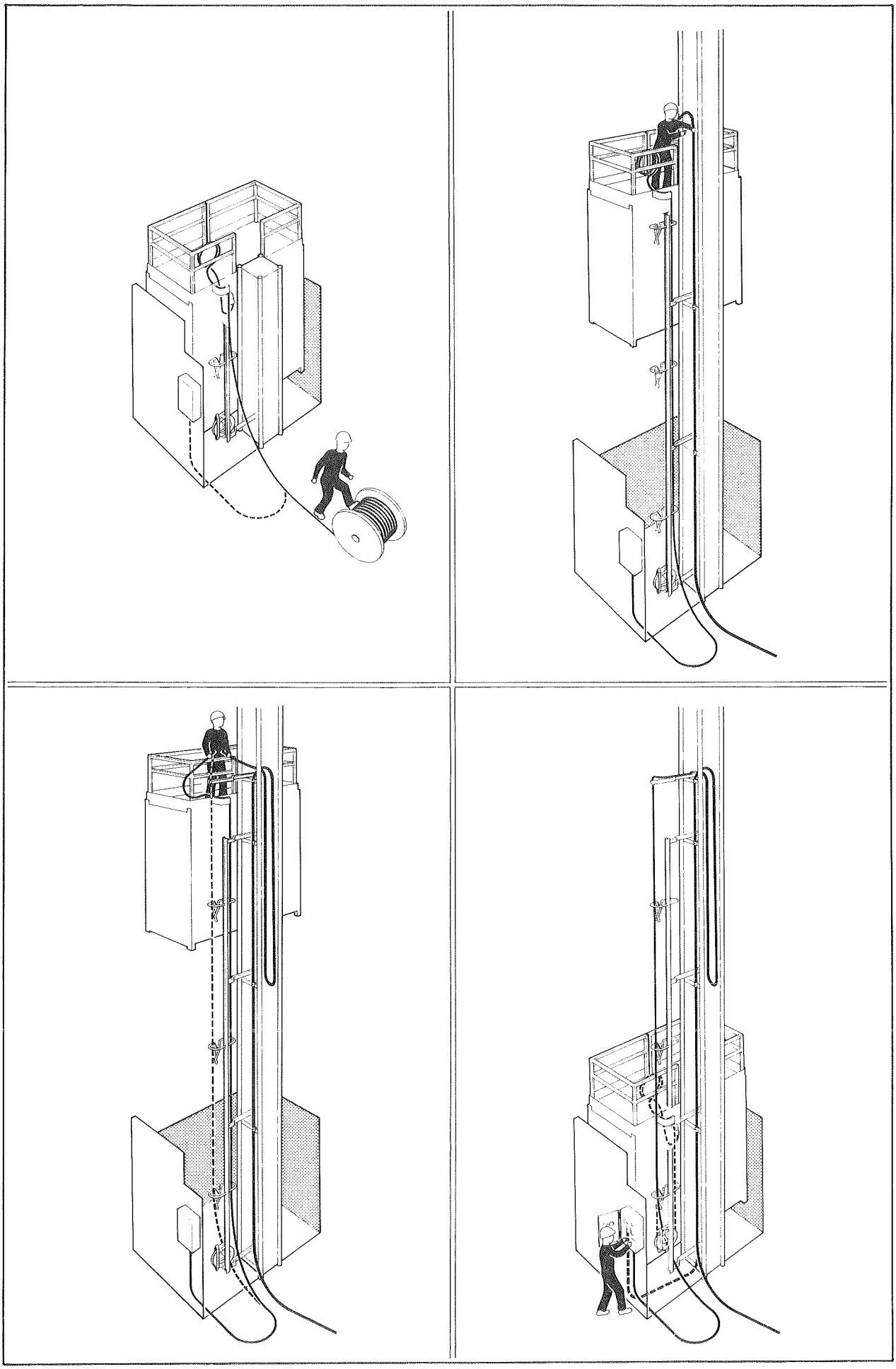
   If adjustments are necessary, put spacers between the brackets and the mast frame.

5. Fasten the plate springs to each cable guide in advance and install one cable guide per mast section.

   Fit the springs as shown on the illustration and adjust the springs concentrically so that a constant pressure of 1-2 kp **(2.20-4.40 pounds)** is obtained between them. Install the guide so that the cage cable holder passes **just between** the two plate springs.







6. Erect the guide rail sections to half the lifting height plus 4.5 m **(14.76 feet).** See also "Extension of Cable Guiding Device with Trolley".

7. Lift the power cable on to the cage roof. Wind off the length required to connect it to the electric junction box at the ground landing.

   Drive upwards by stages, wind off the required cable, position it behind the guide rail and clamp it to the mast. For correct positioning, see illustration below.

   When the power cable has been pulled and clamped to about 1.5 m **(4.92 feet)** above the guide rail end, attach the cable end and leave the excess cable hanging in loops on the mast.

   If the loops are no longer than about 20 m **(65 feet),** the cable may again be pulled easily onto the cage roof when extending the cable guiding device.

   Note that the loops must not hang freely but must be attached to the mast at the bottom end and in such a way that they may easily be loosened.

8. Install the cable support arm with wire 1.5 m **(4.92 feet)** above the guide rail end and connect the power cable end to the electric junction box.

9. Cut off the main power at ground landing.

   Disconnect the power cable from the drive unit. Take the motor plug and the connections apart.
   (Make a note in order to remember the colour of the conductors to their respective tap in the motor plug to facilitate the refitting of the plug to their other end of the cable).

10. Connect the end of the power cable to the feeding cable over the junction box in the mast.

    Unload and loosen the power cable from the cable holder on the cage.
    Let it go carefully and leave it hanging from the cable support arm.

11. Let the cage slide down by gravity between the cable guides of the guide rail and move the cable from the inner, shut-in space to the guide.

12. Disconnect the power cable from the cage and attach the feeding cable.

13. Pull the power cable end around the trolley cable wheel and fit the motor plug.

    Connect the motor plug to the socket on the cage.

    Apply tension to and attach the cable to the cable holder so that the trolley will be about 0.5 m **(1.64 feet)** above the ground landing.

    Wind up the excess cable and attach it to the safety railing on the cage roof.

14. Drive up and check all guide rail joints. Adjust the joints. Grind them smooth if necessary.

15. Install single cable guides every 9 m **(29.52 feet)** above the guide rail.

    Grease guide rail, trolley, cable supports and all plate springs according to recommendations in the lubrication diagram.
    Note that the rubber of the cable is not oil resistant.

Extension of cable guiding device with trolley

If the hoist erection takes place in stages to lifting heights which are less than half of the final mast height, the guide rail should be installed at a distance of 4.5 m **(14.76 feet)** below the mast top. Thus, if the mast is erected to 30 m **(98.42 feet)** in the first stage, and the guide rail to 30 less 4.5 m = 25.5 m **(83.66 feet)**, the cable guiding device may be used for twice the height less 4.5 m, 25.5 + 25.5 — 4.5 = 46.5 m **(152.56 feet)** without having to extend the feeding cable and the power cable.

At 46.5 m height, the feeding cable and power cable must be extended and so must the guide rail up to 4.5 m from the mast top.

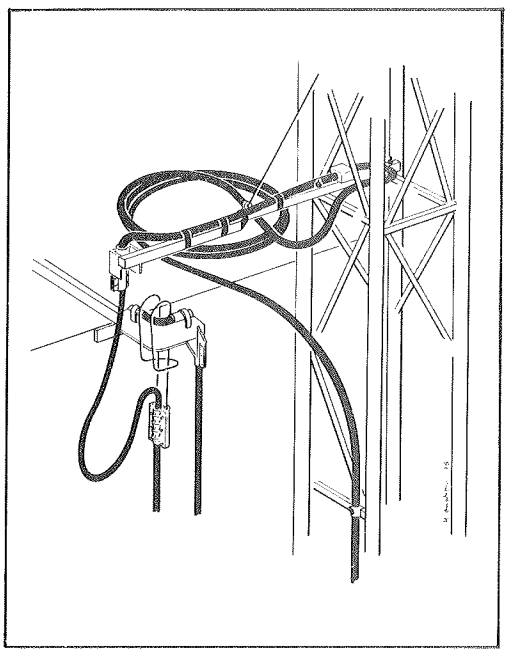
After reaching half the final lifting height plus 4.5 m **(14.76 feet)**, the guide rail need not be extended any further.

1. Remove the necessary number of cable holders above the guide rail end.

   Stop at the guide rail end and loosen the attachment of the cable to the cable holder on the cage a little.

   Pull out the cable through the cable holder — **exactly** the length required to correspond to the forthcoming extension of the mast.

   Attach the cable again.



2. Drive down and disconnect the brackets for the **feeding cable** in the mast. Drive up to the cable support arm and pull all feeding cable onto the cage roof.
3. Install the Alimak cable discharging tool, Part No 460924 on the power cable. Put the tool under the cable holder on the cage. Drive the cage upwards a little, so that the total weight of the power cable will be transferred to the cable holder. Remove the cable support arm from the mast and put it on the cage roof.
4. Drive the cage upwards in steps, clamp the feeding cable to the mast up to about 3 m **(10 feet)** from the mast top. Then install the cable support arm and the discharging wire and leave the excessive feeding cable hanging in loops in the mast.
5. Remove the cable discharging tool.
6. Install guide rail sections and cable guides up to 1.5 m **(approx. 5 feet)** below the cable support arm at the mast top. Install cable guides every 9 m **(approx. 30 feet)** above the guide rail.

LANDINGS

The landings may be installed in openings, on projections or on scaffolds at the building face.

Build the bridge from the building face to the cage with the beams between the vertical pipes as supports.

Wherever there may be a danger of falling down from a landing, its sides must be provided with safety railings and foot lists.

Installation of landing bar

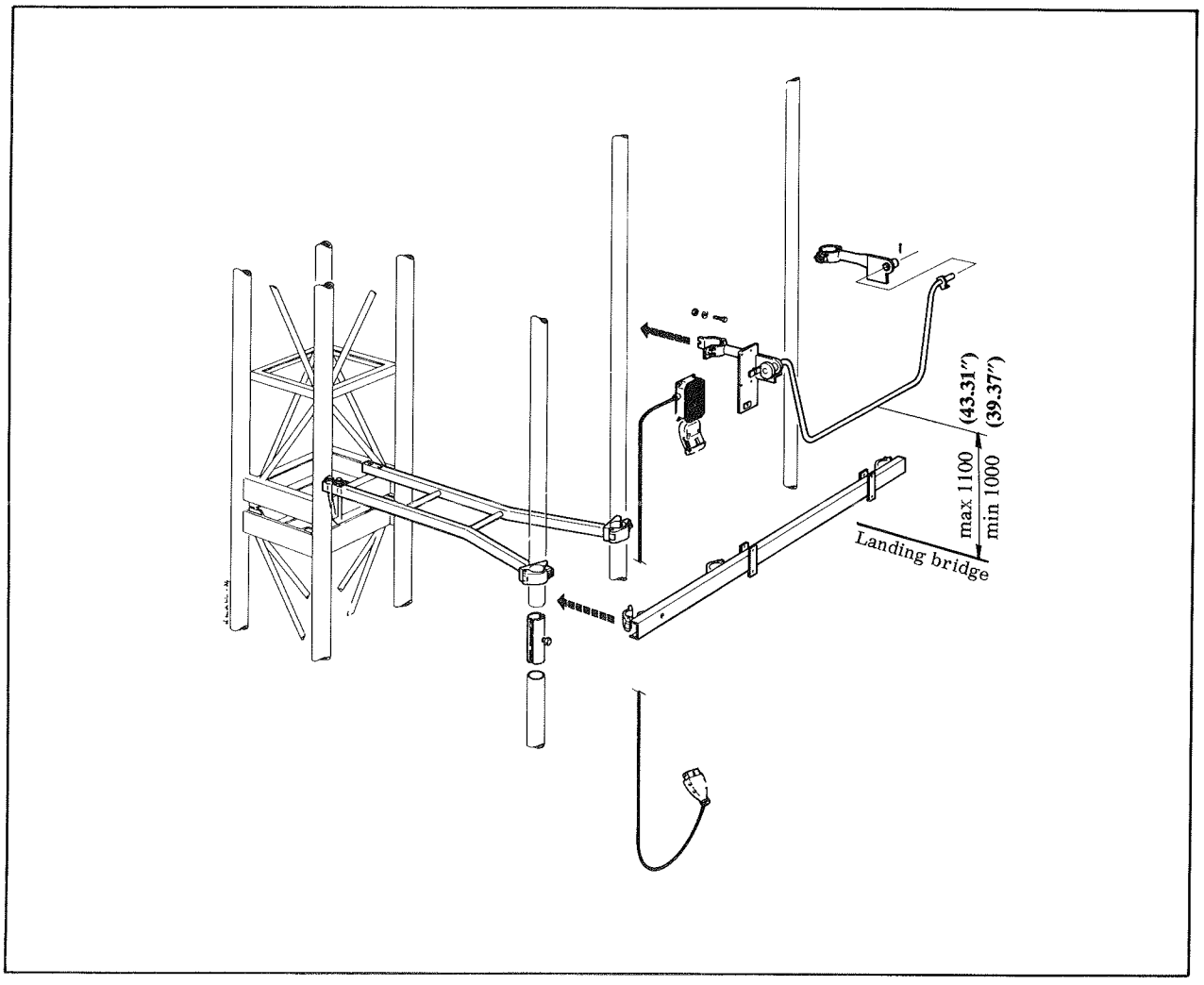
Install the brackets 1.5 m **(4.92 feet)** above the level of the landing.

Lubricate the bearings of the bar and make sure they work satisfactorily.

Connect the control cable of the first push button box to the corresponding socket on the electric junction box at ground landing. Connect the remaining push button boxes to each other.

The plug without a cable in the electric junction box is by-passed (short-circuited) and must be moved to the top landing bar before the hoist can be operated.

Clamp the control cable along the vertical pipes in such a position that it cannot be jammed or damaged.



Installation of Landing Door
(the safety railing of the cage must be level with the upper edge of the doors).

Lower the door halves and fit in the pins on the landing beams.

Attach the bracket with one clamp on each side, but do not tighten the clamps.
Slide down one side of the bracket and position the door half by the pin on the bracket.
Repeat this procedure with the other door half.
Fit the remaining clamps.

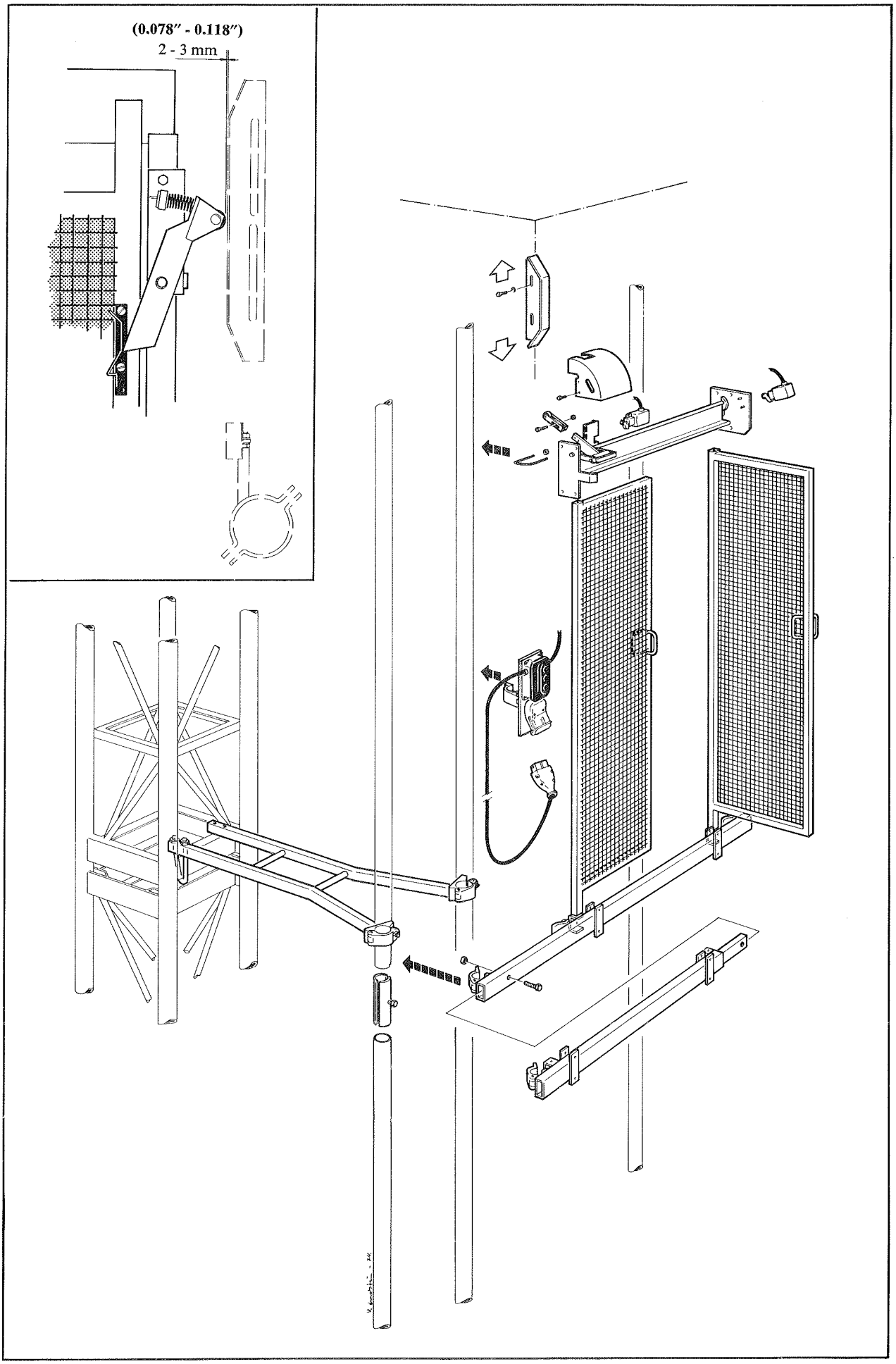
Lubricate all moving parts of the door and make sure they work properly.
Note that the cam on the cage must be just behind the interlock roller when testing the door.

Install the cam that opens the mechanical cage interlocking. When the cage floor is level with the landing, the cam must be just behind the clutch.
If the cam is correctly adjusted, it should not touch the roller when the cage door is completely closed. The play should be 2-3 mm **(0.078-0.118 inches)** according to the illustration.

Connect the control cable of the push button box to the corresponding socket on the electric junction box at the ground landing. Connect the remaining push button boxes to each other.
The plug without a cable on the electric junction box is by-passed and must be moved to the top landing before the hoist can be operated.
Clamp the control cable along the vertical pipes in such a way that it cannot be jammed or damaged.

Note: Check the electrical functioning of the door when all landings have been installed, and the by-passed plug has been moved to the top landing.

Put the erection switch in position "Operation" and attempt a trial run with the cage, leaving the right landing door open, then leaving the left door open. The hoist must not start.


(0.078" - 0.118")
2 - 3 mm

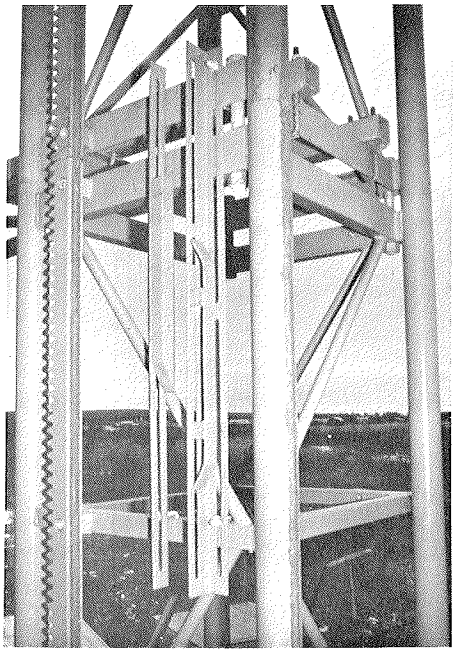
LIMIT CAMS

Ground landing

Install the bottom limit cam and adjust it so that the cage **without any load** will stop about 3-4 cm **(1.18-1.57 inches)** above the enclosure sill. Fasten the bottom three phase cam with screws so that the distance between the upper part of the cam and the switch arm is about 80-100 mm **(3.15-3.94 inches)** when the cage floor is level with the enclosure sill.

Check and adjust the mechanical interlocking of the enclosure.

See "Base Unit".



Top landing

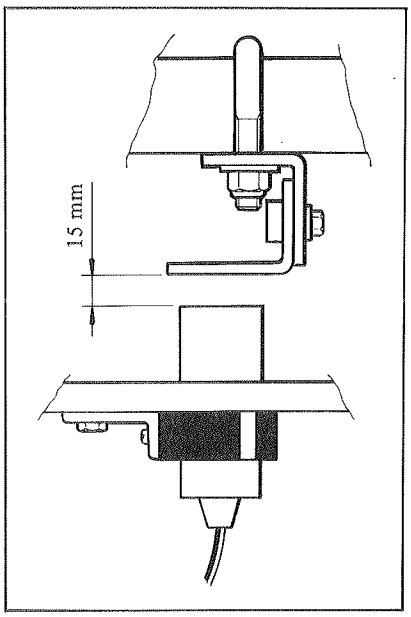
Install the top limit cam and adjust it so that the cage will stop exactly in level with the landing. Adjust the three phase cam so that it will be actuated 80-100 mm **(3.15-3.94 inches)** higher up.

Intermediate landings

If the hoist is equipped with a switch for automatic stops at the landings, cams must be installed at each landing.

Adjust the cams so that the hoist will stop in the same position irrespective of the direction of travel.

The distance between proximity switch and plate angles in mast, should be 15 mm **(0.59″).**



See the attached dimensioned drawings for each individual type of hoist.

FINAL OPERATIONS

1. Tighten all screws, mast, tie-ins, etc.
2. Lubricate the hoist according to all points in the lubrication diagram with the exception of the oil change in the worm gear(s), which shall be made after one week or 50 running hours.

   Do not forget to grease the rack properly and in the way described in the lubrication diagram.
3. Turn the switch of the electric box to position "Operation".
4. Make a trial run with the cage — test and adjust limit cams and all mechanical and electrical interlockings.
5. Make a drop test of the safety device.
6. Reset the safety device.
   Instruction sign and tools are available in the cage.

THE HOIST IS NOW READY FOR INSPECTION

IMPORTANT:

Change the oil in the gears after the first week's operation.

Appendix: Dimensional drawings for the installation of limit cams.

Check lists for service and maintenance.

Dismantling

Methods and sequences at dismantling are in all assential parts reversed, these at erection. As mounting earlier is described only main things are described here.

If you want more detailed information you can find it in chapter "**Erection**".

1. First, study "**Safety instructions**".
2. Fence the area nearest the hoist and put up signs, which reads as follows: **WARNING FALLING OBJECTS.**
3. Put the switch "**Erection/Operation**" in the electric box in position "**Erection**" and mount the erection crane and railing on cage roof.

   If counterweight equipment is mounted:

   Bring along a cable sleeve,wire unloading tool No. 390212 and a rope or a "thin" steel wire on the cage roof.

   The rope or the wire should be of a length equal to the mast height and of a dimension making the wire strong enough for the dead weight of the counterweight wire.

   A Ø 17 mm wire weights approx. 1.1 kg/m (each mast section is 1.5 m long).
4. Drive to the mast top and dismantle both limit cams.

   If counterweight equipment is mounted:

   Unload the counterweight on the buffer at the bottom landing by driving the hoist cage closer to the mast top so that the counterweight wire "pull" ceases.

   No hands on the counterweight wires – squeezing/crushing risk.

   - Mount the wire unloading tools on the counterweight wires and attach the wires to the mast.
   - Remove the counterweight wire attachment in the wire equalizer on the cage roof and fasten the rope and one of the counterweight wire ends together by means of the cable sleeve.
   - Stretch the wire to unload the wire unloading tool.
     If the wire is long and heavy, attach the wire to the hoist cage and drive the hoist cage downwards until the load ceases.
   - Dismount the wire unloading tool and lower the counterweight wire to the ground. Put the rope in two layers around the cylindrical wire attachment on the wire equalizer to make the wire easier to handle.
   - Lower the other counterweight wire in the same way.
   - Dismount the cathead at the mast top and place it on the cage roof by means of the erection crane. Drive down to the bottom landing and unload.
   - Dismount the wire equalizer and unload it.
5. Dismantle mast sections, landing equipment, vertical tubes and tie-ins. Don't load the cage too much.
6. Dismantle the bottom enclosure part behind the mast.
   - Dismount counterweight wire rope from the counterweight and wind them on drums or reels, to avoid twistings
   - Lift off the counterweight from mast and dismount the buffer spring and its bracket.
7. Check that you have at least 3 mast sections before you take away buffer springs and their bracket which is attached to the bottom frame.
8. Dismount mast sections until 2 are remaining. Then dismount erection crane and safety railing from cage roof.

9. Put 2 planks as transport distances on bottom frame. Suitable dimensions is 1 1/4" by 4", length 2 m.
10. Lift brake levers on the motors and slide down slowly to the transport distances. Also put a piece tarpaulin or similar over the brakes to cover from moisture and rain.
11. Mount the enclosure part which was dismantled.
12. Switch off power supply and dismount supply cable to the hoist.
13. Mount the lifting loop in its brackets on the cage roof and base unit is ready for transport.
14. Don't forget to order embedment parts for the next installation.

LINDEN-ALIMAK

Check List

Items No. 1 - 24 refer to the Service and Maintenance Instructions in the manual.

Name of company	Alimak hoist type		Serial No.
Site	Inspector	Month	Year

Inspection	Item	Date / / / / / / / /	Remark	Taken care of ..... date
Once a week	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
Once a month	18			
	19			
	20			
Every 3 months	21			
	22			
Once a year	23			
	24			
	25			

Place	Date /	Year 19	Signature

LINDEN-ALIMAK

Check List

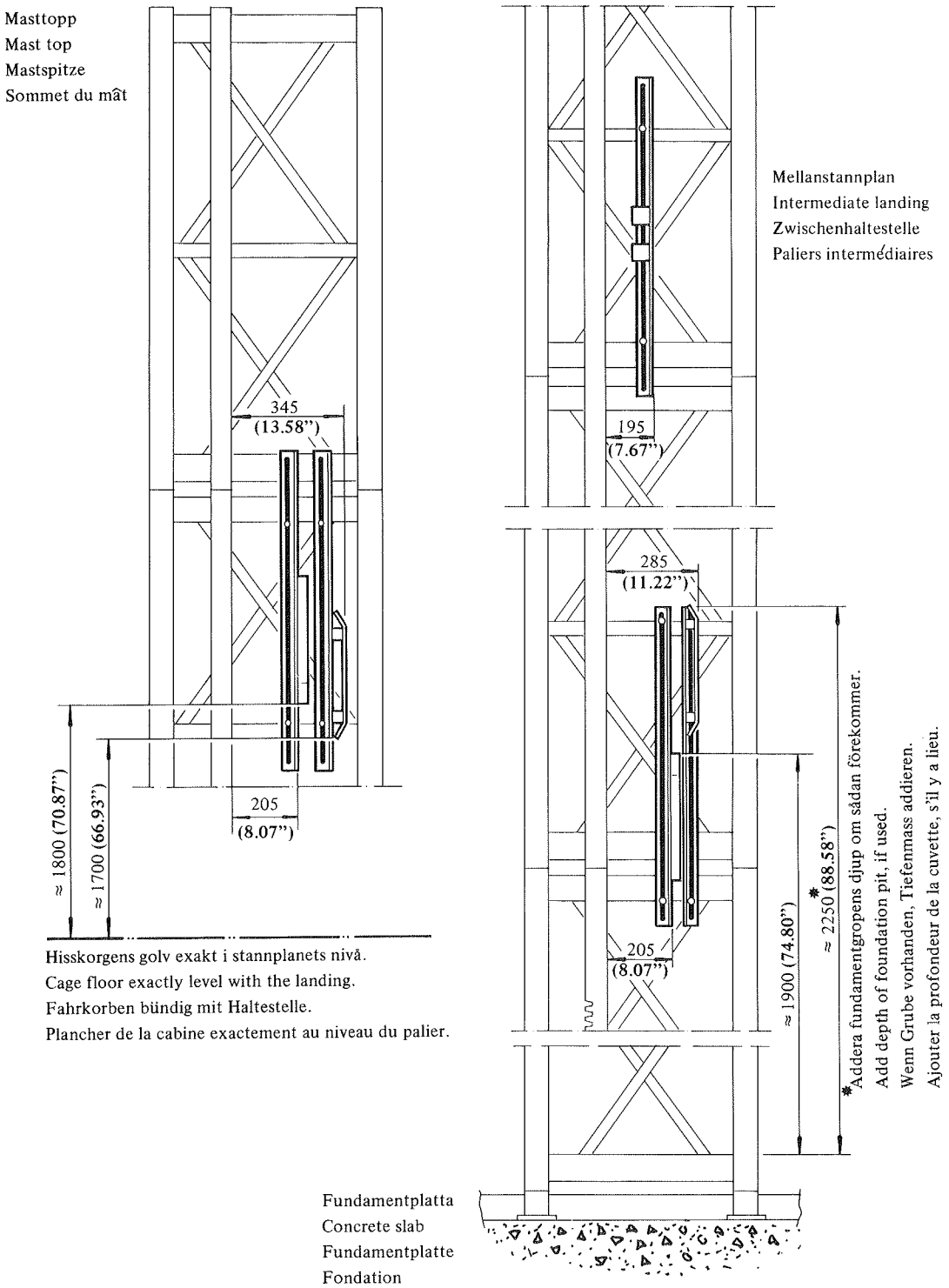
Items No. 1 - 24 refer to the Service and Maintenance Instructions in the manual.

Name of company	Alimak hoist type	Serial No.
Site	Inspector	Month / Year

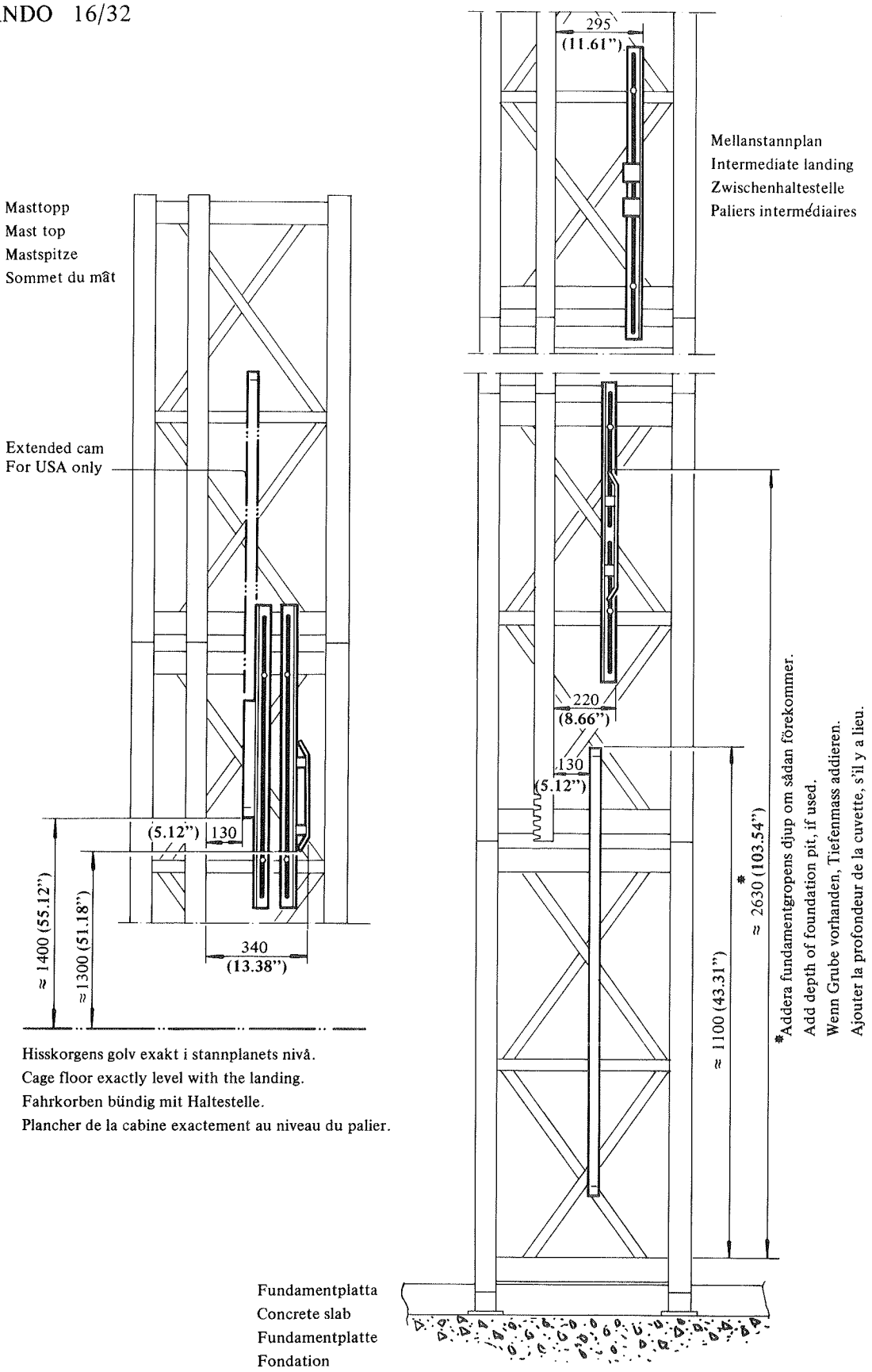
Inspection	Item	Date / / / / / / / /	Remark	Taken care of ..... date
Once a week	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
Once a month	18			
	19			
	20			
Every 3 months	21			
	22			
Once a year	23			
	24			
	25			

Place	Date /	Year 19	Signature

SCANDO 7/20
SCANDO 10/30
SCANDO 20/30 C

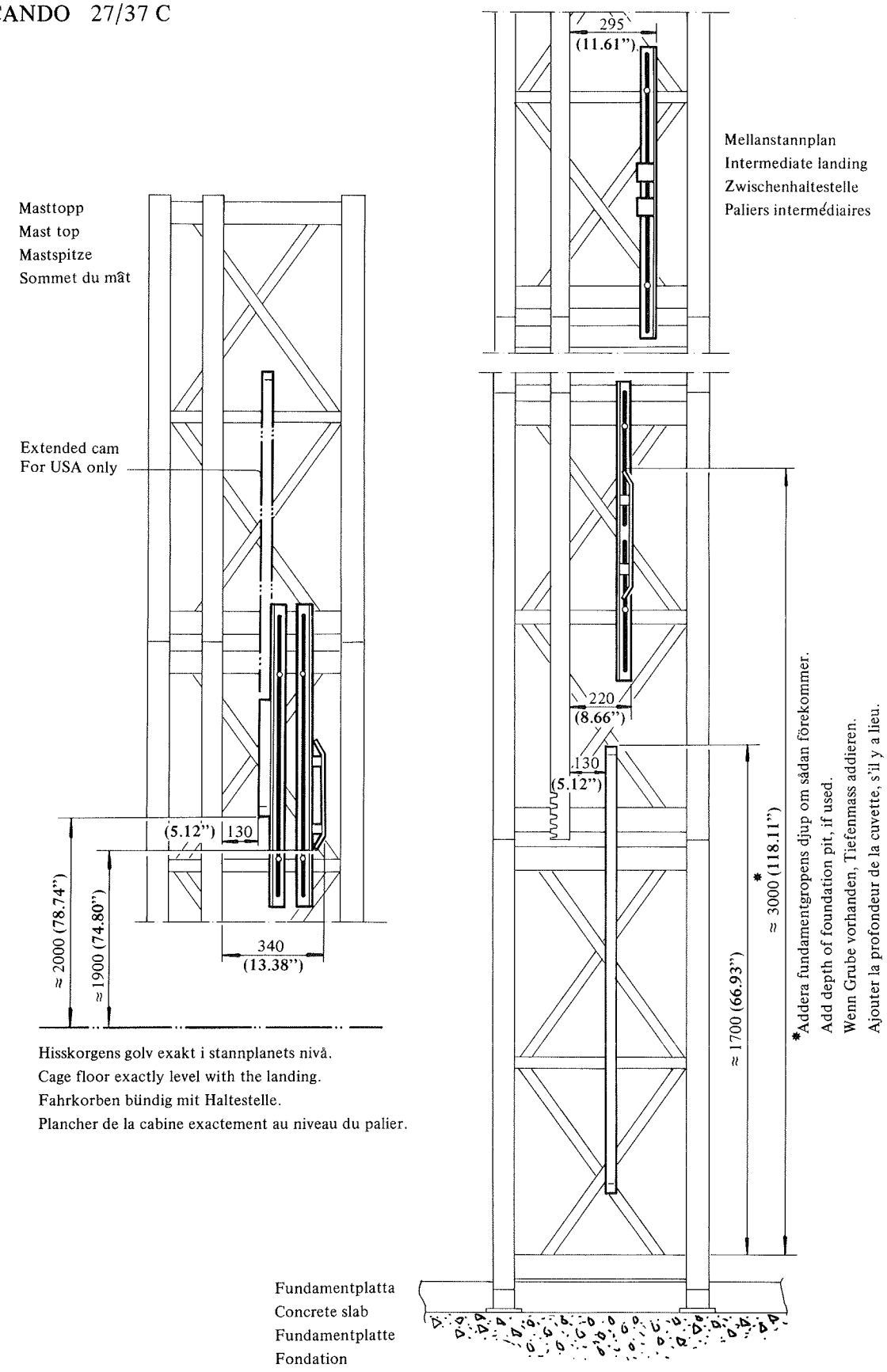


SCANDO 15/30
SCANDO 18/30
SCANDO 16/32



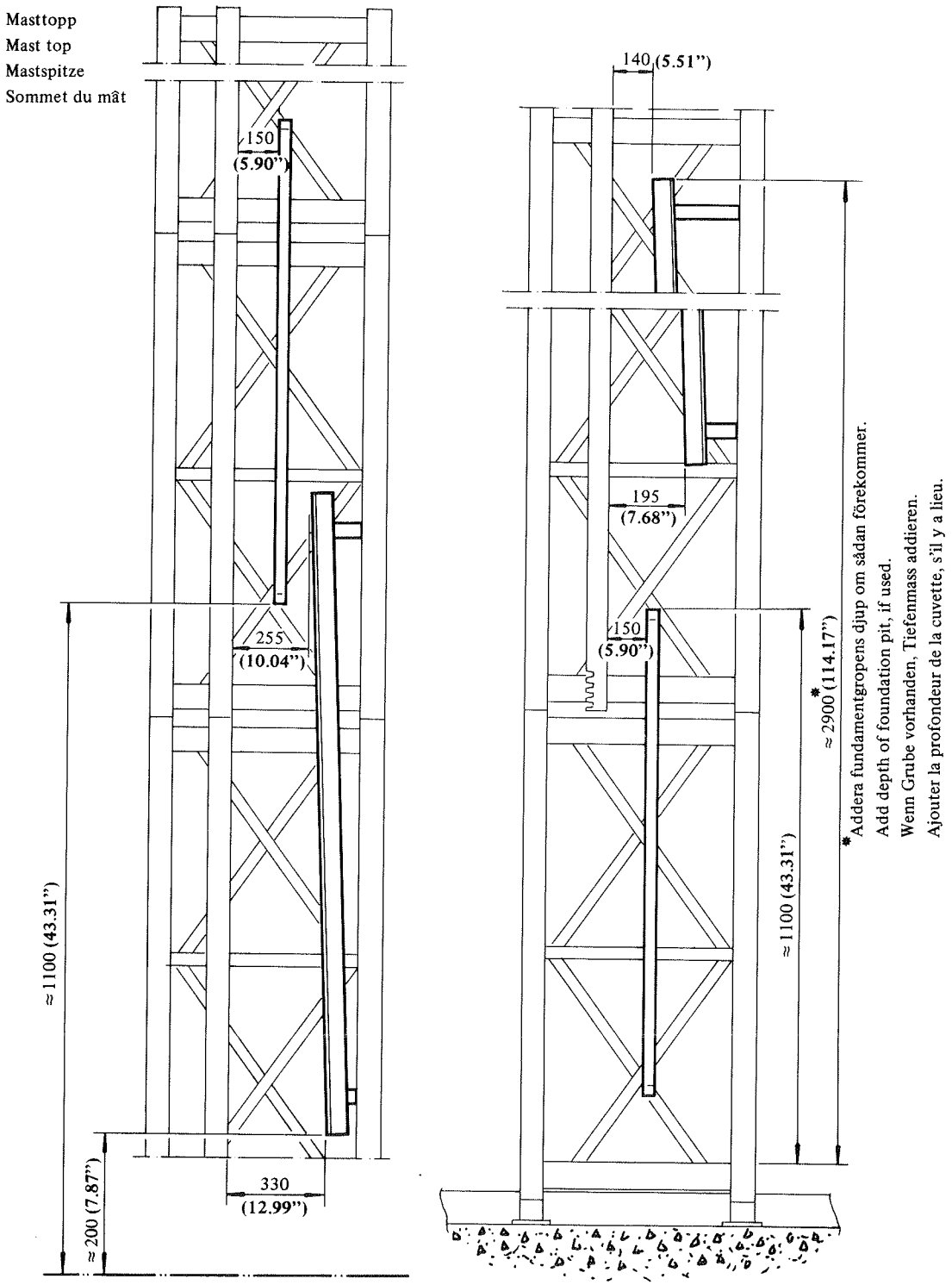
Hisskorgens golv exakt i stannplanets nivå.
Cage floor exactly level with the landing.
Fahrkorben bündig mit Haltestelle.
Plancher de la cabine exactement au niveau du palier.

SCANDO 18/32 C
SCANDO 25/32 C
SCANDO 27/37 C



Hisskorgens golv exakt i stannplanets nivå.
Cage floor exactly level with the landing.
Fahrkorben bündig mit Haltestelle.
Plancher de la cabine exactement au niveau du palier.

SCANDO SUPER



Hisskorgens golv exakt i stannplanets nivå.
Cage floor exactly level with the landing.
Fahrkorben bündig mit Haltestelle.
Plancher de la cabine exactement au niveau du palier.

Fundamentplatta
Concrete slab
Fundamentplatte
Fondation