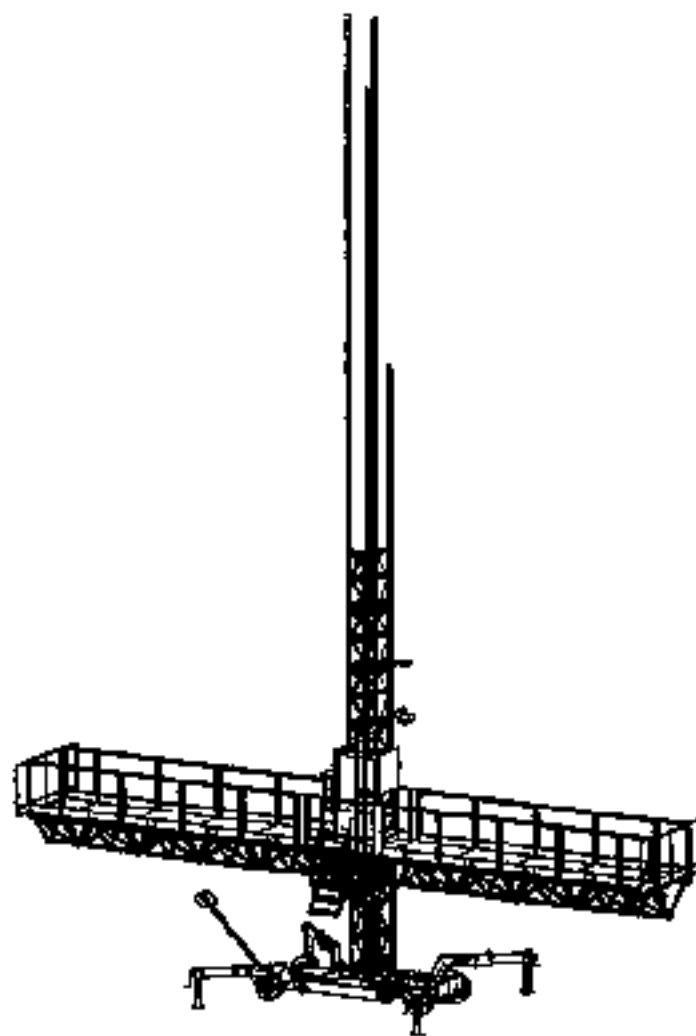




**USER'S MANUAL
WORK PLATFORM
HEK MS ProMax**



This manual is assigned to:

HEK MS ProMax

Issue: April 2003

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1 INTRODUCTION

1.1 General

This machine is developed and produced according to the highest safety and quality requirements.

This operating and maintenance manual is intended for the assembly team, the user and the service mechanic, so they can assemble, disassemble, use and maintain the machine safely and responsibly.

Only trained personnel is allowed to assemble, disassemble and maintain the machine.
Only authorised personnel is allowed to operate the machine.

The information included in this manual refers to the basic machine in the standard version, as delivered by HEK Manufacturing BV. It will be mentioned if the information refers to optionally available accessories. Read this manual carefully before assembling, disassembling, using or maintaining the machine.

This manual has been divided into four main parts.

Chapter 1, 'Introduction', contains general information regarding the machine. This chapter can be used by anyone working with or on the machine.

This also applies to the safety regulations as stated in chapter 2, 'Safety'. Always observe these regulations.

Chapter 3, 'Info for assembly team and user', contains information required for assembling and disassembling the machine in single and twin set-ups, as well as for daily use of the machine at the building site. This also includes the general maintenance and rectification of simple faults by using fault codes.

Chapter 4, 'Info for service mechanic', contains the complete maintenance program for the machine, as well as the description of specific operations.

ONLY a trained HEK service mechanic or a dealer authorized by HEK is allowed to carry out the operations described in this chapter.

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1.3 EC declaration of conformity

EC declaration of conformity for machines
(pursuant to Annex IIa of the Machine Directive 98/37/EG)

We, **HEK Manufacturing by**
Westelbeersdijk 18
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The Netherlands

hereby declare that, based on its design and construction, the machine mentioned below, put into circulation by us, complies with the safety and health requirements contained in the EC Machine Directive.

Modifications made to the machine without our permission shall invalidate this declaration.

This declaration refers to: **Mast climbing work platform**

HEK MS ProMax

In accordance with: **EG Machine Directives 98/37/EG**
EC number: **08/206/A16-YMA132705, August 2nd, 2002**
Certified by: **TÜV NORD CERT**
Date/manufacturer's signature: **Middelbeers, the Netherlands, March 24th, 2003**

Authorized signature:



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

2 SAFETY

2.1 General

- When working with or on the machine, always observe the safety regulations as stated in section 2.2 'Safety during transport, assembly, disassembly, inspection and maintenance' and 2.3 'Safety during operation' to prevent damage to the machine and/or personal injuries.
- The machine includes several subsystems. When working on the machine, do not only observe the instructions in this operating and maintenance manual, but also the information from the manufacturer of the relevant part (if applicable, see 'Supplier literature' in this operating and maintenance manual).
- Store all literature in an accessible location for all parties. Make sure that an instruction sheet (summarized operating instruction) is placed or put up notably near the control panel.
- Do not carry out any work on the machine other than stated in the literature. This operating and maintenance manual distinguishes between work to be carried out by the assembly team and operating staff (the 'operator') and by the maintenance staff (the 'service mechanic').
- The following symbols are used in this manual:

**WARNING**

Failing to (exactly) comply with working or operating instructions may lead to serious injury, fatal accidents, severe mechanical damage or consequential loss



Nobody is allowed under the machine during operation.



Danger of high voltage.



Danger of falling objects.



Suggestions or advice to facilitate certain operations.

2.2 Safety during transport, assembly, disassembly, inspection and maintenance



The (service) mechanic must consider the legal requirements regarding electricity, hydraulics, pneumatics and mechanical drives. Furthermore, the (service) mechanic should take all necessary precautions during maintenance work to prevent accidents.



Only authorized and properly trained personnel is allowed to maintain and inspect the machine.



Operations during the assembly or disassembly of the machine, deviating from the operations for the basic set-ups, should always be carried out by at least 2 mechanics.



If possible, professionally repair faulty parts or replace them with original replacement parts as soon as possible (also see 'List of recommended spare parts'). Taking provisional measures to temporarily restart the machine in case of a malfunction is not allowed. This will endanger the safety of the staff or others.



Operations on the mast climbing work platform should only be carried out by persons who are familiar with the contents of this manual.



Always observe local labour and safety laws and regulations.



The technical staff should be able to deal with any occurring situation during assembly and disassembly.



The technical staff's competence and sense of responsibility determine to a great extent a safe and efficient use of the machine.



If anyone observes errors or danger or does not agree with the safety measures taken, the owner and/or person responsible should be informed immediately.



Inspections and maintenance should be performed as indicated in this operating and maintenance manual.



Do not use the machine for other purposes during assembly and maintenance.



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



The chassis or ground frame must be effectively supported.



For a set-up of two adjacent mast climbing work platforms which can move independently and are not intended as a left and right hand mast of a twin set-up, the platform ends should be placed at a minimum distance of 0.5 m (1.65 ft).



If the fences do not offer sufficient protection during assembly and disassembly, always use reliable climbing materials at heights of 2 m (6.58 ft) or more, if required by the locally applicable legal directives.



Always install anchors at the required distance for the corresponding situation in accordance with the applicable regulations; see the anchoring instructions and anchoring tables in this operating and maintenance manual.



When working near power lines, maintain a safe distance of at least 15 m (49.35 ft), unless otherwise indicated in the locally applicable legal directives.



Place a fence around the mast climbing work platform to prevent personnel or others from unintentionally walking under the platform.



Make sure that the lightning protection cable (see specifications in this manual) is connected to a suitable attachment (ground) point at the building site.



No modifications or adaptations to the machine are allowed without prior written permission from the manufacturer.



Use a suitable truck for transport on public roads

2.3 Safety during operation



Inspect the machine thoroughly before use.



Make sure that the work area around the machine is free from obstacles.



Nobody is allowed under the machine during operation.



Make sure that there are no obstacles in the path of the machine.



Only use the machine for its purpose, i.e. the vertical transport of persons and goods from and to the work area. This machine is NOT designed for letting persons and goods enter to a building through a transfer feature.



The operating staff (hereinafter called the 'operator') should be at least 18 years old (or older, if required by local authorities).



The operator should be familiar with any situation which may occur during operation.



The operator must be able to carry out the instructions as stated in section 3.4, 'Operating the machine'.



The operator's sense of responsibility determines to a great extent a safe and efficient use of the machine.



If anyone observes errors or danger or does not agree with the safety measures taken, the owner and/or person responsible should be informed immediately.



Only enter and/or leave the platform in one position if the machine is stopped, i.e. the lowest position, when the machine is removed from the buffers.



In case of wind forces higher than 5 Beaufort (freestanding machine) or 6 Beaufort (anchored machine), shut down the machine, with the platform in the lowest position.



When using materials and/or tools with a large surface, contact the supplier regarding the wind sensitivity.



Use the loading diagram that applies to the situation for the maximum permissible load (see section 5.1 for detailed information). Distribute materials uniformly over the platform.



Never let materials and/or tools protrude the platform. Secure moveable loads to rolls. Never place loads against the fencing.



Only use platform extensions on outriggers for persons with hand tools. These persons are only allowed on the extensions when the platform is stopped.



Keep the hatches in the platform clear. In case of an emergency they give access to the brake lifters. They can be used to make an emergency descent, for example, if the power supply is cut off.



At least two persons should be present on the platform of a twin set-up in case of an emergency descent.



Keep the work area free from obstacles (building materials, dirt, snow, etc).



Never remove the platform fences during normal operation.



When using the machine in the dark, make sure that the machine is properly illuminated to provide good visibility for the user under any circumstances.



Stop the mast climbing work platform in case of an impending thunderstorm to avoid the danger of lightning strokes. Lower the platform into the lowest position and switch off the machine by putting the main switch in the Off position and locking it with a padlock. Then remove the connector in the building site assembly.



Put the platform into the lowest position after use and lock the main switch with a padlock.



The operator must immediately stop the machine when he/she notices an dangerous situation or dangerous behaviour from the passengers.



The operator must report ALL complaints regarding the machine to the Hek Manufacturing BV fault repair service or an authorized Hek dealer. Please use a logbook for this purpose.

3. INFO FOR ASSEMBLY TEAM AND USER

3.1 Construction and operation

The mast climbing work platform consists of the following basic parts (fig. 3-01):

- **Ground frame or chassis** (option); with or without electric drive (option);
- **Carriage**, with drive unit (motor plate), autolevel system (for twin set-up), stairs, fence and mast guard. The carriage is equipped with a carriage elevation (can be removed for (dis)assembly purposes);
- **Control system** (including the electric safety systems);
- **Platform** with fence and platform extension (if necessary);
- **Mast**, with or without cable support arms / cable guides (option);
- **Anchoring** (depending on the situation);
- **Mechanical safety systems**;
- **Building crane** (option);
- **Weather protection** (option).

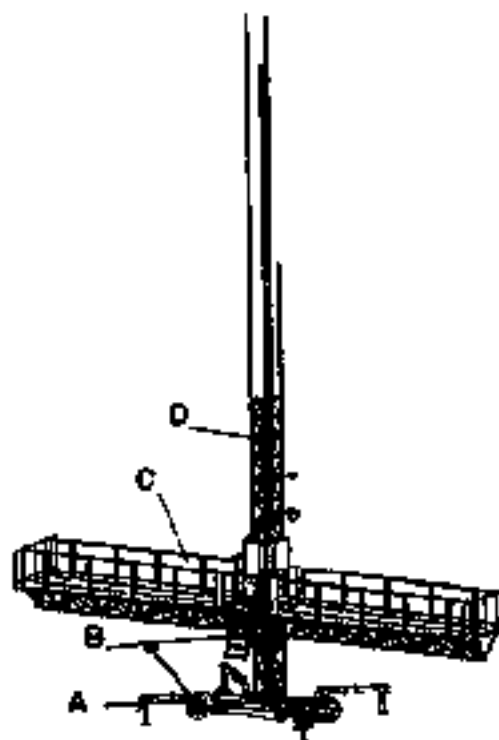


Fig. 3-01 MS ProMax - general view

Ground frame or chassis

Depending on the application, a chassis or ground frame can be used as basic element for the mast.

Ground frame (fig. 3-02)

The ground frame has 4 screw jacks used for levelling frame and mast.

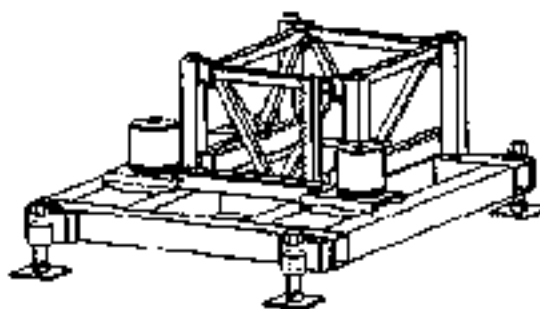


Fig. 3-02 Ground frame

Chassis (fig. 3-03)

The chassis has extending legs with jacks for this purpose.



Fig. 3-03 Chassis



To eliminate the dynamic effects of the moving platform, a fifth jack is installed under the middle of the mast.

The 5 jacks together can carry the total weight of a freestanding machine, including its load.

To obtain sufficient stability for a freestanding mast, the extending legs must be spread.

There are three possibilities: X, 1/2X and K. The position of the extending legs is important for the max. freestanding height, among others. For the applicable values, see paragraph 3.2.

An electric drive for the chassis is available as an option.

By mounting an electric drive onto the chassis, it can be made 'self-propelled'. Several features on this drive ensure a safe and simple operation.

For the technical specifications of the electric drive, see paragraph 3.2, 'Technical specifications'.

Carriage

The carriage (fig. 3-04) with the drive unit (motor plate) attached to it, is guided along the mast by wear-resistant plastic rollers.

An *autolevel system* inside the carriage ensures that the platform will always remain horizontal in a twin set-up.

The machine's complete *control system* is located on the carriage's platform.

The platform is accessible via the stairs and gate on the carriage.

For safety reasons a 2 m (6.58 ft) high mast guard is mounted around the mast. Next to the mast guard and the entrance gate fences are placed.

The motor plate (fig. 3-05) consists of a base plate with 2 electric drives. The motor plate moves freely in the carriage. Each of the drives moves along a rack mounted on the mast by means of a hardened pinion.

The motors have 'normally closed' brakes. When the voltage to the motors is switched off (control system), the brakes are automatically activated, stopping the platform. The same applies in case of a general power failure. Then the brakes will also be closed, locking the platform to the mast.

In addition, both motors have a centrifugal brake. This brake ensures a constant, safe descending speed in case of an emergency descent.

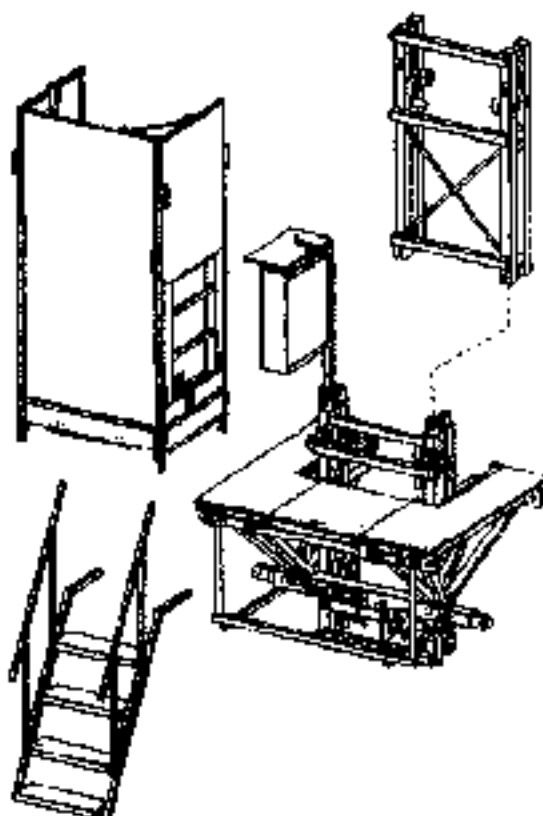


Fig. 3-04 Carriage - general view



Fig. 3-05 Carriage - motor plate

For working with large platform lengths the ProMax will be supplied with a removable carriage elevation (fig. 3-06). Please note that this can be removed for (dis)assembly purposes.

With this elevation the higher load can be transferred safely to the mast.

This elevation can only be removed during the assembly or disassembly of the mast, if restrictions are observed regarding the load distribution (see paragraph 3.4.1).

The carriage also has an autolevel system. This system is required if the machine is applied in a twin set-up.

Since the two carriages in a twin set-up each have an independant drive, a possible difference in speed will lead to tilting of the platform.

To maintain a safe platform position, the carriages have two autolevel switches (fig. 3-07), which are actuated by cams on the tilting beam.

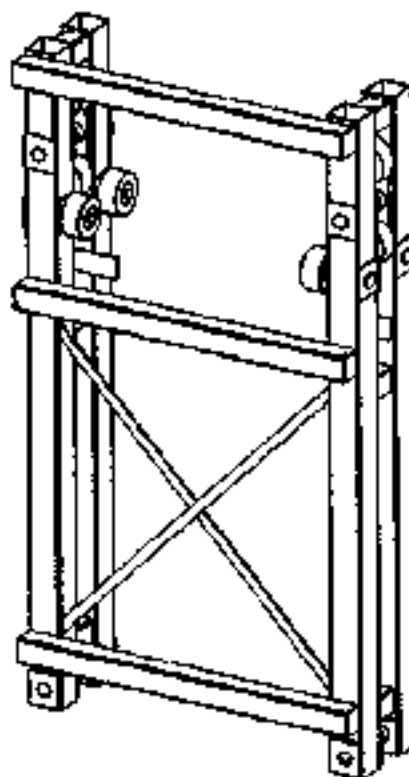


Fig. 3-06 Carriage - elevation



Fig. 3-07 Carriage - autolevel switch

If angle α (fig. 3-08) becomes larger, the tilting beam will be moved. At an angle of $\alpha > 1,5^\circ$, one of the switches will be activated.

This will result in temporarily stopping the carriage that is running too fast. When the difference in height and therefore α is within the tolerances again, the stopped carriage will be restarted.

This system is active for both the upward and downward movement.

Should the platform tilt due to a failing switch, an emergency tilting switch will stop the entire machine.

This situation will be shown on the platform switch box display with error message 7 (see paragraph 4.4 for a complete overview of error messages).

The complete control system is also located on the carriage. This system, which is redundant, consists of a control circuit, a safety circuit and an overload protection, the so-called UOP.

The control circuit includes the UP and DOWN switches, mast detection switches, upper and lower limit switches and an autolevel system.

Several parts of the mast climbing work platform are monitored electrically. The corresponding switches are included in the safety circuit. This safety circuit 'checks' the safety status of the machine with a number of switches. When this circuit is closed, the platform can be raised to the desired height by the control circuit.



Fig. 3-08 Tilting



When one of the following situations is detected, the platform can no longer be operated.

- Wrong phase sequence;
- Emergency stop button pushed;
- Platform overload;
- Platform eccentric overload (single set-up only);
- Difference in current between motors too high;
- Emergency lower switch activated;
- Emergency upper switch activated;
- Anchor ramp closed (option);
- Platform entrance fence open;
- Error in other carriage (twin set-up only);
- Too much tilting of platform in twin set-up.

The range of the platform is limited at the top and bottom by end striker plates on the mast. These will activate the limit switches on the carriage.

Some of the situations mentioned earlier are detected by the UOP (Universal Overload Protector). Among others, the UOP monitors:

- Platform vertical load. The permissible vertical load depends on the configuration and is therefore adjustable. This applies to single and twin set-ups.
- Platform eccentric overload (single set-up only).
- Difference in current between both motors, used for detecting a motor failure.
- Supply voltage value.
- Safety circuit status.

The sockets for the above-mentioned systems / circuits are located on the carriage:

- Carriage supply plug (fig. 3-09, item A): the supply cable for the power supply between the building site connection and the mast climbing work platform is connected to this plug. For cable specifications, see paragraph 3.2.



Each carriage is separately connected to the building site voltage.

It is not possible/allowed to interconnect the supply voltage from one carriage to the other.

- Additional safety circuit connection, including loop plug (fig. 3-09, item B): this can be used to connect additional switches which have to be included in the safety circuit, for example an anchor ramp switch.
- Connection for control cable for operation of twin set-up, including loop plug (fig. 3-09, item C).

An audiovisual warning system (fig. 3-10), consisting of a buzzer and a light at the bottom of the platform, will warn everybody in the vicinity of the mast climbing work platform that the platform is being lowered. This does not go for lowering the platform emergency cases in which no voltage is present on the platform.

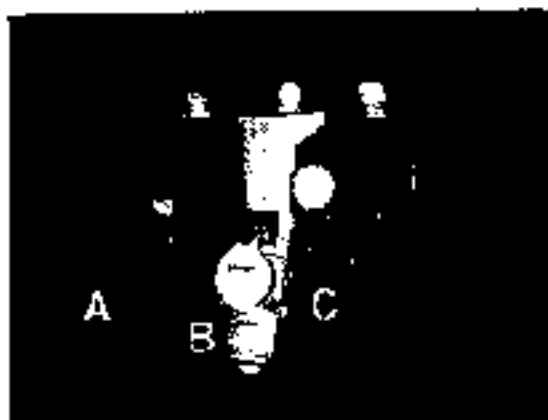


Fig. 3-09 Carriage - sockets



Fig. 3-10 Carriage - audiovisual warning system

Platform

Platform elements can be installed on both sides of the carriage(s).

Because of the modular construction of the platform, its length can be adapted to the user's wishes.

The platform has extending support profiles which can be extended independently in the platform width. This means that the platform can be fully adapted to the shape of the facade.

The platform is composed of separate 1.5 m (4.92 ft) wide platform elements

Standard 0.8 and 1.5 m (2.63 and 4.92 ft) wide elements are available (fig. 3-11) or the so-called Megadeck (fig. 3-12), which is 6 m (19.74 ft) wide.



Only use platform elements made of S-355. These can be identified by the yellow identification label (fig. 3-13, item A).

A 1.10 m (3.62 ft) high fence must be installed around the platform. The fencing is supplied in separate parts and is available for every type of platform element.

Depending on the distance to the facade, the fence may be lower at the facade side.

If the wind influence, combined with any obstacles surrounding the cable will allow it, the supply cable can be secured at the bottom of the platform.

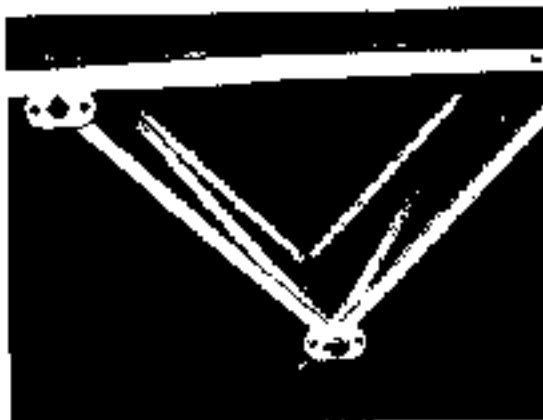


Fig. 3-11 Platform - standard element



Fig. 3-12 Platform - Megadeck



Fig. 3-13 Platform - yellow identification label element

However, it is recommended to install a cable support arm and the corresponding cable guides, especially at large heights (> 65.6 ft). The arm can be moved along the platform, so the cable will always travel in the centre of the guide.

The cable support arm is available in a left and right hand version and is mounted at the front of the carriage (fig. 3-14). The cable guides are universal.



Failure to mount a cable support arm and cable guides may result in the cable getting stuck and damage to the facade.

Other requirements apply for inclined mast set-ups. Consult your dealer for the correct solution.

Mast

The mast consists of separate elements (fig. 3-15) and can be assembled quickly and safely from the platform. The assembly of the mast can be facilitated with a crane, which is available as an option.



Only use mast elements made of B-420 MC. These can be identified by the identification plate, whereas the older ones have a welded 'T'.

Anchoring

When an anchoring is required for stabilising the mast, the mast will be secured to the building with (standard) anchors (see paragraph 3.3.6 for the relevant procedure).



Fig. 3-14 Platform - cable support arm.



Fig. 3-15 Mast - element



Mechanical safety devices

For safety reasons during assembly and operation, the machine is equipped with a number of mechanical safety devices:

- normally closed motor brake on each motor to enable an emergency descent by manually lifting the brakes in case of a power failure;
- centrifugal brake on both motors to maintain the descending speed on a safe level during an emergency descent;
- 2 m (6.58 ft) high fencing around the mast;
- fence with knee rail and kick plate around the platform;
- a mechanical tilting protection which locks the platform in a twin set-up when the difference in height between both carriages becomes too large (e.g. in case of an emergency descent);
- red uppermost mast element without rack to prevent the carriage from running out of the mast;
- buffers on the chassis.

Building crane (option)

A building crane (fig. 3-16) can be mounted onto the carriage as an option.

The crane is factory-built with a 230 V electric winch with a lifting capacity of 160 kg (352 lb). The building crane can be used for:

- loading mast elements from the ground;
- placing mast elements onto the mast;
- installing the carriage elevation.

The building crane is not designed as a loading crane for materials, nor for carrying out work on the facade.

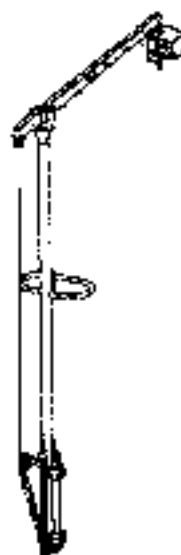


Fig. 3-16 Building crane

Building crane specifications

Lifting capacity:	160 kg (352 lb)
Lifting speed:	8 m/min (26.32 ft/min)
Crane radius:	1.4 m (4.61 ft)
Range:	0.7 m (2.3 ft) outside platform 1.1 m (3.62 ft) on platform
Height:	approx. 2.75 m (9.05 ft)
Chain length:	9.5 m (11.52 ft)
Lifting height:	2.3 m (7.57 ft) above platform
Total weight:	90 kg (198 lb)

Weather protection (option)

To improve the working conditions in bad weather, a weather protection (fig. 3-17) can be installed on the platform.

This consists of a frame of steel tubes, (original Hek part) which can be covered with canvas.

Because of its self-weight and the wind load the weather protection considerably reduces the loading capacity (see loading tables).

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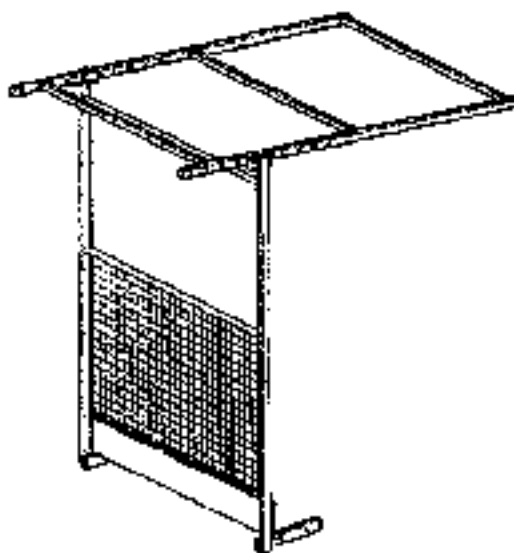


Fig. 3-17 Weather protection



3.2 Technical specifications

3.2.1 General



The technical specifications are based on standard applications for using the mast climbing work platform.

It is possible to deviate from the technical specifications under special circumstances. However, this is only allowed after the written consent of the supplier.

For the general specifications, see the tables and the illustrations 3-18, 3-19 and 3-20 on the following pages.

Set-up		Mast anchored					
		single			twin		
Support		Ground frame	Chassis		Ground frame	Chassis	
Chassis set-up		-	K	(1/2)X	-	K	(1/2)X
A	Mast height [ft], max.; for platforms without (with) weather protection	658 (658)			653 (653)		
B1	Position of the first anchor [ft]	9.9-19.2	18.6-19.7	< 49.4	9.9-13.2	16.5-19.7	< 39.5
B2	Position of the second anchor [ft]	19.7-26.3	26.3-32.9	39.5-49.4	19.7-26.3	26.3-32.9	39.5-49.4
B3	Distance between anchors [ft]	39.5-49.4			39.5-49.4		
C	Top mast length [ft], max.	19.7			19.7		
D	Step height [ft], min.	6.3	5.9		6.3	5.9	
E	Dist. between cable guides [ft], max.	19.7			19.7		
F	Platform length [ft]	11.5-51.0			37.5-130.9		
F1	Platform length outside the mast [ft]	2.6-22.4			2.6-24.7		
F2	Platform length between the masts [ft]	-			19.7-69.1		
G1	Platform width [ft]	4.94					
G2	Platform extension [ft], max.	3.29					
H	Fence height [ft]	3.62					
Load [ft], incl. persons		See par. 3.4.1, page 79			See par. 3.4.1, page 79		
Number of persons allowed		2 - 4					
Speed [ft/min]		36,19					

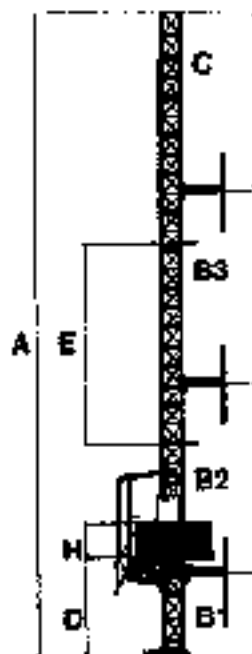


Fig. 3-18 Machine, right-hand view



Set-up		Mast, free-standing					
		single			twin		
Support		Chassis					
Chassis set-up		K	1/2X	X	K	1/2K	X
A	Mast height (ft), max.; for platforms without (with) weather protection	26.3 (-)	55.9 (55.9)	65.8 (65.8)	26.3 (-)	55.9 (46.1)	23 (55.9)
B1	Position of the first anchor (ft)	-			-		
B2	Position of the second anchor (ft)	-			-		
B3	Distance between the anchors (ft)	-			-		
C	Top mast length (ft), max.	-			-		
D	Step height (ft), min.	5.9			5.9		
E	Distance between cable guides (ft), max.	-			-		
F	Platform length (ft)	11.5-51.0			37.5-130.9		
F1	Platform length outside the mast (ft)	2.6-22.4			2.6-24.7		
F2	Platform length between the masts (ft)	-			18.7-59.1		
G1	Platform width (ft)	-			4.94		
G2	Platform extension (ft), max.	-			3.29		
H	Fence height (ft)	-			3.62		
Load (lbf), inclt. persons		See par. 3.4.1, from page 79 onwards			See par. 3.4.1, from page 79 onwards		
Number of persons allowed		-			2 - 4		
Speed (ft/min)		-			38.19		

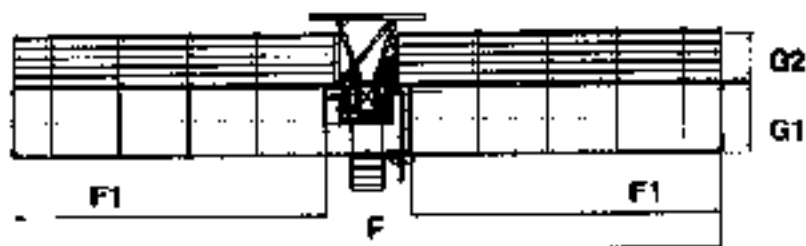


Fig. 3-19 Machine, single set-up, top view

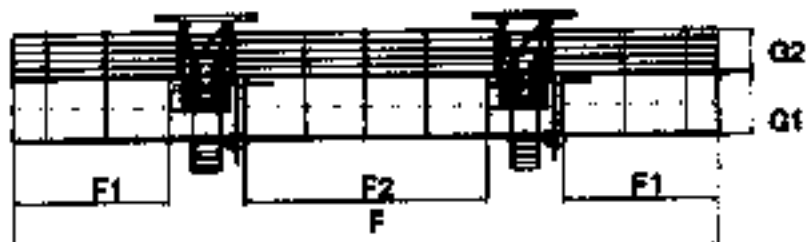


Fig. 3-20 Machine, twin set-up, top view

3.2.2 Electrical installation

Work platform

		400 V / 50 Hz	230 V / 60 Hz
Number of motors		2	2
Rated power		8.8 kW	8.9 kW
Rated current		19 A	34 A
Max. starting current		71 A	143 A
Supply voltage		400 V	230 V
Min. supply voltage		360 V	208 V
Phases		3 + N + Pe	3 + N + Pe
Supply frequency		50 Hz	60 Hz
Building site fuse (slow)		63 A	125 A
Control voltage		24 V AC	24 V AC
LOP supply voltage		24 V DC	24 V DC
Machine cable (based on the rated supply voltage)	5 x 0.006 in ²	up to 329 ft	-
	5 x 0.009 in ²	up to 658 ft	up to 329 ft
	5 x 0.016 in ²	-	up to 658 ft
Accessories power supply outlet		230 V / 16 A	110 V / 16 A

Chassis drive unit

		400 V / 50 Hz	230 V / 60 Hz
Number of motors		1	1
Rated power (kW)		1.5	1.73
Rated current (A)		3.6	6.1
Max. starting current (A)		± 12	± 21.4
Supply voltage (V AC)		400	230
Min. supply voltage (V AC)		360	208
Phases		3 + N + Pe	3 + N + Pe
Supply frequency (Hz)		50	60
Building site fuse (slow) (A)		63	63
Control voltage (Vac)		42	42

3.2.3 Static part

Mast

Type		YRK 700
Material		S420 MC
Dimensions [inch]	Short	27.6 x 27.6 x 48.5
	Long	27.6 x 27.6 x 59.4
Weight (incl. rack) [lb]	Short	216
	Long	242
Mast bolts		M20 x 200 – B.2
Torque [lb ft]		207
Rack		
Module [inch]		0.32
Rack bolts		M10 x 70 – B.8
Torque [lb ft]		40.7
Rack reference dimensions		See paragraph 4.3.2.4

Ground frame

A [inch]	3.95
B [inch]	58.31
C [inch]	38.20
D [inch]	47.28
E [inch]	20.88 – 25.41
Buffers	Acis 165 x 160
Weight [lb]	398

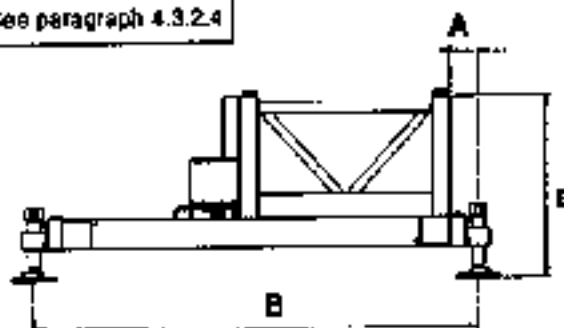


Fig. 3-21 Ground frame - side view

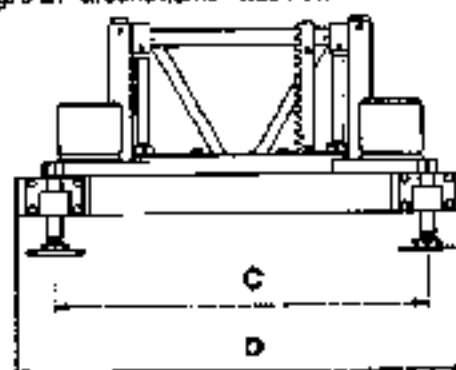


Fig. 3-22 Ground frame - top view



Chassis

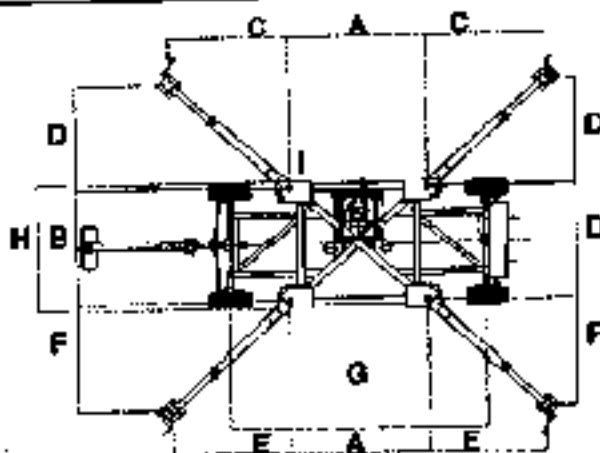


Fig. 3-23 Chassis - top view

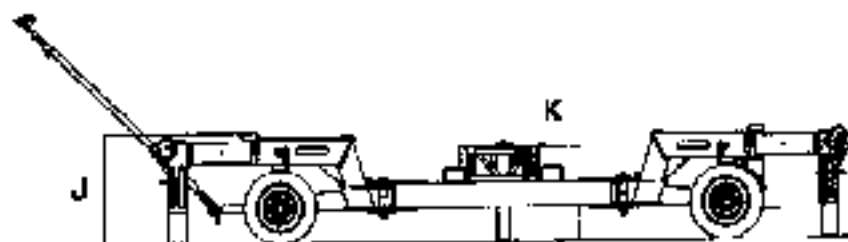


Fig. 3-24 Chassis - side view

A [ft]	6.58			
D [ft]	5.29			
Chassis set-up	H	K	1/2X	X
C [ft]	5.53	6.53	6.90	5.81
D [ft]	0	0	2.56	4.94
E [ft]	5.63	5.81	5.81	5.61
F [ft]	0	4.94	4.94	4.94
G [ft]	12.17			
H [ft]	5.79			
I [ft]	2.37			
J [ft]	2.98			
K [ft]	2.53			
Weight, incl. drive unit [lb]	4,246			
Weight, excl. drive unit [lb]	3,850			
Buffers, type	ACLA, 165 x 160			
Drive unit				
Speed [mph]	50 [Hz]	1.05		
	60 [Hz]	1.24		
Tyre pressure [bar]	5			



3.2.4 Dynamic part

Carriage

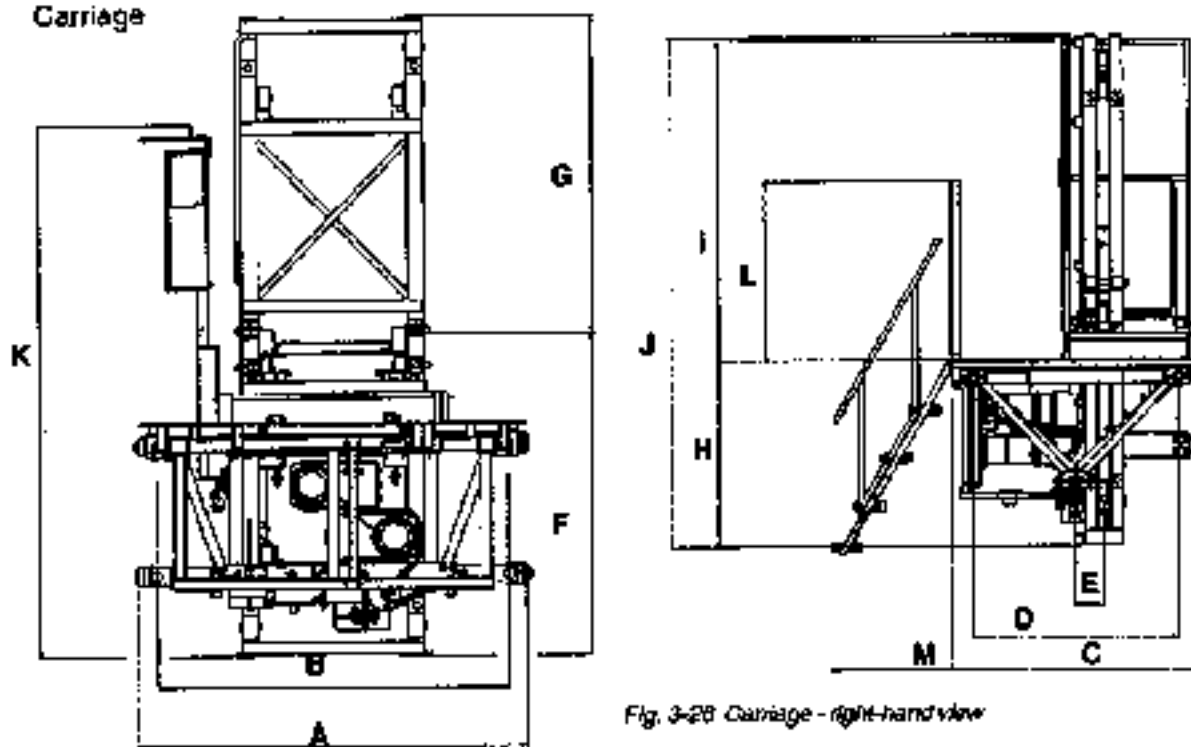


Fig. 3-25 Carriage - front view

A [inch]	73.43
B [inch]	68.59
C [inch]	62.08
D [inch]	51.22
E [inch]	7.09
F [inch]	63.24
G [inch]	62.84
H [inch]	46.10
I [inch]	78.80
J [inch]	120.08
K [inch]	105.20
L [inch]	44.33
M [inch]	30.14
Weight, total [lb]	2,662
Weight, top frame [lb]	198

Fig. 3-26 Carriage - right-hand view

Platform

Fig.	Description	Steel quality	Dimensions Length [m]	Weight [kg]	Balls		
					Number	Size and quality	1 piece (b x k)
3-27	Platform element 0.8 m (2.63 ft)	305c	2.4 x 0.7 x 2.9	40	6	M20 x 20 - 8.8	1 x 8
3-28	Platform element 1.5 m (4.92 ft)	305c	4.9 x 0.7 x 2.9	88	6	M20 x 20 - 8.8	1 x 8
3-29	Megadeck 15.74 [ft]	305b	16.7 x 0.5 x 2.8	1,498	6	M20 x 20 - 8.8	1 x 8
3-30	Tensioning element	305b	5.7 x 0.5 x 0.5	368	6	M20 x 20 - 8.8	1 x 8

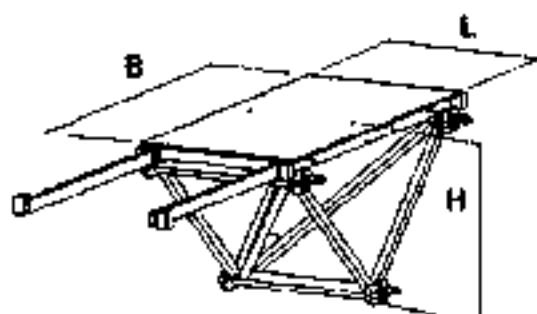


Fig. 3-27 Platform element 0.8 m (2.63 ft)

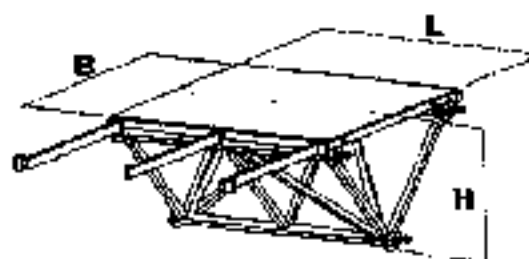


Fig. 3-28 Platform element 1.5 m (4.92 ft)

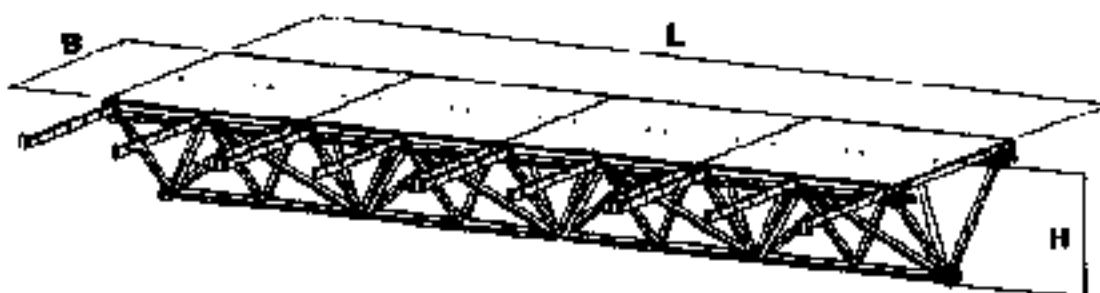


Fig. 3-29 Megadeck

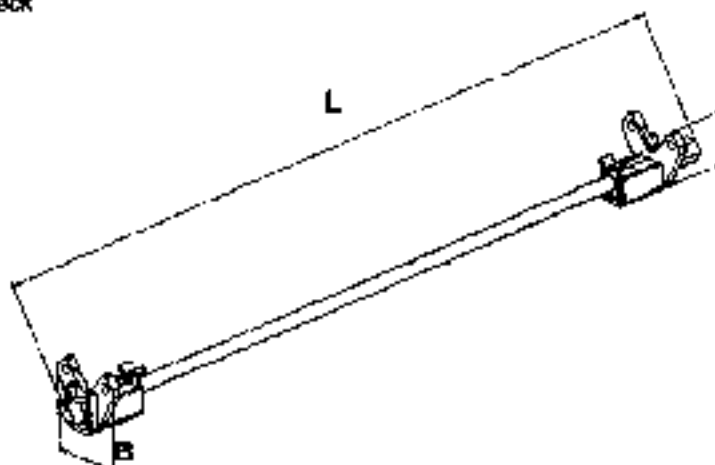


Fig. 3-30 Tensioning element



Fencing

Fig.	Description	Dimensions LxWxH (inch)	Weight (lb)
3-31	Plug-in fence 60	30.73 x 1.58 x 48.07	26.6
3-32	Plug-in fence 150	58.31 x 1.58 x 48.07	39.8
3-33	Corner post, left	2.76 x 2.76 x 51.22	13.2
3-34	Corner post, right	2.76 x 6.73 x 51.22	13.2
3-35	Gate	33.69 x 1.58 x 50.04	33
N.A.	Plug-in fence Megadeck	117.4 x 1.58 x 48.07	66
N.A.	Carnage plug-in fence, left	24.63 x 1.58 x 50.04	33
N.A.	Carnage plug-in fence, right	24.63 x 1.58 x 50.04	33
N.A.	End fence	98.50 x 1.18 x 43.93	66

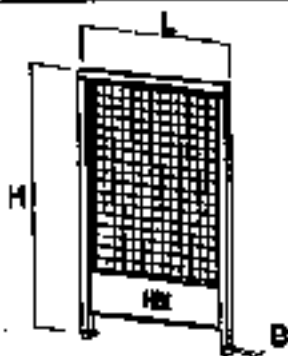


Fig. 3-31 Plug-in fence 60

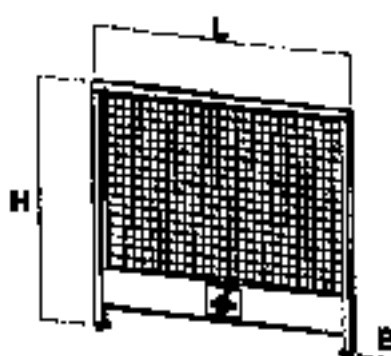


Fig. 3-32 Plug-in fence 150

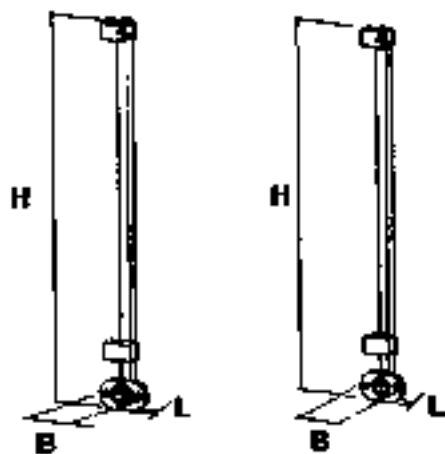


Fig. 3-33 Corner post, left and right

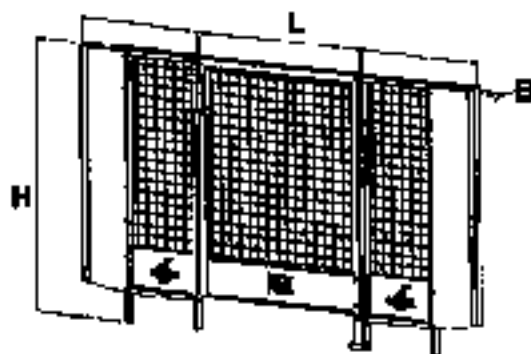


Fig. 3-34 Gate / plug-in fence

3.3 Transport and (dis)assembly

Although this section is mainly written for the technicians of the (dis)assembly team, it may also be important for the normal user or service mechanic. In this section the technicians of the (dis)assembly team will find instructions for transporting, assembling, on site repositioning, disassembling and once more transporting the machine. For users and service mechanics these instructions are an important source of information to learn more about the structure of the machine on and with which they work.

3.3.1 Transport to building site



Transporting the machine on public roads with a chassis is not allowed.



The national traffic regulations must be observed.

- 1 Select a vehicle suitable for the machine dimensions and weight, see paragraph 3.2 for the specifications.
- 2 Make sure that the machine is disassembled until it is more or less identical to the basic version (machine without fences, steps and mast guard). Remove fences, steps and mast guard, if mounted.
- 3 Check whether the machine is in the buffers or not (fig 3-35); if not, lower the machine onto the buffers.



Fig. 3-35 Chassis - buffers

- 4 Fit all securing devices.
- 5 Lift or raise the machine from the vehicle with a fork-lift truck or a crane (fig. 3-36).



Make sure that the machine weight and dimensions are within the lifting equipment specifications, before raising or lifting the machine.

When using a crane:
Only lift the machine by the appropriate lifting eyes.

When using a fork-lift truck:
Only pick-up the machine under the appropriate lifting points.

lifting eyes for lifting with crane

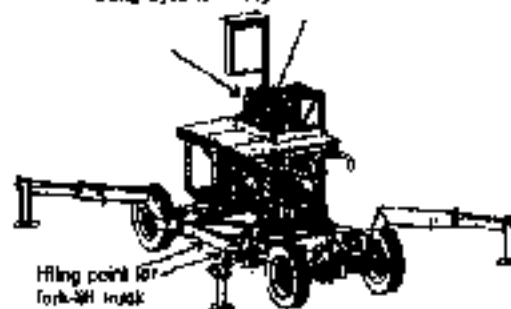


Fig. 3-36 Lifting points

- 6 Make sure that the machine weight is distributed uniformly when placing the machine onto the truck.
- 7 Secure the machine to the truck with suitable security straps.

3.3.2 Positioning

Proceed as follows when positioning the mast climbing work platform on a building site:

In the project planning phase:

- 1 Determine the global position for the mast climbing work platform based on the project drawings.

Consider the following:

- mast climbing work platform position in relation to the facade (also consider extensions such as balconies and roof edges);
- the front of the mast; it does not run parallel to the front of the platform (fig. 3-37);
- required space for the extending legs, i.e. the so-called X, K and 1/2X position (applicable to freestanding machine on chassis only);
- permissible geometry of the original Hek anchoring material (other anchoring material NOT permitted);

$$A = 2.14 \cdot 4.11 R$$

$$B = 2.34 \cdot 4.31 R$$

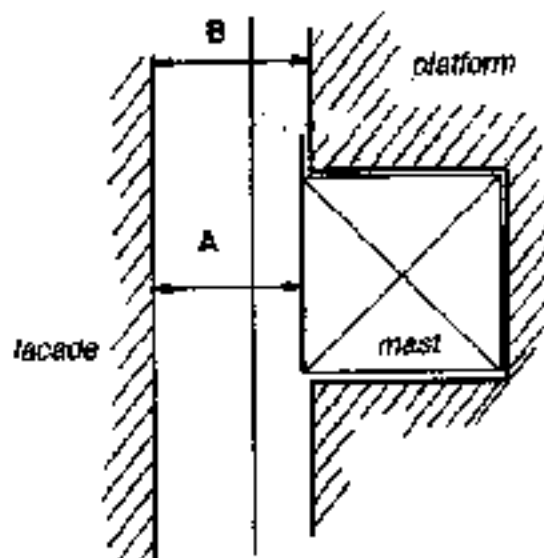


Fig. 3-37 Distance to the facade

- 2 Check the technical data of the planned building site power and arrange for proper illumination all around the planned location.
- 3 Supply adequate lifting equipment for unloading the mast climbing work platform and during the assembly.
- 4 Ask permission from the local authorities for assembling the mast climbing work platform.

When assembling the mast climbing work platform:

- 1 Before transporting the mast climbing work platform to the building site, personally check if the site where the platform will be assembled complies with the national safety requirements and if the permission for assembling the platform, which you applied for in the planning phase, has been obtained from the relevant authorities.



2 Check the assembly location of the mast climbing work platform for good drainage and soil conditions (see paragraph 3.3.3).

3 Make sure that the building site is easily accessible during transport of the mast climbing work platform

Have obstacles such as flower boxes removed before transporting the mast climbing work platform to the building site.

4 Ensure the availability of a power supply, illumination, lifting equipment and suitable tools.

3.3.3 Installing ground frame / chassis



In case of an interruption in the positioning work, make sure that its progress is clear when resuming work. Always completely finish the part of the positioning that you are working on, before interrupting the work.

The mast climbing work platform can have a ground frame or chassis.

The version with a ground frame can only be repositioned by a crane or fork-lift truck, while the version with a chassis can be equipped with an electric drive and is therefore 'self-propelled' (operated from the tow bar).



The ground should be able to resist a ground pressure of at least 50 lb/in². If the ground does not comply with this requirement, carry out ground improvements or install 'stelcon' plates to guarantee the above-mentioned value.



Both versions are positioned and supported differently. Make sure that you are following the correct procedure!



When placing ground supports, make sure that the forces are distributed uniformly over a large surface.



The ground support surface must be sufficient, so the ground pressure of 30 lb/in², combined with the jacking forces, is not exceeded. The min. size is 15.76 x 15.76 in. In addition, the ground support should be flat and centrally loaded.



A ground support must be durable and of such a quality that the load can be transferred safely.

If the ground frame or chassis is placed on a concrete foundation or paved road, the installation must be equipped with wooden ground supports to prevent slipping.



When a twin set-up is required (see paragraph 3.3.5), first assemble one basic machine according to the instructions described in the next part of this paragraph and finish it as described in paragraph 3.3.4. Equip this basic machine with the same number of plates on left and right-hand side (= number of plates required on the outside of the twin set-up).

Place the machine on the other side a little further away than the planned position, seen longitudinally from the twin set-up; follow the instructions in this and the next paragraph but wait with the exact positioning, accurate levelling and final placing of the ground supports until the second machine can be linked to the fully assembled first basic machine.

Otherwise it will be impossible to link and draw up the machines. Make sure that the second machine is stable (position it provisionally with the extending legs in the final position and place ground supports as described).

Slightly screw in the jacks, just before linking both carriages. See paragraph 3.3.5 for linking two machines as a twin set-up.



Placing basic machine with ground frame:



When a twin set-up is required (see paragraph 3.3.5), first assemble a machine on one side according to the instructions in this and the next paragraph 3.3.4.

Place the machine on the other side near the planned position, but wait with the exact positioning, accurate levelling and final placing of the ground supports until the second machine can be linked to the fully assembled first basic machine. Otherwise, it will impossible to link and draw up the machines.



A basic machine with ground frame can only be used anchored.



If anchoring is not possible or advisable, use a basic machine with chassis.

A ground frame has 4 screw jacks. They are only used for levelling the frame and should NEVER carry the weight of the machine.

- 1 Inspect the soil conditions. If the ground has sufficient load bearing capacity (concrete, paved road, etc.), it will not be necessary to take further measures. If the ground load bearing capacity is less than 30 lb/in², always carry out ground improvements.

- 2 Use a crane or fork-lift truck to take the machine to the correct location. Do not yet put the basic machine down to the ground, but keep it slightly raised, so the ground supports can be placed.

- 3 Support the ground frame.

Sufficient load bearing capacity ground (i.e. suitable for a ground pressure of min. 30 lb/in²)

If the ground has sufficient load bearing capacity (concrete, paved road) to level the frame with the screw jacks, a ground support (with suitable building timber) under the corners of the ground frame (fig. 3-38) will suffice.

No sufficient load bearing capacity ground (i.e. not suitable for a ground pressure of min. 30 lb/in²)

If this is not the case, also support the screw jacks with suitable building timber (fig. 3-39).

- 4 Lower the basic machine onto the ground supports. Check the positioning and adjust it, if necessary, with the crane / fork-lift truck.

If the mast is in the correct position, fill up the space between floor and ground frame with chock and use wedges for an optimal load bearing capacity.

- 5 Then screw in the jacks, so they no longer have a load bearing function.

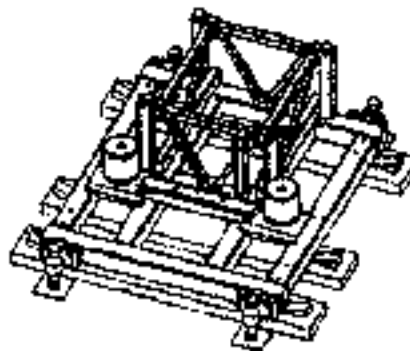


Fig. 3-38 Ground frame ground support

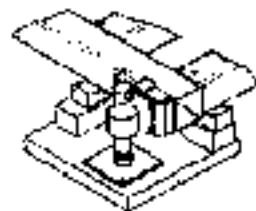


Fig. 3-39 Screw jack ground supports



Placing basic machine with chassis:

A basic machine with chassis can be used for both anchored and freestanding machines. The position of the extending legs depends on the situation (anchored or not and height of first anchor, etc.).

- 1 Inspect the soil conditions. If the ground has sufficient load bearing capacity (concrete, paved road, etc.), it will not be necessary to take further measures.

If the ground load bearing capacity is less than 30 lb/in², always carry out ground improvements.

- 2 Use a crane or fork-lift truck for unloading the machine. Place the machine as close to the work area as possible.

Since the machine is equipped with a chassis, it can later on be driven (electrically, if supplied with an electric drive) to the exact location in relation to the building or to a second machine of the same type (In case of a twin set-up).

- 3 Put the extending legs in the desired position, depending on the situation.

Not freestanding

When the mast is later on anchored with the first anchor at a height of < 16.45 ft, the extending legs can remain folded in and retracted (the so-called H-position).

Freestanding or first anchor at a height of > 16.45 ft.

Place the extending legs in X, K or $1/2X$ position (fig. 3-40), depending on the situation, and insert the locking pins. For detailed information about the various positions and corresponding locking pin positions, see paragraph 3.4.1.



The extending legs should always be fully extended and secured on a freestanding machine or a machine on which the first anchor is at a height of > 16.45 ft.



On a freestanding machine (single or twin set-up) the max. load, platform length and/or mast height is limited, since no anchors are used. See paragraph 3.4.1, 'Loading the machine', for the relevant loading diagrams.



Note that for a freestanding set-up and large spreading of the extending legs an extension to the platform is required for working on the facade.



When a so-called $1/2X$ set-up will suffice for stability and you have to work behind the mast, place the mast climbing work platform rotated 180° , i.e. with the back to the facade. This will eliminate the need for an extension.



Fig. 3-40) Extending legs position



During heavy wind or a storm the stability of high, freestanding set-ups can be seriously threatened. HEK Manufacturing BV **STRONGLY** advises you to always install an top anchor and minimise the use of freestanding machines.

- 4 Place ground supports under the jacks (suitable building timber) (fig. 3-41).
- 5 Mount the handles to the jacks and screw out the 4 jacks at the supporting legs until the wheels no longer have a load bearing function, but still touch the ground.
Do not yet screw out the jack underneath the mast.

The jacks have a reduction gearbox. By pushing or pulling the handle on the shaft, one of the following three positions can be selected (fig. 3-42):

- A Pushed = 'low gearing' (higher force)
Use this position to fine-tune the chassis. After levelling the chassis, put the jacks in this position.
- B Central position = 'neutral'
In this position the handle has no function.
- C Pulled = 'high gearing' (higher speed)
In this position one turn of the handle results in a higher displacement of the jack. However, the force to be applied is limited. Suitable for rough levelling.



Fig. 3-41 Chassis - jack ground supports



Fig. 3-42 Jacks - handle positions

The centre jack can be screwed out with a special handle stored next to this jack. For extending or retracting the shaft, one of the other handles can be used.

- 6 Level the mast with the jacks. Use a spirit level which is at least 3.29 ft long. Measure ON the mast, in two directions: parallel and perpendicular to the facade. The chassis wheels should not have a load bearing function any more, but should still touch the ground.

- 7 Determine whether the mast is planned higher than 65.8 ft and if so, place ground supports under the corners of the chassis.

Mast < 65.8 ft

The 5 chassis jacks are able to carry the total machine weight plus permissible load (see paragraph 3.4.1, 'Loading the machine'). No action has to be taken.

Mast > 65.8 ft

Place ground supports under the corners of the chassis (fig. 3-43). Fill up the space between the floor and frame with chock. Use wedges for an optimal load bearing capacity.

- 8 Screw out the jack under the mast (machine levelled), until it touches the ground. However, it should never take over the load bearing function of the 4 other jacks.
- 9 Secure all jacks by placing the handles in the middle position and then remove the handles. See paragraph 3.1 for detailed information about operating and securing the handles (fig. 3-44). Secure all jacks against moving by placing the handle in position 'A' (fig. 3-42) and locking it. For this purpose the supplied locking plates (fig. 3-44) can be put on the shaft or the installed handle can be locked with a tie-wrap.

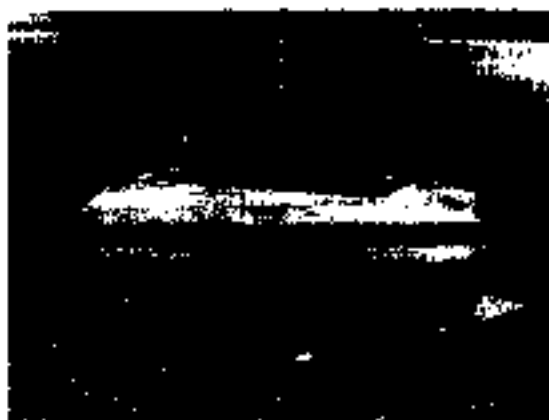


Fig. 3-43 Chassis - corner ground supports

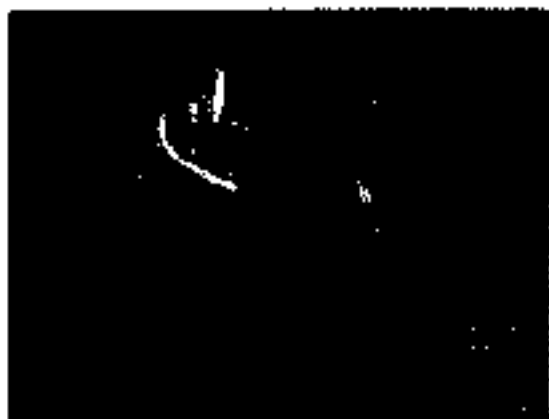


Fig. 3-44 Screw jack locked

3.3.4 Assembling basic set-up

General

- In case of an interruption in the assembly work, make sure that its progress is clear when resuming work.

Always completely finish the part of the assembly that you are working on, before interrupting the work.

- Only use standard platform elements made of S-355, identifiable by the yellow identification plate welded in the platform element, or so-called Megadeck sections (option).

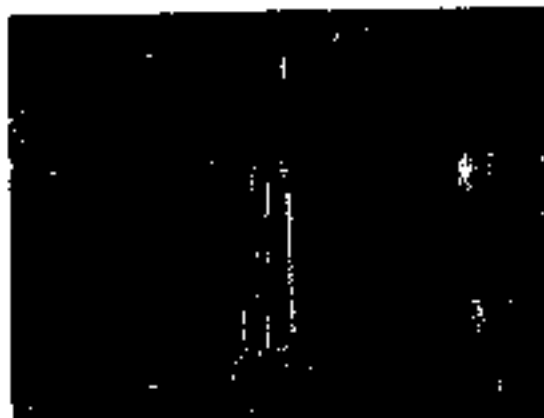


Fig. 3-45 Blocking pin in autolevel beam

Assembly with standard HEK platform elements

- 1 Make sure that the locking pin is placed in the autolevel beam (see fig. 3-45). The machine can now be used independently, i.e. in a single set-up. This is important for the completion of the basic set-up.
- 2 Assemble the platform sections symmetrically in relation to the mast on both sides of the carriage until the required platform length has been achieved.

The shape of the tie plates of the left and right-hand platform sections is different (fig. 3-46).

For possible configuration, see paragraph 3.2, 'Technical data'.

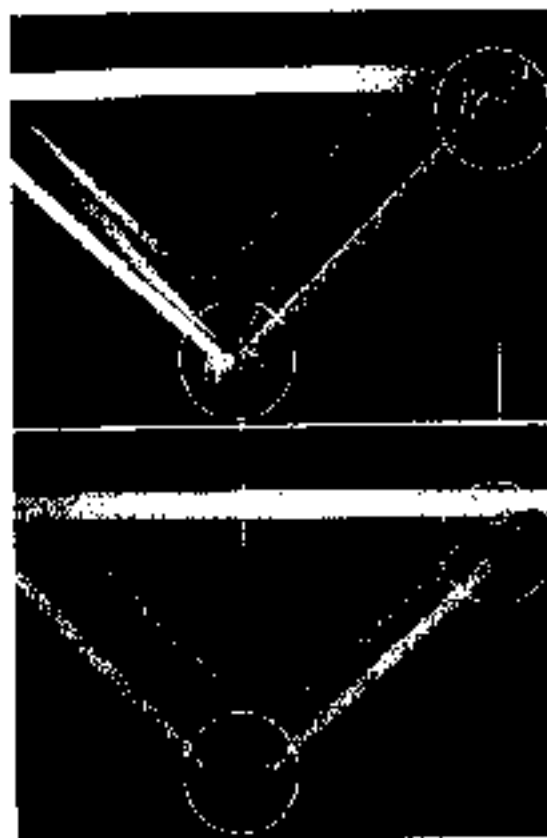


Fig. 3-46 Platform element - differences



Do not exceed the max. permissible length.



Tighten all platform bolts with a 147.6 lb ft torque.




Only use self-locking nuts once.

- 3 For safety reasons, place fence sections on the platform at mast/carriage height during the remaining assembly work.
- 4 Connect the machine to the building site power and install a lightning protection on the machine, see step 6.

Assembly with standard HEK platform elements and Megadeck sections (option, also see manual supplied with these sections).

- 1 Make sure that the locking pin is placed in the autolevel beam. The machine can now be used independently, i.e. in a single set-up. If not, insert the locking pin, see 'Assembly with standard HEK platform elements'.
- 2 Preferably position the Megadeck section as symmetrically as possible between the masts (twin set-up). When using a Megadeck section in a single set-up or when mounting an additional Megadeck section on the outside of a twin set-up, then mount it as close to the carriage as possible. For the number of elements to be used to obtain the required platform length, see diagram T1 on the next page.



 When assembling a Megadeck section between the masts of a twin set-up, the middle part should only contain one other 2.63 ft plate. Assemble this plate directly next to one of the carriages. This also goes for a Megadeck section on the outside of a twin set-up or in a single set-up.

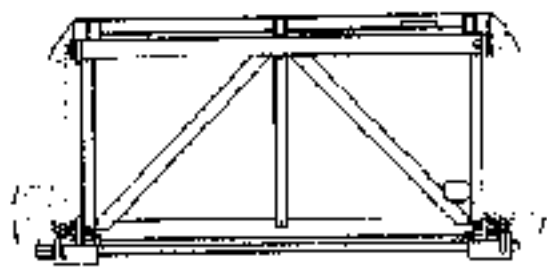


Fig. 3-47 Megadeck - tensioning device

3 Check if an additional tensioning device is required (fig. 3-47) (see loading table below). When more than one device is used, equally mount on both side of the Megadeck element.

Diagram T1

N1 (ex. megadeck):	0			1			2		
	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner
No									
1	37,4	42,0	-	40,0	48,9	-	44,9	51,8	-
2	47,2	51,8	-	49,9	58,8	-	54,8	61,7	-
3	57,1	61,7	-	59,7	68,6	-	64,6	71,5	-
4	66,9	71,5	-	69,6	78,4	-	74,5	81,4	-
5	76,8	81,4	-	79,4	86,3	-	84,3	91,2	-
N1 (ex. megadeck):	3			4			5		
	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner
No									
1	49,9	58,8	-	54,8	18,6	-	59,7	68,6	1
2	59,7	68,6	-	64,6	21,8	-	69,6	76,4	-
3	69,6	78,4	-	74,5	24,8	-	79,4	86,3	-
4	79,4	86,3	-	84,3	27,6	-	89,2	96,1	-
5	89,2	96,1	-	84,2	30,8	-	89,1	106,0	-
N1 (ex. megadeck):	6			7			8		
	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner
No									
1	64,6	71,5	2	69,6	76,4	2	74,5	81,4	2
2	74,5	81,4	2	79,4	86,3	2	84,3	91,2	2
3	84,3	91,2	-	89,2	96,1	1	94,2	101,0	2
4	94,2	101,0	-	99,1	106,0	-	104,0	110,9	-
5	104,0	110,9	-	108,9	115,8	-	113,8	120,7	-
N1 (ex. megadeck):	9			10			Spanner 1: 1 x 4 9/16" 2: 2 x 4 9/16"		
	Lmin	Lmax	Spanner	Lmin	Lmax	Spanner			
No									
1	79,4	86,3	2	84,3	91,2	2			
2	89,2	96,1	2	94,2	101,0	2			
3	99,1	106,0	2	104,0	110,9	2			
4	108,9	115,8	2	113,8	120,7	2			
5	118,8	125,7	-	123,7	130,6	-			

Twin-configurations (N1 = number of 4.92 ft plates additional to the Megadeck element between the masts /
 No = number of 4.92 ft plates outside the masts)



Failure to install a tensioning device in a configuration in which it should have been installed, will result in considerably decreasing the loading capacity for this configuration. This may cause permanent deformation of the platform and even accidents.

- 4 If required, install the tensioning bar(s) between the Megadeck junction and the next junction of 2 platform sections.



Tighten all mounting bolts with a 147.8 lb ft torque.



Only use self-locking nuts once.

- 1 Mount the brackets (fig. 3-48, item A) and the 2 M20 x 110 bolts (fig. 3-51, item B); note the direction of the bracket.
 - 2 Place the bar (fig. 3-48, item C).
 - 3 Mount the nuts (fig. 3-48, item D) on the tensioning bar. Use washers for both nuts. Tighten the nut of the tensioning device with a 147.8 lb ft torque. During the tightening, the platform must be level (support the platform between the masts and remove any load from the platform before tightening).
 - 4 Repeat this step for the other side of the Megadeck if 2 tensioning bars are required.
- 5 Connect the machine to the building site power and install a lightning protection on the machine, see step 6.



Fig. 3-48 Installing tensioning element

Connecting to building site power and installing lightning protection

- 6 Install the supply cable.
If the mast is longer than 65.8 ft and the wind load is low, the supply cable can be installed without using a cable support arm. In all other cases a cable support arm (fig. 3-49) (option) should be mounted before installing the supply cable, see paragraph 3.3.7, 'Mounting the accessories'.



Fig. 3-49 Cable support arm

- 7 Connect the main power supply to the socket under the platform (fig. 3-50, item A).

Connect both carriages in a twin set-up with its own main supply cable to the building site power supply; looping is NOT allowed.

- 8 Check whether or not the machine has additional switches for the safety circuit, such as the safety switch on the anchor ramp (option), see paragraph 3.3.7, 'Mounting the accessories'.

If not, connect the loop plug to the corresponding socket (fig. 3-50, item B).

If so, connect, after mounting the additional switches, the safety circuit cable to them instead of the above-mentioned loop plug.

Repeat this for the other machine, when working in a twin set-up.

- 9 Using basic machine in single set-up: Make sure that the dummy plug (fig. 3-50, item C) is inserted in the corresponding socket. If not, insert the plug.

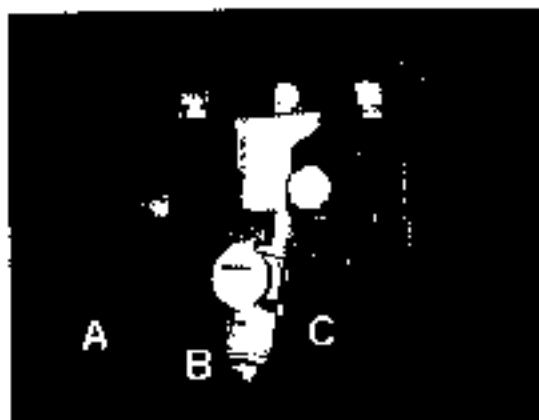


Fig. 3-50 Sockets under platform

Using basic machine in twin set-up:
install control cable through the
platform elements between the
carriages of both basic machines.
Make sure that the coloured plugs are
located on the correct side: yellow at
the left basic machine side / black at
the right basic machine side.



When the plugs are mounted
incorrectly, the autolevel
protection does not function.

- 10 Install a lightning protection on the
basic machine(s).
Mount the interconnecting cable, if not
yet connected, between chassis/
ground frame and mast (fig. 3-51).
Cable specifications: Insulated copper,
0.025 in².
Connect the cable supplied with the
basic machine (0.030 in², 82.25 ft) to
the building site assembly or to a
suitable grounding point at the building
site. This connection must comply with
the local standards and specifications.



Fig. 3-51 Lightning protection

The basic set-up is now ready for linking
the machines to a twin set-up (see
paragraph 3.3.5), if required, or completion
to desired height and anchoring, if a single
set-up is selected (see paragraph 3.3.6).

3.3.5 Linking to a twin set-up



In case of an interruption in the
linking work, make sure that its
progress is clear when resuming
work. Always completely finish
the part of the linking that you are
working on, before interrupting
the work.

- 1 Check if a middle part is required to link both single set-ups. If so, assemble it on the ground from standard platform sections or Megadeck sections; see loading tables in paragraph 3.2, 'Technical data', for the max. permissible length for the set-up and the corresponding max. load.
- 2 Use a fork-lift truck or a crane to position the middle part, if applicable, between both single set-ups (fig. 3-52). Make sure that the platform section ends are supported on the left and right between the masts.
- 3 Secure the middle part, if applicable, to the platform sections of the machine, which has already been levelled and supported.



When a difference in height occurs between both carriages, resolve it by raising the lowest carriage electrically.

- 4 Draw up the other machine, which has already been provisionally levelled and supported, with a fork-lift truck or crane, so the platform sections can be linked to the other side at the side between the masts (fig. 3-53).
- 5 Level the repositioned machine, align the platform sections with the sections on the other side (hold a rope between both masts, along the platform sections; fig. 3-54) and support this machine; see paragraph 3.3.3 for the correct procedure.



Fig. 3-52 Positioning middle part



Fig. 3-53 Linking middle part



Fig. 3-54 Aligning platform sections

- 6 Install the mounting nuts and bolts (fig. 3-55), as well as the last tensioning bars, if required.



Tighten all mounting bolts with a 147.8 lb ft torque.



Only use self-locking nuts once.

- 7 Remove the platform support mentioned under point 2.

- 8 Remove the autolevel blocking pins from both machines by carefully lowering the highest carriage with the brake lifters (fig. 3-56) until the blocking pin (fig. 3-57) (see 'Assembly with standard HEK platform sections' in paragraph 3.3.4) can be removed. Store it in its case (fig. 3-57 - detail). Also visually check if the switches are operated. Then lower this carriage approx. 0.33 ft by using the brake lifter, so the other carriage can be released by following the same procedure.

Repeat the procedure above for the other carriage.



Always remove/install the blocking pins with 2 mechanics: one for the **controlled** lowering of the carriage with the brake lifter and the other for removing/installing the blocking pin of the same carriage (fig. 3-57).



Fig. 3-55 Screwing down platform sections



Fig. 3-56 Carriage - brake lifter



Fig. 3-57 Blocking pin in autolevel beam

- 9 Adjust the autolevel brake correctly. Mount the arm on L on the left carriage (fig. 3-58); on R on the right carriage (fig. 3-59) (left and right: seen from the side at which the stairs have been mounted). Remember to install the locking pins!



Failure to correctly adjust the autolevel brake can result in a dangerous tilting of the platform in case of an emergency descent.



The autolevel control cable was adjusted in the factory. **NEVER** change this adjustment.

The twin set-up is now ready for completion up to the required height and anchoring; see paragraph 3.3.6.

3.3.6 Assembly up to required height / anchoring



In case of an interruption in the assembly and anchoring work, make sure that its progress is clear when resuming work. Always completely finish the part of the assembly and anchoring that you are working on, before interrupting the work.



When the work is interrupted, always lock the main switch to prevent others from operating the machine.



Fig. 3-58 Autolevel brake - left-hand carriage



Fig. 3-59 Autolevel brake - right-hand carriage



Always conclude the assembly with a test run; see paragraph 3.4.3.3 for the correct procedure. When this test run has not been performed yet, **ONLY** use the mast climbing work platform for transporting its own mast elements and anchoring material.



Only use mast elements made of ST-420 MC. They can be identified by an identification plate or welded on 'T'.



When assembling with the carriage without an elevation, turn the adjustable guide rolls free from the mast until they 'click', i.e. from the operating position (fig. 3-60) into the assembly position (fig. 3-61). Then the safety switch switching arms should be lifted from the switching disc recess.



During the assembly of the mast a maximum load of 50% of the total lifting capacity applies for the relevant configuration (see paragraph 3.4.1, 'Loading the machine', for the loading diagrams) and in case of a single set-up a max. of 2 persons are allowed on the platform and in case of twin set-up a max. of 4.



When the mast is anchored, never load more mast elements onto the platform than required for reaching the next anchor position (when the anchor position has been reached, no load is allowed on the platform, except for the anchoring material, tools and the max. permissible number of persons).

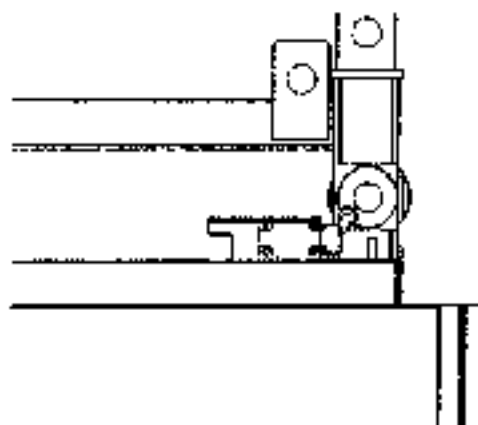


Fig. 3-60 Platform - guide rollers - operating position

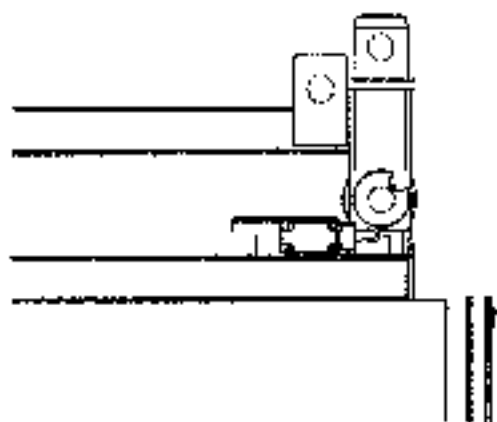


Fig. 3-61 Platform - guide rollers - assembly position



Do not assemble the mast when the windforce is higher than 5 Beaufort.

- 1 Mount the stairs to facilitate access to the platform (fig. 3-62).
- 1 Mount the railings to the stairs, if necessary.
- 2 Open the carriage platform hatch.
- 3 Remove the locking pins from the stairs (fig. 3-63).
- 4 Slide the stairs into the tubes.
- 5 Secure the stairs with the locking pins (fig. 3-64).

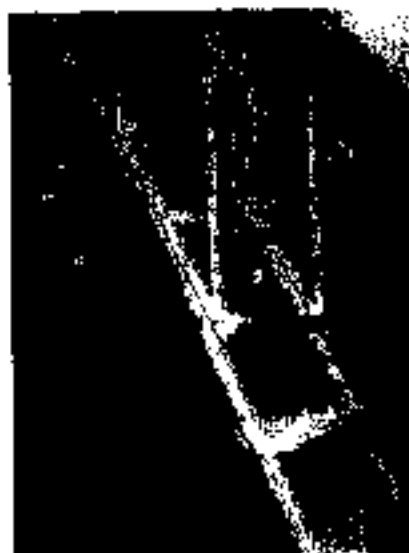


Fig. 3-62 Platform - stairs

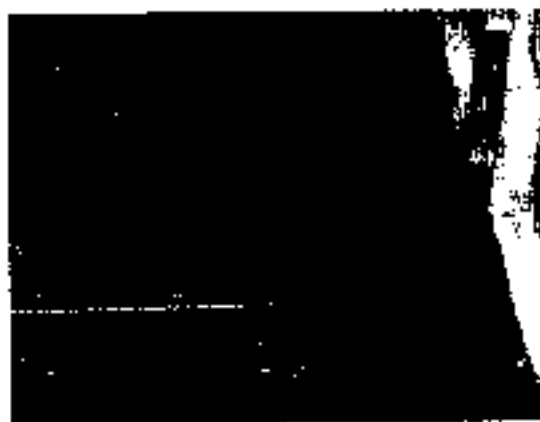


Fig. 3-63 Platform - stairs locking pin removed



Fig. 3-64 Platform - installing stairs locking pin



2 Mount the gate.

- 1 Place the gate in the appropriate tube on the carriage (fig. 3-65).
- 2 Mount the switching disc for the gate safety switch in the assembly position (also refer to fig. 3-65, item 1 - switch shown in operating position).
- 3 Adjust the disc so the switch roller will fall into the recess when the gate is closed. The switch should switch when the door is opened up to 1.97 in.
- 4 Secure the assembly.
- 5 Check the operation of the gate and gate safety switch in the operating position (fig. 3-66).

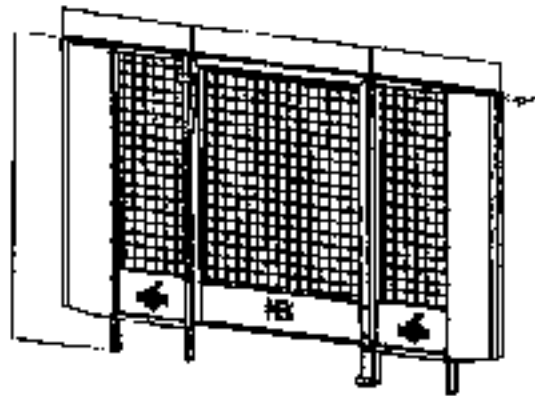


Fig. 3-65 Platform - gate



Fig. 3-66 Platform - gate safety switch

- 3 Install the fence (fig. 3-67) onto the platform before continuing. In the next steps you will go upwards with the platform and materials, so the platform should have a protection to prevent personal injuries and material damage.

Position the fences directly next to the gate and mast after mounting the fences on the plates next to the carriage(s). Do not forget them!

A 3.62 ft high fence including kick plate around the mast climbing work platform is mandatory. This can only differ at the facade side under the following circumstances. If the distance between facade and platform is less than or equals 0.82 ft, a kick plate with a minimum height of 0.49 ft is required. When the distance is more than 0.82 ft, but less than or equals 1.32 ft, a fence with a minimum height of 2.3 ft is required. If the distance is more than 1.32 ft, a fence with a minimum height of 3.62 ft is required. Also see fig. 3-68.

- 1 Slide the fences in the appropriate tubes and lock them with spring washers.
- 2 Place the plug-in fences next to the gate and mast guard and secure them with spring washers. See fig. 3-69.
- 3 Attach the corner posts to both platform ends. Note the connections: male or female.



Fig. 3-67 Platform - placing fences

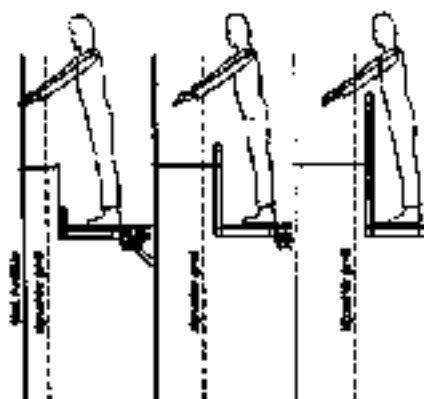


Fig. 3-68 Platform - distance to facade



Fig. 3-69 Platform - fence next to gate

- 4 Slide the end fence in the guide and fix its position with locking pins.
 - 5 Check whether or not the platform should be extended with platform extens or sections (option) at the facade side. If so, install them now; see paragraph 3.3.7, 'Mounting the accessories' for the correct procedure.
 - 6 Install the protection at facade side.
- 4 Take the carriages from the buffers (if not taken from the buffers for the assembly of the basic set-up or linking to a twin set-up, if applicable) and perform the operational tests. See paragraph 3.4.2, 'Controls', for the location and function of the various controls and paragraph 3.4.3, 'Operating the machine', for the correct procedures.

Also check the operation of the proximity switch (fig. 3-70) on the carriage(s). If it no longer detects any metal (mast), the carriage must be stopped.



The proximity switch is not a safety device. Do not automatically assume that the proximity switch will stop the platform.

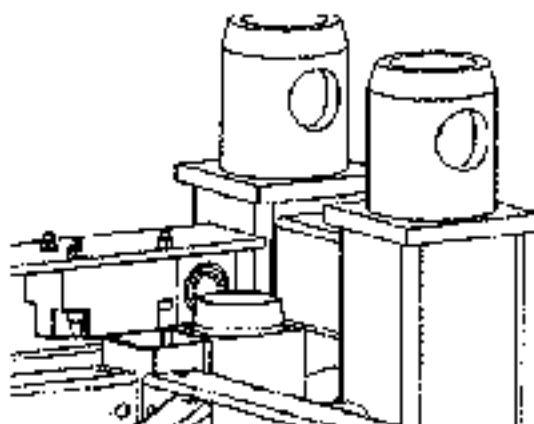


Fig. 3-70 Carriage - lower proximity switch



- 5 Select the assembly method and position all mast sections (freestanding machine) or the mast sections up to the next anchoring point (anchored machine).

In this last case, for reaching an anchoring point see step 6 for the anchoring procedure and continue the assembly at step 5 until the selected permissible height has been reached.

The assembly method for the mast depends, among others, on the local labour standards, the type of mast elements used (49.49 or 59.42 in long) and the available means. The mast can be assembled as follows:

- A Manually (not always permitted because of the mast element weight) (proceed with step 5a);
- B With a crane on the platform (proceed with step 5b);
- C With mobile or building cranes (proceed with step 5c).

Assemble both masts simultaneously on a twin set-up.

Do forget to install cable guides during the assembly.

5a Manual mast assembly

Generally, the 'light-weight' 4.11 ft masts are used for manual assembly.

- 1 Load sufficient mast elements for one anchor field on the machine and distribute them uniformly on both sides of the mast. Consider the maximum permissible load during assembly. Facilitate the loading of the platform by temporarily removing one or more fences. Make sure that the fences are reinstalled and secured before the machine is moved upwards.
- 2 Move the platform upwards until there is approx. 3.94 inch of mast left over the upper edge of the carriage.
- 3 Place a new mast element on the mast (fig. 3-71).
- 4 Lower the platform until the bolts can be fastened in safe and comfortable way. Tighten the bolts from top to bottom (nut first); for tightening torque see paragraph 3.2, 'Technical data'.
- 5 Repeat step 2 - 6. To prevent an excess eccentric loading, unload the platform evenly during the mast assembly, symmetrically distributing the load over the platform in relation to the mast.

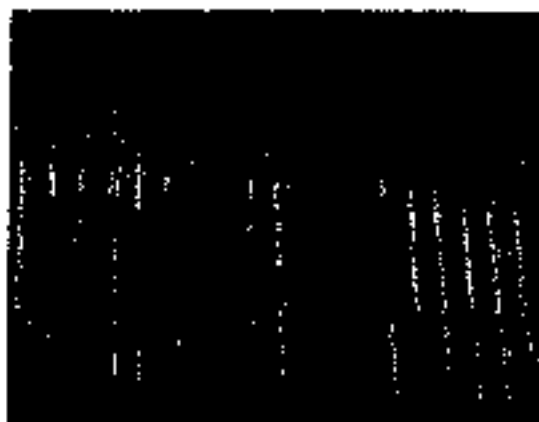


Fig. 3 71: Placing mast element



**5b Mast assembly with building crane
(option)**

An optionally available HEK building crane can be used for mast assembly. See paragraph 3.3.7 for the positioning procedure of the crane before continuing.

The building crane has sufficient working height to install 4.92 ft long masts.

- 1 Load (by using the building crane) sufficient mast elements on the machine and distribute them uniformly on both sides of the mast. Consider the maximum permissible load during assembly.

Facilitate the loading of the platform by temporarily removing one or more fences. Make sure that the fences are reinstalled and secured before the machine is moved upwards.

- 2 Attach one of the mast elements to the crane.
- 3 Move the platform upwards until the mast element in the crane can be placed onto the mast, but always leave at least approx. 3.94 in of mast over the upper edge of the carriage. Any additional lifting height can be obtained with the crane.



- 4 Place the new mast element on the mast.
- 5 Tighten the bolts from top to bottom (nut first).
- 6 Repeat step 2 - 6 for the next mast.

Put the crane in the locked position while the platform is ascending or descending.

Upon completion of the mast and upper part assembly, remove the building crane, see paragraph 3.3.9.

5c Mast assembly with mobile or building crane

If a (building) crane is used, the mast assembly can be accelerated considerably. By using the crane, mast sections with a maximum length of 24.7 ft can be placed on the mast.

If a crane is used for assembly, no masts have to be placed on the platform. Complete mast lengths can be supplied. The lengths can also be assembled at the building site. This is done as follows:

- 1 Push together as many masts on a flat surface as required for one mast length with a maximum of 24.7 ft.
- 2 Tighten the bolts and make sure that they are orientated from top to bottom (nut first).



- 3 Attach the crane on max. 1/3 of the height or higher on the mast length. It is recommended to fasten the mast on one side, because the mast length will otherwise tip over while lifting.
- 4 Position the mast length vertically. Keep the crane above the mast's centre of gravity, otherwise the mast bottom will forcibly slide over the ground.
- 5 Move the platform to the required height.
- 6 Lift the mast length above the mast
- 7 Put the mast length in the correct position and slowly lower the crane.
- 8 Tighten the bolts from top to bottom (nut first); for torque see paragraph 3.2.
- 9 Move the platform upwards and disassemble the crane.
- 10 Repeat this for the next mast length.

When using a building crane, the mast can be assembled with a mounted upper part and mast guard. For this purpose, the mast guard is equipped with steps. These steps, combined with the safety measures complying with the local regulations, enable the assembly of masts above the mast guard. Make sure that the persons involved at least wear a certified safety line.

- 6 Install the anchor (applicable for anchored machine only; proceed with step 7 when the machine is used freestanding).



Only use original HEK anchoring material (mast adapters, adjustable anchor tubes, wall plates, shore tubes) developed especially for this machine.



The quality of the construction (facade) to which the mast is anchored, must be such as to withstand the anchoring forces applied to it.



The owner / person responsible for the construction to which the mast is anchored, should confirm this (in writing).



Always complete the last assembly phase when work is interrupted. Tighten the bolts of the fast mountings and lock the main switch, so the mast climbing work platform cannot be operated by anyone.



Plan the mast assembly and loading so the platform load is minimised during anchoring.



The mast should not protrude too far above the highest anchor. Install an additional anchor for stability, as close to the mast top as possible.



Note the position of the cable support arm when positioning the anchor.

Consult the following tables for the anchoring forces:

- single set-up - table S1 to S5
- twin set-up - table T1 to T5

The anchoring forces (fig. 3-72) are mainly influenced by the platform length and the presence of an extension and / or weather protection.

In the tables the various configurations are coded as follows:

- A** without platform extension, without covering
- B** with 1 m (3.29 ft) platform extension, without covering
- C** without platform extension, with covering
- D** with 1 m (3.29 ft) platform extension, with covering

Furthermore, the following abbreviations are used:

N_a number of platform sections outside the mast

N_i number of platform sections between two masts other than the obligatory Megadeck

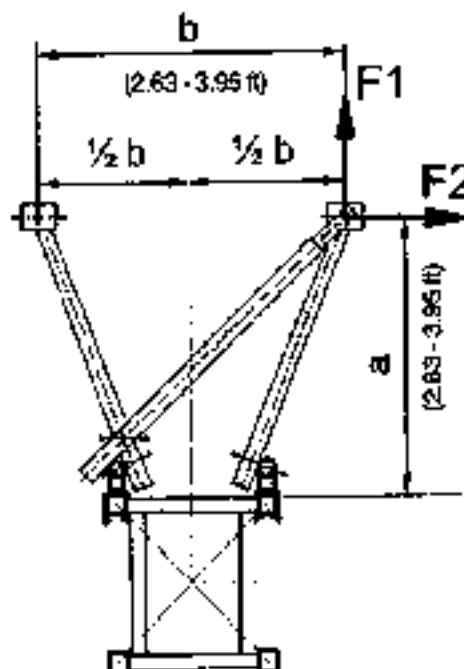


Fig. 3-72 Anchoring forces & ratio a/b



For the anchor directly under the uppermost mast element the anchoring forces described in the tables below have to be increased with the following factors:

- 1.3 for all in-service anchoring forces
- 2.2 for all out-of-service anchoring forces



For all anchors used in a single or twin set-up (with anchor ratio a/b higher than or equal to 1) use anchor tubes with an outer diameter of 2.5" with corresponding work platform couplings.



For intermediate values for a/b (fig. 3-72) the anchoring forces can be determined by linear interpolation. This applies to both $F1$ and $F2$, as well as to the out-of-service anchoring forces. See the info block below for an example of a calculation.

Precalculation of interpolation

Set-up: 1-mast (= single set-up)

- Platform configuration: C (platform with covering, without extension (table S3))
- Platform length: 41.13 ft
- Number of persons: 4
- Anchoring distance: 46.08 ft
- Anchor ratio (a/b): 1.0

- For anchoring distance 39.5 [ft]: Anchor ratio (a/b): 0.55 \rightarrow 3,816.5 [lbf]
 Anchor ratio (a/b): 1.55 \rightarrow 5,837 [lbf]
 Anchor ratio (a/b): 1.0 \rightarrow 4,736.95 [lbf] (A)

- For anchoring distance 34.3 [ft]: Anchor ratio (a/b): 0.55 \rightarrow 3,592 [lbf]
 Anchor ratio (a/b): 1.55 \rightarrow 5,812.5 [lbf]
 Anchor ratio (a/b): 1.0 \rightarrow 4,512.45 [lbf] (B)

- For anchoring distance 46.1 [ft]: Anchor value for 39.5 [ft] anchoring distance: (A)
 Anchor value for 49.4 [ft] anchoring distance: (B)
 Anchor value for 46.1 [ft] anchoring distance: 4,579.9 [lbf]

Result:

$F1 = 4,579.9$ [lbf] for 46.1 ft anchoring distance and 1.1 anchor ratio (a/b).

The same procedure can be followed for the other anchoring forces.



MS ProMax in single set-up

Table S1 to S5 refer to an MS ProMax single set-up.

See fig. 3-73 for a diagram and abbreviations.

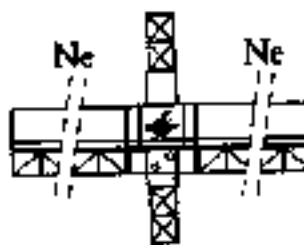


Fig. 3-73 Single set-up - diagram

Diagram S1

Configuration:			A															
Anchor distance (m):			33.4						48.2									
Ratio (m/h):			0.55				1.85				0.85				1.85			
Ne	2.83	L	Number of persons				Number of persons				Number of persons				Number of persons			
			F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2		
0	1	11.5	1574		1799	899	3147		3597	1124	1574	874	1799		3147		3372	
1	0	16.1	1799		2023	899	3597	1124	4047		1799		2023	899	3372		3491	1124
1	1	21.3	2023	899	2248		3822	1124	4496		2023		2248		3822		4272	
2	0	25.9	2248		2698	1124	4272		4948		2248	899	2473		4847		4721	
2	1	31.2	2248		2698		4496		5171		2248		2698	1124	4272	1124	4948	
3	0	38.8	2473		2923		4721		5491	1349	2473		2923		4496		5096	
3	1	41.0	2473		3147	1349	4721	1349	5845		2473		2923		4496		5421	1349
4	0	45.6	2698	1124	3372		4948		6070		2698	1124	3147	1349	4721		5845	
4	1	50.8	2698		3372	1079	5171		6205		2698		3372		4721		5845	

L in h / F in G

Diagram S2

Configuration:			B															
Anchor distance (m):			12						15									
Ratio (m/h):			0.55				1.85				0.55				1.85			
Ne	2.83	L	Number of persons				Number of persons				Number of persons				Number of persons			
			F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2		
0	1	11.9	1574		1799		3147		3597	1124	1574	874	1799		3147		3372	
1	0	16.1	1799		2023	899	3597		4047		1799		2023	899	3372		3822	1124
1	1	21.3	2023	899	2248		3822	1124	4496		2023		2248		3822		4272	
2	0	25.9	2248		2473		4047		4721		2248	899	2473		4496		4848	
2	1	31.2	2248		2698	1124	4272		5171	1349	2248		2698	1124	4047	1124	4948	
3	0	35.8	2473		2923		4496	1349	5398		2473		2923		4272		5171	1349
3	1	41.0	2473	1124	2923	1040	4496		5621		2473		2923		4272		5398	
4	0	45.6	2473		3147		4721	1124	5845		2473	1124	3147	1349	4496		5621	
4	1	50.8	2698		3147		4721		5845	1124	2473		3147		4496		5398	1124

L in h / F in G



Diagram 52

Configuration:			C													
Anchor distance (R):			39.4						49.2							
Ratio (a/b):			0.55			1.55			0.55			1.55				
No	4.92	2.63	Number of persons				Number of persons				Number of persons				Number of persons	
			F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴		
0	1	11.5	1799	2023	800	3822	1124	3822	1799	1799	800	3822	1124	3822	1124	
1	0	16.1	2023	899	800	3822	1124	4272	1799	899	2023	800	3597	1124	4047	
1	1	21.3	2248	2473	1124	4047	4721	4721	2248	2473	1124	3822	1124	4496	4496	
2	0	25.9	2473	2923	1349	4272	4946	4946	2473	2923	1124	4272	1349	4721	4721	
2	1	31.2	2698	3147	1349	4496	5398	5398	2698	3147	1349	4272	1349	5171	1349	
3	0	38.8	2923	3597	1574	4721	5621	5621	2923	3597	1349	4496	1349	5398	5398	
3	1	41.0	3147	3822	1574	4946	5946	5946	2923	3822	1574	4496	1574	5621	5621	
4	0	45.8	3597	3822	1574	4946	5946	5946	3147	1349	3822	1574	4721	1124	5621	
4	1	50.9	3822	3822	1574	4946	1124	5621	3147	3822	1574	4496	1124	5998	1124	

L in R / F in lbf

Diagram 53

Configuration:			D													
Anchor distance (R):			39.4						49.2							
Ratio (a/b):			0.55			1.55			0.55			1.55				
No	4.92	2.63	Number of persons				Number of persons				Number of persons				Number of persons	
			F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴	F1 ²	F2 ⁴		
0	1	11.5	1799	2023	899	3572	1124	5822	1799	1799	899	3372	1124	3822	1124	
1	0	16.1	2023	899	800	3822	1124	4272	1799	899	2023	800	3597	1124	4047	
1	1	21.3	2248	2473	1124	4047	4496	4496	2023	2473	1124	3822	1124	4496	4496	
2	0	25.9	2473	2923	1124	4272	4946	4946	2248	2698	1124	4047	1124	4721	1349	
2	1	31.2	2698	3147	1349	4272	5171	5171	2473	2923	1349	4272	1349	4946	1349	
3	0	35.8	2923	3372	1349	4496	5398	5398	2698	3147	1349	4272	1349	5171	5171	
3	1	41.0	2923	3597	1574	4496	5621	5621	2923	3572	1574	4272	1574	5171	5171	
4	0	45.8	3147	3822	1349	4496	5621	5621	2923	1349	3822	1574	4272	1124	5621	
4	1	50.9	2923	3822	1574	4047	899	5621	2923	3822	1574	4047	899	5621	5621	

L in R / F in lbf

Diagram 54

Configuration:			Out-of-service							
Anchor distance (R):			39.4				49.2			
Ratio (a/b):			0.55		1.55		0.55		1.55	
			F1	F2	F1	F2	F1	F2	F1	F2
			1349	1124	3372	1374	1798	1349	4047	1798

F in lbf

All 'out-of-service' anchoring forces are calculated up to a wind force of 11.4 lbf/ft² (10 Bft) with a wind pressure of 544 N/m².

If higher wind forces occur locally, the anchoring forces mentioned have to be corrected proportional to the wind pressure.



MS ProMax in twin set-up

Table T1 to T5 refer to an MS ProMax twin set-up.

See fig. 3-74 for a diagram and abbreviations.

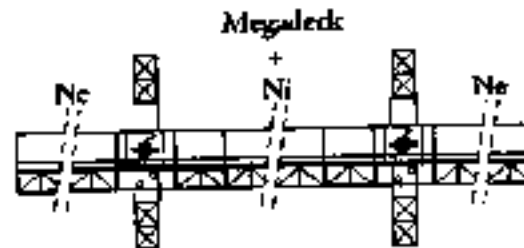


Fig. 3-74 Twin set-up - diagram

The values in the following tables refer to set-ups in which one Megadeck is centrally located between both masts. If no Megadeck is used or if it is not centrally located between the masts, different anchoring tables apply.

Between the masts only 1 large platform element (4.92 ft) can be replaced by a smaller one (3.14 ft); then values from the following tables still apply

Diagram T1		A											
Configuration:		D				E				F			
M (w. megadeck): Anchor distance (ft): Poles (ft)		30.4		30.2		30.1		30.1		30.2		30.3	
Ma		0.56	1.50	0.50	1.54	0.44	1.50	0.54	1.48	0.54	1.44	0.46	1.48
		P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
1		1148	860	2479	860	1128	860	2473	860	1128	860	2473	860
2		1124	2020	2124	2020	1124	2020	1124	2020	1124	2020	1124	2020
3		1124	874	2020	874	1124	874	2020	874	1124	874	2020	874
4		1124	2020	874	2020	1124	874	2020	874	1124	874	2020	874
5		1124	1728	1728	1728	1124	1728	1728	1728	1124	1728	1728	1728
M (w. megadeck): Anchor distance (ft): Poles (ft)		30.1		30.2		30.4		30.2		30.1		30.3	
Ma		0.56	1.48	0.50	1.45	0.44	1.45	0.50	1.45	0.50	1.40	0.46	1.40
		P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
1		1248	860	2473	860	1124	860	2473	860	1124	860	2473	860
2		1248	2020	2124	2020	1124	2020	1124	2020	1124	2020	1124	2020
3		1124	874	2020	874	1124	874	2020	874	1124	874	2020	874
4		1124	2020	874	2020	1124	874	2020	874	1124	874	2020	874
5		1124	1728	1728	1728	1124	1728	1728	1728	1124	1728	1728	1728
M (w. megadeck): Anchor distance (ft): Poles (ft)		30.3		30.2		30.4		30.2		30.1		30.3	
Ma		0.43	1.46	0.50	1.50	0.44	1.46	0.50	1.46	0.46	1.42	0.46	1.50
		P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
1		1124	860	2342	860	1124	860	2342	860	1124	860	2342	860
2		1124	2020	2124	2020	1124	2020	1124	2020	1124	2020	1124	2020
3		1124	874	2020	874	1124	874	2020	874	1124	874	2020	874
4		1124	2020	874	2020	1124	874	2020	874	1124	874	2020	874
5		1124	1728	1728	1728	1124	1728	1728	1728	1124	1728	1728	1728
M (w. megadeck): Anchor distance (ft): Poles (ft)		D				E							
Ma		30.4		30.2		30.4		30.2					
		0.56	1.50	0.50	1.54	0.44	1.50	0.54	1.48				
		P1	P2	P1	P2	P1	P2	P1	P2				
1		1124	2020	1124	2020	1124	1728	1124	1728				
2		1124	2020	1124	2020	1124	1728	1124	1728				
3		1124	874	1124	874	1124	874	1124	874				
4		1124	2020	1124	2020	1124	874	1124	874				
5		1124	1728	1124	1728	1124	1728	1124	1728				



Diagram 72

Configuration:

Anchor distance (ft):

Ratio (adj):

No	0.55		1.00		1.55		2.00		2.55		3.00		3.55		4.00		4.55	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
	1	1674	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874
2	1674	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
3	1674	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
4	1674	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573

Anchor distance (ft):

Ratio (adj):

No	0.55		1.00		1.55		2.00		2.55		3.00		3.55		4.00		4.55	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
	1	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874
2	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
3	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
4	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573

Anchor distance (ft):

Ratio (adj):

No	0.55		1.00		1.55		2.00		2.55		3.00		3.55		4.00		4.55	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
	1	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874
2	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
3	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
4	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573

Anchor distance (ft):

Ratio (adj):

No	0.55		1.00		1.55		2.00		2.55		3.00		3.55		4.00		4.55	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
	1	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874
2	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
3	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573
4	1700	2473	1574	2292	1474	2173	1374	2073	1274	1973	1174	1873	1074	1773	974	1673	874	1573

Diagram 73

Configuration:

Anchor distance (ft):

Ratio (adj):

No	Out-of-service							
	0.55				1.00			
	F1	F2	F1	F2	F1	F2	F1	F2
1	1340	1724	1340	1724	1340	1724	1340	1724
2	1340	1724	1340	1724	1340	1724	1340	1724
3	1340	1724	1340	1724	1340	1724	1340	1724
4	1340	1724	1340	1724	1340	1724	1340	1724

F in ft

All 'out-of-service' anchoring forces are calculated up to a wind force of 11.4 lbf/ft² (10 BR) with a wind pressure of 544 N/m².

If higher wind forces occur locally, the anchoring forces mentioned have to be corrected proportional to the wind pressure.

Securing an anchor:

- 1 Determine the position of an anchor on the wall or construction.
- 2 Consider a possible extension when determining the location of the wall plates.
- 3 Push the emergency stop button on the platform switch box.
- 4 Mount the mast adapters (fig. 3-75, item 1) at the correct height onto the mast using 4x M14 bolt, quality 8.8. Lock the bolts with self-locking nuts, quality 8; tightening torque: 77.6 lb ft.
- 5 Mount the wall plates (fig. 3-75, item 2) to the facade as shown.
- 6 Mount the anchor tubes (fig. 3-75, item 3) between the mast adapters and wall plates. Mount the anchor tubes to the wall plates using 2x M16 bolts, quality 8.8.
- 7 Level the mast and place it parallel to the building.
- 8 Tighten the anchor tube couplings with a 56.95 lb ft torque. Lock the M16 bolts with self-locking nuts, quality 8; tightening torque: 116.24 lb ft.
- 9 Check if the mast is level by using a spirit level of at least 3.29 ft.
- 10 Secure the shore tube (fig. 3-75, item 4) to the anchor tube using a coupling; tightening torque: 36.95 lb ft. Mount the shore tube to the wall plate, refer to the steps 6 and 8.

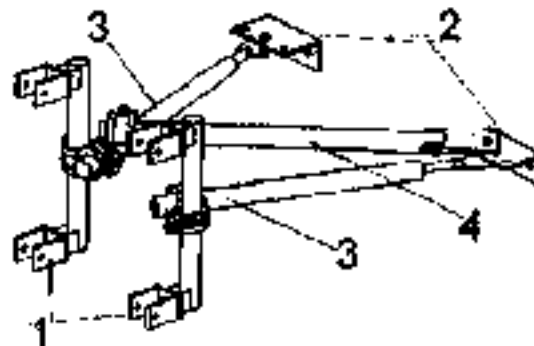


Fig. 3-75 Mast - anchoring



- 11 Make sure that the platform extension does not interfere with the mast anchoring.
- 7 Install the red uppermost mast element(s).
- 8 Place the upper part of the carriage(s).

The upper part can only be mounted 'over the mast'. Depending on the local (labour) standards, it can be mounted by two persons or (simpler) by using the crane on the platform.

- 1 Move the platform towards the top of the mast.
- 2 Lift or raise the upper part (fig. 3-76) over the (uppermost) mast (element) and lower it over the mounting tubes.
- 3 Insert the two mounting pins and secure them with spring washers (fig. 3-77).
- 4 Carefully lower the platform until the guide rolls are on the mast tubes.
- 5 Connect the proximity switch plug.
- 6 Turn the adjustable guide rolls free from the mast until they 'click' (fig. 3-78). In this position the switching arms should fall in the recess on the switching disc.

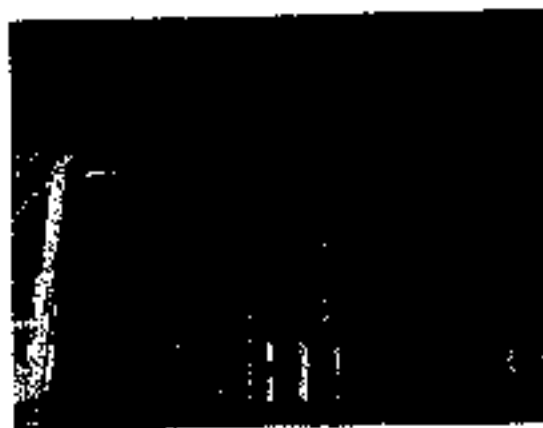


Fig. 3-76 Carriage - placing upper part



Fig. 3-77 Carriage - securing upper part

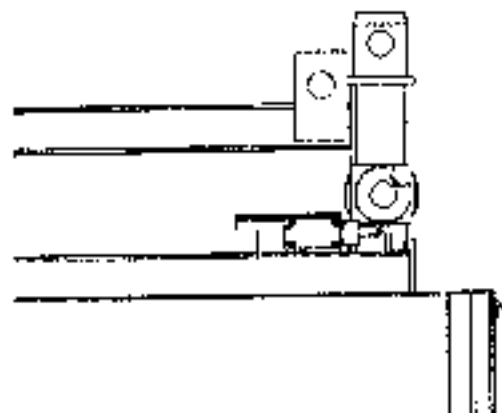


Fig. 3-78 Platform - guide rollers - assembly position

- 7 Move the platform upwards and check the operation of the proximity switch on the upper part.



To enable the assembly of the carriage elevation, install the uppermost mast elements with an upper striker plate with the striker plate on the wall side.

- 9 Install the detachable upper striker plate at the correct height. Although many of the (older) uppermost mast elements have an upper striker plate, it cannot be used for the ProMax. Always install the detachable upper striker plate at the correct height; proceed as follows:

- 1 Determine the machine's maximum stopping height. Consider the mast guard height.
- 2 Install the striker plate on both masts so the emergency upper switches (lowest of the two limit switches) can be operated in this platform position.

- 10 Install the mast guard. First install the left and right part and then the front part. Lock the mast guard at the bottom with blocking pins.

The machine is now ready for use (see paragraph 3.4, 'Operating the machine') or mounting of accessories (see paragraph 3.3.7, 'Mounting the accessories').

3.3.7 Mounting the accessories



In case of an interruption in mounting the accessories, make sure that its progress is clear when resuming work. Always completely finish the part of the assembly that you are working on, before interrupting the work.

Cable support arm

The cable support arm protects the supply cable during the operation of the machine. Although it is allowed to work without a cable support arm: at mast heights <math>< 85.8\text{ ft}</math> and low wind load, it is recommended nevertheless to use this arm in these situations. In all other cases, the use of a cable support arm is mandatory.

- 1 Select the correct version.
A left and right-hand version is available. Determine the correct position of the cable support arm by using a cable guide.
- 2 Install the cable support arm on one of the shores at the rear (facade side) of the carriage (fig. 3-79).



Note the position of the cable support arm when positioning the anchorings.



Fig. 3-79 Cable support arm

Anchor ramp

When you have to work at the rear of the (anchored) mast, an anchor ramp must be installed. To prevent ascending and descending with a closed ramp (fig. 3-80), the ramp position must be monitored electrically (fig. 3-81).

- 1 Mount the anchor ramp to the platform extension.
- 2 Connect the anchor ramp to the safety circuit. Use the special socket underneath the platform (fig. 3-82, item A).



Fig. 3-80 Anchor ramp



Fig. 3-81 Anchor ramp switch



Fig. 3-82 Safety circuit socket position



Platform extension sections

The optionally available platform extension sections are used for extending the platform at facade side. For this purpose, the platform elements have outriggers.

They can be extended to a maximum of 3.29 ft. Since the outriggers can be adjusted independently, the platform can be adapted to almost any type of facade.



The platform extension must comply with the EN1495 standard.

The platform extension should be made of a skid-proof, easily cleanable material. The extension should have good drainage.

Ensure that there are no openings in the floor where a ball with a 0.01 in diameter can roll through.



The platform extension must be able to resist a static load of at least 440 lb at the most unfavourable square surface of 0.33 x 0.33 ft, without permanent deformation.



The outriggers must be secured.



When working behind the mast, an anchor ramp must be mounted if the mast is anchored.



The platform extension deck must be secured under any circumstances.



The platform extension and mast anchoring must not make contact when the mast climbing work platform is ascending or descending. The minimum distance is 0.33 ft.

Never extend the outriggers outside the maximum length (last hole). The maximum extending length is marked in red on the outrigger and matches a platform extension of 9.29 ft.

- 1 Extend the outriggers up to the desired length and secure them with locking pins. The outriggers have some standard locking holes. When they do not match the holes in the platform tube in the desired extending position, drill a 0.51 in hole on the outrigger centre line.
- 2 Provide the outriggers with boards or footdeck. Make sure that the outrigger ends are uncovered to leave room for mounting a kick plate or fence.



Building crane

The building crane (fig. 3-83) is used for facilitating the machine assembly (lifting fence elements, mast sections, etc). The crane can either be mounted on left or right-hand side of the stairs on the carriage.

The building crane cannot be applied combined with the optionally available weather protection.

Below the right-hand side assembly of a 'folded up' crane is described. Two persons are required for the installation.

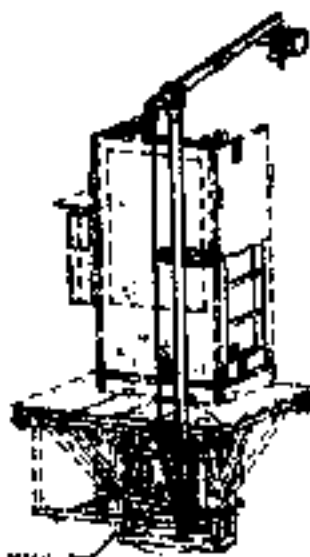


Fig. 3-83 Building crane



Tighten the bolts in the couplings with a 36.95 lb-ft torque.

- 1 Mount the support with spacers on the carriage.
- 2 Install the shores.
- 3 Place the crane in the support and mount the bolt at the bottom side (fig. 3-84).
- 4 Attach the electric winch to the crane jib.
- 5 Lift up the crane jib and attach the bottom side of the tensioning cable to the frame (fig. 3-85).
- 6 Feed the supply cable under the platform and insert the plug in the wall socket next to the switch box.
- 7 Secure the supply cable with cable ties to the crane.

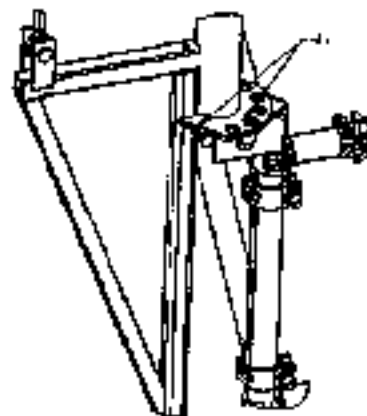


Fig. 3-84 Building crane - locking

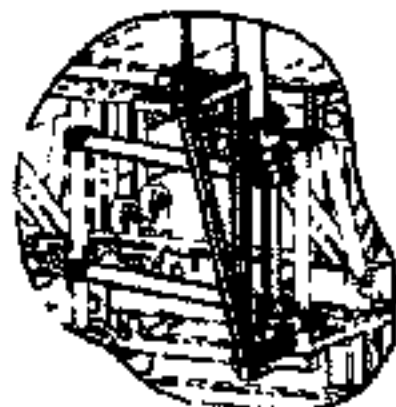


Fig. 3-85 Building crane - detail A (tensioning cable)

- B Test the crane's upward / downward movement.**

Put the crane in the locked position while the platform is ascending or descending

Upon completion of the mast and upper part assembly, remove the building crane.

Weather protection

As a base optionally available 2.63 or 4.82 ft long steel tube frames (fig. 3-86) are used, which can be pushed in the lower tubes of the standard plates. Then a canvas can be installed.

For detailed advice regarding the available possibilities for creating walls and/or a roof, we advise you to consult your dealer.

A frame consists of a 'wall part' and a 'roof part'. The roof part has various mounting holes. With these holes the weather protection can be adapted to the platform width. Assuming that the weather protection is placed at the front of the platform, the assembly is as follows:



A weather protection has a considerable influence on the loading capacity; see loading tables in paragraph 3.4.1, 'Loading the machine'.

- 1 Remove the locking pins at the front of the platform tubes.
- 2 Slide the wall part in the cleared platform tubes
- 3 Secure the tubes with locking pins.

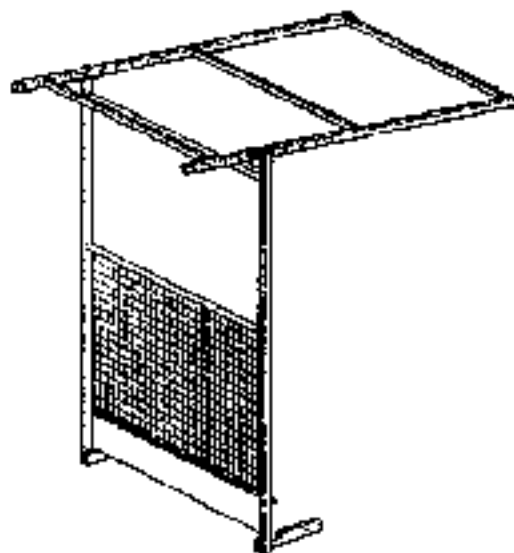


Fig. 3-86 Weather protection - tube frame

INFO FOR ASSEMBLY TEAM AND USER



- 4 Determine the mounting holes used for mounting the roof part onto the wall part.
- 5 Place the roof part upright between the wall part mounting plates and install a bolt on each side.
- 6 Turn the roof part on the installed bolts and install the second set of bolts.
- 7 When frames are placed on every plate, the assembly can be closed up.

3.3.8 Repositioning at the building site



Always observe the following guidelines when repositioning a machine on a chassis at the building site.



Take care not to hit any obstacles such as trees, power cables, etc.



No load is allowed on the platform during repositioning.



Put the platform in the lowest position on the mast, i.e. in the buffers, during repositioning.

If the chassis drive is used, the mast can have a maximum length of 65.8 ft under ideal circumstances (on a flat, hard, horizontal surface and when there is no wind).

The legs must be in an X position, fully extended and secured. Unscrew the jacks until they are just above the ground and secure them.

Under less favourable circumstances than described above, consult your supplier.

A freestanding twin set-up can only be repositioned without taking curves. If curves are unavoidable, the platform must be split into two (symmetrical) single set-ups. Note the maximum permissible platform length of a single set-up.



The chassis can be repositioned manually, with a towing vehicle or by electric drive (if mounted). It is only allowed to drive at a foot pace.

3.3.8.1 Repositioning the chassis manually or with a towing vehicle



Transporting the machine on public roads with a chassis is not allowed.



No load is allowed on the platform during repositioning.



The speed limit for repositioning with a towing vehicle is mainly determined by the conditions of the surface. Adapt your speed to these conditions.

- 1 If required, disconnect the two mechanical clutches of the drive (fig. 3-87) by moving both handles outwards till the locking cams engage.
- 2 Attach the tow bar and secure it.
- 3 Lower the platform onto the buffers.
- 4 Connect the tow bar to the towing vehicle, if applicable.
- 6 Release the blocking in the right rear wheel (fig. 3-88) by pulling the blocking away from the wheel, till the locking cam engages.
- 6 Move the machine to the new position.



Fig. 3-87 Drive clutch is neutral



Fig. 3-88 Wheel blocking locked

After repositioning the chassis, engage the wheel blocking and release the drive clutch.

3.3.8.2 Repositioning the chassis with the electric drive

Transporting the machine on public roads with a chassis is not allowed.

No load is allowed on the platform during repositioning.

- 1 Engage the two mechanical clutches of the electric drive, if necessary; see 'Repositioning the chassis manually or with a towing vehicle' (paragraph 3.3.8.1).
- 2 Attach the tow bar and secure it; see 'Repositioning the chassis manually or with a towing vehicle' (paragraph 3.3.8.1).
- 3 Lower the platform onto the buffers.
- 4 Connect the platform supply voltage to the chassis switch box (fig. 3-89).
- 5 Connect the control voltage cable from the tow bar remote control (fig. 3-90) to the chassis (fig. 3-91).
- 6 Release the blocking in the right rear wheel; see 'Repositioning the chassis manually or with a towing vehicle' (paragraph 3.3.8.1).



Fig. 3-89 Chassis drive supply connection



Fig. 3-90 Chassis drive remote control

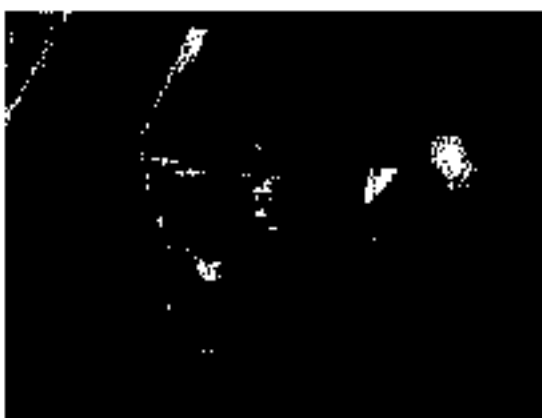


Fig. 3-91 Control current cable connection



- 7 The chassis can be repositioned by operating the buttons on the tow bar. The travel direction depends upon the phase sequence of the supplied voltage. Push one of the buttons to determine the travel direction. The control voltage can always be disconnected by pushing the emergency stop button.

After repositioning the chassis, operate the emergency stop, engage the wheel blocking and put the clutch in neutral. Remove the supply voltage and control voltage plugs.

3.3.9 Disassembly procedure

The disassembly procedure actually is the assembly procedure reversed. See the assembly procedure for detailed information and perform the steps in reverse order.



Ensure that the maximum load during assembly is not exceeded.



Always start the mast disassembly of an anchor field with an empty platform.



Do not disassemble the machine when the windforce is higher than 5 Beaufort.

Twin set-up:

Lower the platform until it has reached the first mast element and disconnect both machines. Then they can be disassembled as a single set-up and be prepared for transport.

- 1 Disassemble the mast guard.
- 2 Turn the adjustable guide rolls back till you hear a 'click'.
- 3 Disconnect the proximity switch plug of the carriage elevation, if assembled, and remove the carriage elevation.
- 4 Disassemble the mast elements above the uppermost anchor. Before loosening the uppermost anchor, first lower the already disassembled mast elements to the ground. Then disassemble the uppermost anchor.



- 5 Disassemble the cable guides while disassembling the mast.
- 6 If a (building) crane is available at the building site, the mast can be disassembled more quickly. Then mast sections up to 24.66 ft can be removed all at once.
- 7 Repeat this procedure until the mast, with the platform in its lowest position, has been disassembled as far as the carriage.
- 8 Disconnect the supply cable(s).
- 9 Lower the platform onto the buffers by lifting the motor brakes.
- 10 Remove the ground supports. When using a ground frame, loosen the screw jacks. When using a chassis, loosen the jacks if the frame is supported. When the chassis is only supported under the jacks, retract the jacks.
- 11 Screw and slide in the supporting legs of the chassis in the basic position and secure them.
- 12 Put the control box on the platform.
- 13 Disassemble the fences and corner posts.
- 14 Remove the platform extension, if mounted, retract the outriggers and secure them.
- 15 Disassemble the stairs and platform elements. Make sure that the machine remains balanced when disassembling the platform elements. Support the platform, if necessary.



Five platform elements can be stacked at a time.



Make sure that the various parts are thoroughly secured on the truck. Pay special attention to loose parts. Check if the plate outriggers have been secured.

- 16 Prepare the machine for transport, see paragraph 3.3.10.

3.3.10 Transport from building site



Transporting the machine on public roads with a chassis is not allowed.



The national traffic regulations must be observed.

- 1 Disassemble the machine as described in paragraph 3.3.9. Make sure that the machine is disassembled until it is more or less identical to the basic version (machine without fences, steps and mast guard). Remove fences, steps and mast guard, if mounted.
- 2 Check whether the machine is in the buffers or not; if not, lower the machine onto the buffers.
- 3 Select a normal truck suitable for the machine dimensions and weight, see paragraph 3.2 for the specifications.



- 4 Lift or raise the machine. Use the crane mounted on the truck, a building crane or a fork-lift truck.



Make sure that the machine weight and dimensions are within the crane specifications, before raising or lifting the machine.

When using a crane:
Only lift the machine by the appropriate lifting eyes.

When using a fork-lift truck:
Only pick-up the machine under the appropriate lifting points.

- 5 Make sure that the machine weight is distributed uniformly when placing the machine onto the truck.
- 6 Fit all securing devices.
- 7 Secure the machine to the truck with suitable security straps.

Also see the procedures for transport to the building site.



3.4 Using the machine

This paragraph provides detailed information on how to use the machine:

- 1 loading the machine correctly
- 2 location and function of the various control elements
- 3 controlling the machine (incl. the troubleshooting in the case of minor problems)

3.4.1 Loading the machine

The MS ProMax can be used both anchored and free-standing. For both cases, specific instructions apply.

General information - machine anchored

The platform is built of the following standard elements:

- Carriage on the mast, length 6.25 ft
- Platform element - 80, length 2.63 ft
- Platform element - 150, length 4.94 ft
- Megadeck, length 19.74 ft

A large number of single and twin set-ups can be configured by combining the above-mentioned elements.

In the diagrams, the various configurations have been coded as follows:

- A** without platform extension, without weather protection
- B** with 1 m (3.29 ft) platform extension, without weather protection
- C** without platform extension, with weather protection
- D** with 1 m (3.29 ft) platform extension, with weather protection



Use the loading diagrams in the paragraph and diagram T1 in paragraph 3.3.4 to determine the length and lifting capacity of the most-commonly used configurations.

In the loading diagrams and the corresponding illustrations the following abbreviations have been used:

N_e = number of platform elements (2.63 or 4.92 ft) outside the mast per side (this has to be equal on both sides) (single and twin set-up)

N_i = number of platform elements (2.63 or 4.92 ft) between the masts in addition to the obligatory Megadeck (twin set-up only).



Whether the mast is being anchored or not results in a considerable difference in lifting capacity.



The platform extension and the weather protection are frequently used platform accessories. These accessories also have an influence on the lifting capacity of the platform; refer to the loading diagrams.



The lifting capacity indicated in the loading diagram includes the number of persons as stated: 2 or 4 in a single set-up and 4 in a twin set-up. More persons are allowed on the platform under certain conditions after you have received prior written consent of the supplier and reduced the platform load accordingly.



All values in the diagrams have been based on a symmetrical load distribution. Asymmetrical configurations are possible after prior written consent of the supplier.



All values in the diagrams can be used for platform extensions between 0 and 3.29 ft, by means of linear interpolation of the values for the configurations A and B (or C and D). Platform extension > 3.29 ft are possible under certain conditions after you have received prior written consent of the supplier and reduced the platform load accordingly.



A platform extension is only to be used as a working platform. Only persons and light equipment are allowed on the extension.



The load has to be distributed evenly over the platform; do not allow materials to protrude the platform.



The max. wind force at which it is allowed to work on a platform with anchored mast is 6 Beaufort. For a free-standing mast 5 Beaufort applies. At higher wind forces, the platform should be put in its lowest position and shut down.



When 2.63 ft platform elements are being used, mount these at the outside of the platform.



The following items only apply to a twin set-up:



Mount max. 1 platform element of 2.63 ft between the mast (in combination with at least 4 platform elements of 4.92 ft)



When using a 2.63 ft platform element between the masts, position this element next to one of the carriages.



When using a 2.63 ft platform elements outside the mast, mount these at the outer part of the platform.



Four platform elements of 4.92 ft can be replaced by one 19.74 ft Megadeck.



When the number of platform elements between the masts is 7 or higher, a Megadeck must be used, with or without tensioning rod (refer to diagram T1 on the next page).



Leaving out the tensioning devices results in a considerable decrease of the lifting capacity of the configuration.



This may cause danger of permanent deformation of the platform and even accidents.



A twin set-up always contains a Megadeck centred between the masts, in specific cases enforced with a tensioning device (see diagram T1 in paragraph 3.3.4). A twin set-up without a Megadeck centred between the masts is possible under certain conditions after you have received prior written consent of the supplier and reduced the platform load accordingly.

**MS ProMax anchored:
load diagram single set-up**

The diagrams S2 to S4 are valid for an anchored single set-up of the MS ProMax.

See fig. 3-92 for the layout and the abbreviations used.

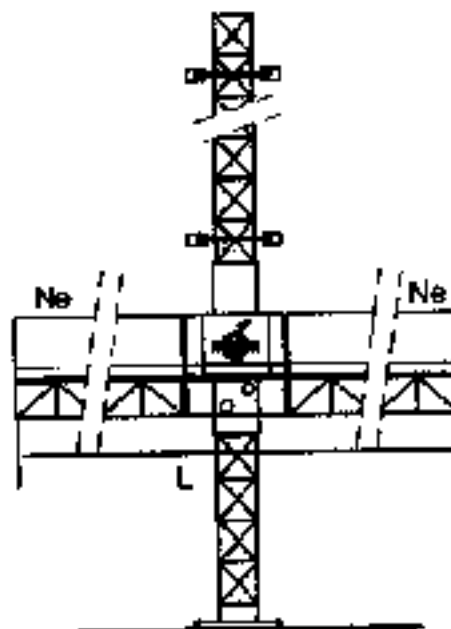


Fig. 3-92 Single set-up, anchored

Diagram S1

Configuration:			A 0 No		B 3.3 No				C ⊕ Yes		D 3.3 Yes	
Platform extension [m]:			Number of persons		Number of persons				Number of persons		Number of persons	
Weather protection:												
No												
4.92	2.63	L	2	4	2	4	2	4	2	4	2	4
			P	UOP	P	UOP	P	UOP	P	UOP	P	UOP
0	1	11.9	6300	0380	6027	6927	6283	6283	6217	6217		
1	0	18.1	6199	8129	5696	5968	6070	5836	5798	5798		
1	1	21.3	5622	5622	5423	5423	6313	5313	5116	5116		
2	0	25.9	5257	6307	5083	5093	4880	4880	4696	4696	20	20
2	1	31.2	4850	20	4850	20	4519	20	4343	20	4412	20
3	0	35.8	4586	4586	4189	4189	3990	3880	3803	3803		
3	1	41.0	4078	4078	3816	3816	3373	3373	2910	2910		
4	0	45.8	3814	3993	3086	3285	3020	2601	18	2425	1301	17
4	1	50.9	3307	3070	2112	2183	18	2024	19	1180	17	860

L in ft / 2 in lb



**MS ProMax anchored:
load diagram (twin set-up)**

The diagrams T2 to T5 are valid for an anchored twin set-up of the MS ProMax.

See fig. 3-93 for the layout.

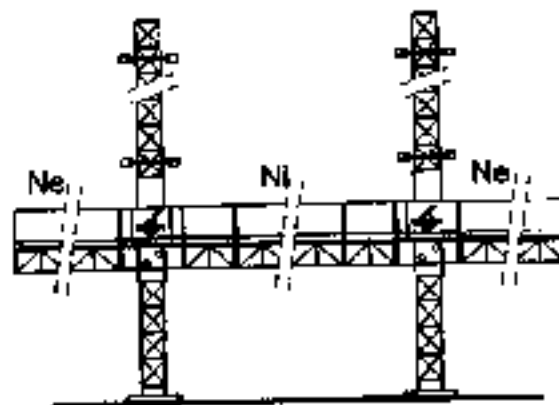


Fig. 3-93 Twin set-up, anchored

Diagram T2

Configuration:
Platform extension (M):
Weather protection:

Platform extension (M):
No (ex. mezzdeck):

No	A 0 No											
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	9854	6688	3250	8928	8508	8009	8349 18	4918 15	8704 14	2648 12	1898 11	
2	8774	6684	8444	8178	7882	7584	7275	6018 13	4541 17	3283 15	2198 13	
3	7650	7850	7540	7311	7099	6804	6548 20	6238	5788	4283 18	2932 16	
4	6361	6880	6536	6804	6308	6063	5788	6541 20	3220 20	4418	4187 20	1187 20
5	3438 14	3018 15	3792 16	3058 17	4167 18	4343 18	4519 19	4748	4818	4233	3524	

P in lb

Diagram T3

Configuration:
Platform extension (M):
Weather protection:

Platform extension (M):
No (ex. mezzdeck):

No	B 3.3 No											
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	8524	6171	8796	6422	8026	7474	5710 16	4233 15	2854 14	1880 12		
2	8355 23	6178 20	7882 20	7584	7231	6856	6481	5313 19	3748 17	2400 15	1238 14	
3	7142	7099	6900	6236 20	6348 20	6049	5668 20	5291	4848 20	3438 18	2060 17	
4	4538 17	4818 16	3228 19	3534	3448	3188	1828	4475 20	4128	3748 20	3328 20	
5	1595 12	1608 17	1875 13	1720 14	1752 15	1808 15	1874 16	1918 17	1982 18	2028 18	2072 19	

P in lb

Diagram T4

Configuration:
Platform extension (M):
Weather protection:

Platform extension (M):
No (ex. mezzdeck):

No	C 0 Yes											
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	9847	8873	8578	8157	7790	7187	5401 18	3883 18	2513 14	1058 12		
2	8137 20	7937 20	7428 20	7275 20	6878 20	6504	6080	4838 19	3285 17	1685 14		
3	6900	6812	6382	6289	6052	5900	5226 20	4828 20	4431 20	3557 18	1182 18	
4	3461 13	3682 18	3388 17	4101 18	4321 19	4541	4321	3946	3571	3175 20	2181 20	

P in lb

Diagram T5

Configuration:
Platform extension (M):
Weather protection:

Platform extension (M):
No (ex. mezzdeck):

No	D 3.3 Yes											
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	9017	8576	8135	7830	7187	6014	4782 18	3210 16	1423 13			
2	7718 20	7428 20	7077 20	6858 20	6217 20	5754 20	5313 20	3528 19	2180 18			
3	6412	6238	5952	5800	5581	5362	4321	3880 20	3417 20	1822 18		
4	1488 12	1565 13	1809 14	1875 15	1720 16	1734 17	1830 18	1874 18	1840 19	1884 20	1314 19	

P in lb

General information - free-standing

Operating the MS ProMax in a free-standing single or twin set-up is more or less identical to operating an anchored machine.

When used free-standing, in both a single set-up and a twin set-up attention must also be paid to the following:



The work platform with a free-standing mast is only to be used when mounted on a chassis.



The extending legs must be fully extracted and locked. In X and 1/2X position, the extending legs must be fully extracted and locked. In K position, fully extract and lock the front extending legs; lock the rear extending legs in retracted position (see paragraph 3.2.3) to optimize the rigidity of the set-up.

The max. load of a free-standing working platform can be determined based on the mast height and the position of the extending legs of the chassis.

The extending legs can be put and locked in a number of positions (fig. 3-94)

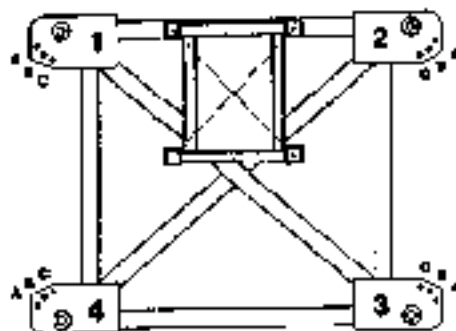


Fig. 3-94 Locking positions

Position of the extending legs	Description	Position the locking pins			
		1	2	3	4
	X position	A	A	A	A
	1/2 X position	B	B	A	A
	K position	C	C	A	A



**MS ProMax free-standing:
load diagram single set-up**

The diagrams S2 to S4 are valid for a free-standing single set-up of the MS ProMax.

See fig. 3-95 for the layout and the abbreviations used.

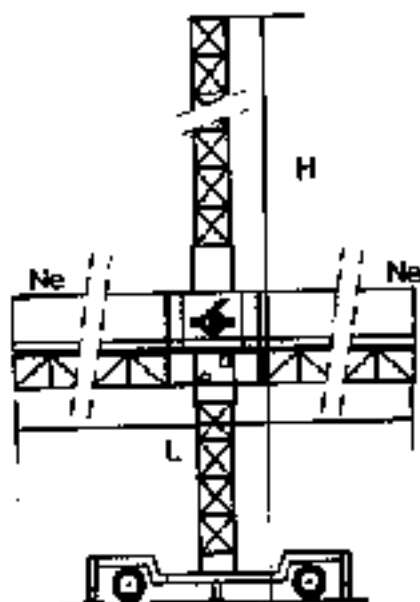


Fig. 3-95 Single set-up, free-standing



Diagram 52

Configuration:			A	B	C	D		
Platform extension (m):			0	3.3	0	3.3		
Weather protection:			No	No	Yes	Yes		
Channels:			X					
Max height (m):			< 65.6					
No			Number of persons		Number of persons		Number of persons	
1.92 2.63			2		4		2	
L			P	UOP	P	UOP	P	UOP
0	1	11.5	6264	20	5992	18	6217	20
1	0	16.1	5686	19	6181	18	5622	19
1	1	21.3	4818	18	4263	18	4826	19
2	0	25.9	4343	17	3618	15	4233	18
2	1	31.2	3816	17	2844	14	3505	17
3	0	36.8	3131	16	2315	13	2968	17
3	1	41.0	2513	15	1853	13	2359	14
4	0	45.6	2116	15	1213	12	1940	16
4	1	50.9	1587	-	-	-	1411	16
Max height (m):			< 65.8					
No			Number of persons		Number of persons		Number of persons	
4.92 2.63			2		4		2	
L			P	UOP	P	UOP	P	UOP
0	-	11.5	6090	-	6380	-	6327	20
1	0	16.1	6129	-	6129	20	5986	20
1	1	21.3	5822	20	5467	-	5423	20
2	0	25.9	5297	-	4674	18	5093	19
2	1	31.2	4718	-	3856	17	4518	18
3	0	35.8	4146	19	3255	16	4168	18
Max height (m):			< 65.9					
No			Number of persons		Number of persons		Number of persons	
4.92 2.63			2		4		2	
L			P	UOP	P	UOP	P	UOP
0	1	11.5	6383	-	6393	-	6327	20
1	0	16.1	6129	-	6129	20	5986	20
1	1	21.3	6022	-	5622	20	5423	20
2	0	25.9	5367	-	5367	-	5093	20
2	1	31.2	4850	20	4850	-	4519	20
3	0	35.8	4588	-	4255	16	4188	20
3	1	41.0	4078	-	3571	16	3816	19
4	0	45.6	3814	-	3088	16	3175	19
4	1	50.9	3307	-	2657	16	2712	19

Line / Page



Diagram 30

Configuration:			A	B	C	D				
Platform extension [R]:			0	3.3	0	3.3				
Weather protection:			No	No	Yes	Yes				
Climatic:			100%							
Meat height [R]:			< 93.8							
No			< 93.8							
4.92 2.83										
L										
			Number of persons		Number of persons		Number of persons		Number of persons	
			2	4	2	4	2	4	2	4
			P	UOP	P	UOP	P	UOP	P	UOP
0	1	11.5	4674	4808 15	4630	4693 15	4101 14	3988 13	4078 14	3924 13
1	0	18.1	4277 15	4078 14	4211 15	4012 14	3373 12	3020 11	3907 13	3834 11
1	1	21.3	3704	3253 13	3593 15	3175 13	2425 11	1698 10	2315 12	1908 10
2	0	25.9	3807	2734 12	3175	2601	1875 10		1568 11	
2	1	31.2	2888	2028	2513	1874 12				
3	0	35.8	2248	1585 11	2072	1411				
3	1	41.0	1875	970	1499 14					
4	0	45.6	1323		1124					
4	1	50.9	838		885					
Meat height [R]:			< 45.9							
No			< 45.9							
4.92 2.83										
L										
			Number of persons		Number of persons		Number of persons		Number of persons	
			2	4	2	4	2	4	2	4
			P	UOP	P	UOP	P	UOP	P	UOP
0	1	11.5	6385	6393	6327	6327	6263 20	6128 20	6217 20	6107 20
1	0	18.1	6129	6035 20	5996	6090 20	6467 12	6247 18	6401 18	6181 18
1	1	21.3	5558	5334	5423 20	5247	4463 18	4174 17	4387 18	3990 17
2	0	25.9	5137	4836 18	5028	4586 19	3782 17	3108 16	3682 17	3096 15
2	1	31.2	4519	3812	4409	3770 18	2890 15	1386 13	2830 15	1992 14
3	0	35.8	4056	3351 17	3824	3197 17	1830 14		1896 16	
3	1	41.0	3459 18	2888 16	3283 19	2491				
4	0	45.6	2998	2205 15	2822	2028 16				
Meat height [R]:			< 35.1							
No			< 35.1							
4.92 2.63										
L										
			Number of persons		Number of persons		Number of persons		Number of persons	
			2	4	2	4	2	4	2	4
			P	UOP	P	UOP	P	UOP	P	UOP
0	1	11.5	6396	6393	6327	6327	6283	6288	6217	6217
1	0	18.1	6129	6129	5996	5996	5900	5930 20	5788	5758 20
1	1	21.3	5822	5622	5423	5423	5313 20	5313	5115	5115 20
2	0	25.9	5357	5357	5093	5093	4960	4850	4896 20	4696
2	1	31.2	4850 20	4850 20	4519 20	4619 20	4321	3818 18	4012	3662 19
3	0	35.8	4588	4588	4189	4189	3439 19	2734 18	3627	2800 18
3	1	41.0	4078	4078	3816	3816	2657 18	1830 18	2648	1896
4	0	45.6	3814	3814	3285	3285	1918 17	1188 18	1964	1297 17
4	1	50.9	3307	3219	2712	2183 19	1295		1323 19	
			L in / P in							



Diagram 24

Configuration:
Platform extension (H):
Weather protection:
Checkle:
Mast height (H):

			A	B	C	D				
			0	3.3	0	3.3				
			No	No	Yes	Yes				
			K							
			≤ 26.3							
			Number of persons		Number of persons		Number of persons		Number of persons	
			P ²	P ⁴	P ²	P ⁴	P ²	P ⁴	P ²	P ⁴
			UOP	UOP	UOP	UOP	UOP	UOP	UOP	UOP
4.92	2.63	L								
0	1	11.5	4662	4888	15	4004	4841			
1	0	14.1	4277	4967		4188	4078	15		
1	1	21.3	3704	3649	14	3593	3439			
2	0	25.9	3373	3987		3241	3042			
2	1	31.2	2886	2988	14	2742	2484	14		
3	0	35.8	2601	2369		2408	2180			
3	1	41.0	2180	1788	13	1918	1685			
4	0	45.6	1918	1433		1563	1365			
4	1	50.9	1485	826		1088	718			
			K							
			≤ 28.2							
			Number of persons		Number of persons		Number of persons		Number of persons	
			P ²	P ⁴	P ²	P ⁴	P ²	P ⁴	P ²	P ⁴
			UOP	UOP	UOP	UOP	UOP	UOP	UOP	UOP
4.92	2.63	L								
0	1	11.5	6363	6363		6327	6327			
1	0	14.1	6129	6129		5998	5998			
1	1	21.3	5622	5622		5423	5423			
2	0	25.9	5357	5357		5063	5063	20		
2	1	31.2	4850	4850	20	4518	4518			
3	0	35.8	4588	4588		4189	4189			
3	1	41.0	4078	4078		3816	3816			
4	0	45.6	3814	3814		3285	3285			
4	1	50.9	3307	3307		2712	2712	19		

N.B: All valid configurations are based on an 'out-of-service' wind force of 13.4 m/s (10 mph).

L in ft./P in lb.



**MS ProMax free-standing:
load diagram twin set-up**

The diagrams T6 to T15 are valid for a free-standing twin set-up of the MS ProMax.

See fig. 3-96 for the layout.

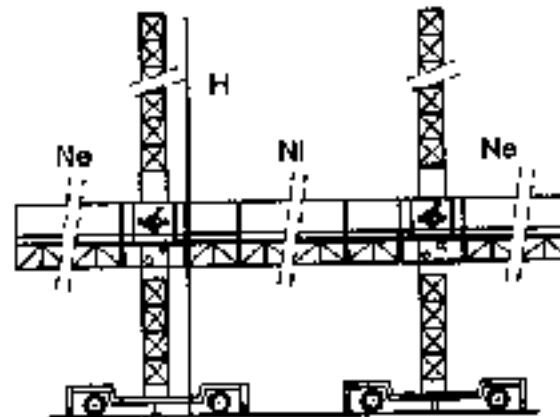


Fig. 3-96 Twin set-up, free-standing

Diagram T6

Configuration:
Platform extension (m):
Weather protection:
Cheeks:

Max height (m):
m (acc. megadeck):

		A D No X C 88.6										
		0	1	2	3	4	5	6	7	8	9	10
		P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No												
1		9017	8600	8225	7880	7467	7011	6540	6019	5504	5040	4588
2	10	7582	7199	6850	6529	6227	5904	5577	5232	4871	4528	4198
3	18	6592	6250	5948	5679	5427	5184	4937	4687	4432	4200	3982
4	17	5403	5101	4831	4583	4346	4111	3880	3657	3440	3230	3028
5	15	4499	4246	4022	3817	3621	3434	3254	3081	2915	2755	2600

Max height (m):
m (acc. megadeck):

		C 56.8										
		0	1	2	3	4	5	6	7	8	9	10
		P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No												
1		5154	4908	4680	4468	4264	4068	3879	3698	3524	3356	3194
2	20	4774	4544	4332	4137	3950	3770	3597	3430	3269	3114	2964
3	20	4350	4138	3944	3767	3594	3426	3265	3110	2960	2814	2672
4	18	3891	3698	3524	3358	3200	3049	2904	2764	2628	2496	2368
5	15	3439	3272	3122	2979	2842	2710	2580	2452	2328	2208	2092

P in B

Diagram T7

Configuration:
Platform extension (m):
Weather protection:
Cheeks:

Max height (m):
m (acc. megadeck):

		A D No 1/2X C 80.8										
		0	1	2	3	4	5	6	7	8	9	10
		P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No												
1		6406	6096	5818	5572	5340	5111	4888	4670	4458	4250	4048
2	14	5211	4921	4654	4410	4178	3948	3720	3494	3270	3048	2828
3	13	4298	4021	3768	3538	3320	3104	2890	2678	2468	2260	2054
4	13	3163	2908	2674	2450	2236	2022	1808	1594	1380	1168	958
5	11	2006	1772	1550	1338	1126	914	702	490	278	66	-146

Max height (m):
m (acc. megadeck):

		C 46.8										
		0	1	2	3	4	5	6	7	8	9	10
		P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No												
1		3664	3468	3290	3128	2972	2822	2678	2538	2400	2268	2142
2	20	3774	3584	3412	3250	3094	2944	2790	2640	2494	2350	2208
3	20	3350	3168	2994	2832	2676	2526	2372	2224	2078	1934	1792
4	18	2891	2718	2554	2398	2248	2094	1946	1794	1648	1504	1362
5	15	2439	2272	2122	1979	1842	1710	1580	1452	1328	1208	1092

P in B



Diagram 7P
 Configuration:
 Platform extension (N): A
 Weather protection: No
 Chassis: K

Max height (H): $\leq 28,2$
 H (no. modules):

No	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	6217	6108	5879	5547	4918	4508	4277	3849	3606	3248	2995
2	5478	5325	5082	4750	4121	3711	3480	3052	2810	2452	2199
3	4729	4543	4300	3970	3341	2931	2700	2272	2030	1672	1419
4	4000	3779	3536	3206	2577	2167	1936	1508	1266	908	655
5	3287	3040	2797	2467	1838	1428	1197	769	526	168	-

Max height (H): $\leq 16,4$
 H (no. modules):

No	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	6854	6648	6260	5829	5098	4669	4438	3910	3678	3300	3047
2	6774	6564	6144	5719	4988	4559	4328	3800	3568	3190	2937
3	7050	6830	6360	5935	5204	4775	4544	4016	3784	3406	3153
4	6283	6060	5590	5165	4434	4005	3774	3246	3014	2636	2383
5	5528	5310	4840	4415	3684	3255	3024	2496	2264	1886	1633

P in B

Diagram 7B
 Configuration:
 Platform extension (N): B
 Weather protection: No
 Chassis: X

Max height (H): $\leq 28,8$
 H (no. modules):

No	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	6640	6499	6081	5648	4918	4508	4270	3842	3599	3241	2988
2	5918	5759	5319	4882	4152	3742	3504	3076	2833	2475	2222
3	5249	5074	4634	4197	3467	3057	2819	2391	2148	1790	1537
4	4580	4395	3955	3518	2788	2378	2140	1712	1469	1111	858
5	3925	3730	3290	2853	2123	1713	1475	1047	804	446	193

Max height (H): $\leq 16,8$
 H (no. modules):

No	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	6524	6371	5955	5522	4792	4374	4136	3708	3465	3087	2834
2	6065	5912	5496	5063	4333	3915	3677	3249	3006	2628	2375
3	7143	6989	6573	6138	5408	4990	4752	4324	4081	3703	3450
4	6300	6146	5730	5295	4565	4147	3909	3481	3238	2860	2607
5	5565	5411	4995	4560	3830	3412	3174	2746	2503	2125	1872

P in B

Diagram 7P
 Configuration:
 Platform extension (N): B
 Weather protection: No
 Chassis: 12X

Max height (H): $\leq 33,8$
 H (no. modules):

No	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	6065	5922	5507	5074	4344	3926	3688	3260	3017	2639	2386
2	5347	5204	4789	4356	3626	3208	2970	2542	2299	1921	1668
3	4630	4487	4072	3639	2909	2491	2253	1825	1582	1204	951
4	3912	3769	3354	2921	2191	1773	1535	1107	864	506	253
5	3195	3052	2637	2204	1474	1056	818	390	147	-	-

Max height (H): $\leq 13,8$
 H (no. modules):

No	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
1	6524	6371	5955	5522	4792	4374	4136	3708	3465	3087	2834
2	6065	5912	5496	5063	4333	3915	3677	3249	3006	2628	2375
3	7143	6989	6573	6138	5408	4990	4752	4324	4081	3703	3450
4	6300	6146	5730	5295	4565	4147	3909	3481	3238	2860	2607
5	5565	5411	4995	4560	3830	3412	3174	2746	2503	2125	1872

P in B

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Diagram 71

Configuration:
 Platform extension (M): B
 Weather protection (K): K
 Chassis: K

Max. height (H):
 H (acc. megadeck): < 28.3

No	0		1		2		3		4		5		6		7		8		9		10	
	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP
1	2074	5822 13	5208	14	4834	14	4310	14	3745	14	3202	14	2617	14	2054	14	1530	12	-	-	-	-
2	6115	14 4884	4500	14	4230	14	3870	14	3500	14	3140	14	2780	14	2420	14	2060	12	1700	14	1340	14
3	3048	3950 14	2900	13	2815	13	2730	13	2645	13	2560	13	2475	13	2390	13	2305	12	2220	12	2135	12
4	2244	12 2932	2668	14	2776	14	2883	14	2990	14	3097	14	3204	14	3311	14	3418	12	3525	12	3632	12
5	1582	12 1808	1578	13	1720	14	1742	14	1884	14	1906	14	2048	14	2070	14	2212	12	2234	12	2376	12

Max. height (H):
 H (acc. megadeck): < 30.4

No	0		1		2		3		4		5		6		7		8		9		10	
	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP
1	9524	9171	8798	8422	8026	7674	7341	6987	6650	6311	5970	5628	5285	4941	4596	4250	3903	3555	3206	2856	2505	2153
2	2016	20 2179 20	2022	20 2184 20	2028	20 2196 20	2034	20 2208 20	2040	20 2220 20	2046	20 2232 20	2052	20 2244 20	2058	20 2256 20	2064	20 2268 20	2070	20 2280 20	2076	20 2292 20
3	7 43	2082	2098	2104	2110	2116	2122	2128	2134	2140	2146	2152	2158	2164	2170	2176	2182	2188	2194	2200	2206	2212
4	2405	17 2611 17	2625	19	2635	19	2645	19	2655	19	2665	19	2675	19	2685	19	2695	17	2705	17	2715	17
5	1585	12 1809 12	1824	13	1834	13	1844	13	1854	13	1864	13	1874	13	1884	13	1894	12	1904	12	1914	12

Diagram 72

Configuration:
 Platform extension (M): C
 Weather protection (K): K
 Chassis: K

Max. height (H):
 H (acc. megadeck): < 28.3

No	0		1		2		3		4		5		6		7		8		9		10	
	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP
1	2017	15 2204 15	2214	12	2228	12	2242	12	2256	12	2270	12	2284	12	2298	12	2312	12	2326	12	2340	12
2	4395	12 2564 11	1800	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Max. height (H):
 H (acc. megadeck): < 48.0

No	0		1		2		3		4		5		6		7		8		9		10	
	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP
1	9347	90	8726	20	8328	19	7928	18	7545	18	7167	18	6794	18	6426	18	6062	18	5702	18	5346	18
2	8157	20	7822	19	7498	18	7174	18	6850	18	6526	18	6202	18	5878	18	5554	18	5230	18	4906	18
3	6486	17	6209	17	5932	16	5655	16	5378	16	5101	16	4824	16	4547	16	4270	16	3993	16	3716	16
4	2381	13	2204	13	1875	12	1448	12	-	-	-	-	-	-	-	-	-	-	-	-	-	

Max. height (H):
 H (acc. megadeck): < 35.7

No	0		1		2		3		4		5		6		7		8		9		10	
	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP	P	UOP
1	8347	20	8270	20	8196	20	8122	20	8048	20	7974	20	7900	20	7826	20	7752	20	7678	20	7604	20
2	8157	20	7937	20	7698	20	7459	20	7220	20	6981	20	6742	20	6503	20	6264	20	6025	20	5786	20
3	6900	20	6612	20	6324	20	6036	20	5748	20	5460	20	5172	20	4884	20	4596	20	4308	20	4020	20
4	4521	18	4380	18	4239	18	4098	18	3957	18	3816	18	3675	18	3534	18	3393	18	3252	18	3111	18
5	1802	11	1709	12	1616	13	1523	14	1430	15	1337	16	1244	17	1151	18	1058	19	965	20	872	21



Diagram 73B

Configuration:	C										
Platform extension (R):	d										
Weather protection:	Yes										
Chassis:	SQK										
Clear height (R):	4.85.0										
Ht (m, suspended):	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No											
1	6460	7407	8374	9359	10341	11327	12308	-	-	-	-
2	8712	9769	10830	11892	12954	-	-	-	-	-	-
3	10964	12021	13083	-	-	-	-	-	-	-	-
Clear height (R):	4.36.1										
Ht (m, suspended):	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No											
1	6347	7478	8678	9937	11253	12627	14058	15546	17091	18693	-
2	8157	9427	10768	12178	13657	15194	16788	18439	20147	21912	-
3	9902	11312	12792	14341	15958	17642	19393	21210	23093	25042	1587
4	11641	13170	14778	16465	18230	20073	21984	23953	25980	-	-
5	13378	15027	16758	18571	20465	22440	24486	26593	-	-	-
Clear height (R):	4.28.3										
Ht (m, suspended):	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No											
1	6347	7478	8678	9937	11253	12627	14058	15546	17091	18693	-
2	8157	9427	10768	12178	13657	15194	16788	18439	20147	21912	-
3	9902	11312	12792	14341	15958	17642	19393	21210	23093	25042	1587
4	11641	13170	14778	16465	18230	20073	21984	23953	25980	-	-
5	13378	15027	16758	18571	20465	22440	24486	26593	-	-	-

Diagram 74A

Configuration:	D										
Platform extension (R):	3.3										
Weather protection:	Yes										
Chassis:	X										
Clear height (R):	4.85.8										
Ht (m, suspended):	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No											
1	6539	7604	8684	9783	10901	-	-	-	-	-	-
2	8787	9912	11054	-	-	-	-	-	-	-	-
Clear height (R):	4.85.9										
Ht (m, suspended):	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No											
1	6017	7076	8159	9264	10391	11540	12711	13904	-	-	-
2	7786	8929	10099	11293	12512	13756	15025	-	-	-	-
3	9566	10781	12021	13285	14573	15886	-	-	-	-	-
4	11347	12642	13961	15304	-	-	-	-	-	-	-
Clear height (R):	4.35.1										
Ht (m, suspended):	0	1	2	3	4	5	6	7	8	9	10
	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP	P UOP
No											
1	6017	7076	8135	9200	10277	11364	12462	13571	14691	-	-
2	7786	8929	10077	11238	12411	13594	14788	15993	17209	18436	-
3	9475	10689	11922	13173	14441	15725	17025	18341	19672	21018	-
4	11174	12454	13758	15086	16437	17811	19208	20628	22071	23528	1039

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Diagram 715		D											
Configuration		33											
Platform dimension (H)		188											
Master platform Check:		124											
Max height (H)		<450											
N (acc. regulated):		0	1	2	3	4	5	6	7	8	9	10	
No		P	UCF	P	UCF	P	UCF	P	UCF	P	UCF	P	UCF
1		780	18	7187	18	6481	17	5754	17	5071	17	4343	18
2		6421		5330		4313		3430					
Max height (H)		<361											
N (acc. regulated):		0	1	2	3	4	5	6	7	8	9	10	
No		P	UCF	P	UCF	P	UCF	P	UCF	P	UCF	P	UCF
1		9077		8578		8125		7690		7187		6614	
2		7716	20	7463	20	7077	20	6668	20	6217	20	5754	20
3		6415		6229		5962		5630		5181		4782	
4		5278	15	4984	15	4708	17	4383	18	3917	19	3571	
Max height (H)		<262											
N (acc. regulated):		0	1	2	3	4	5	6	7	8	9	10	
No		P	UCF	P	UCF	P	UCF	P	UCF	P	UCF	P	UCF
1		9077		8578		8125		7690		7187		6614	
2		7716	20	7463	20	7077	20	6668	20	6217	20	5754	20
3		6415		6229		5962		5630		5181		4782	
4		5278	15	4984	15	4708	17	4383	18	3917	19	3571	
Finis													

3.4.2 Control elements

The machine can be controlled via the platform switch box (fig. 3-97). This contains the following (control) elements:

1 Main switch

Turn the switch in position I of II to switch on the machine. If message 02 appears on the display, turn the switch in the other position.

2 Error message label

This contains the description of various messages appearing on the info panel.

3 UOP

The UOP combines the following six (safety) functions:

- A info panel
- B Static Overload Protection (SOP)
- C Eccentric Overload Protection (EOP)
- D Residual current measurement between both motors
- E Voltage check

On the next page you will find a short description of the above-mentioned functions. Refer to the corresponding paragraph for assembly parameter settings.

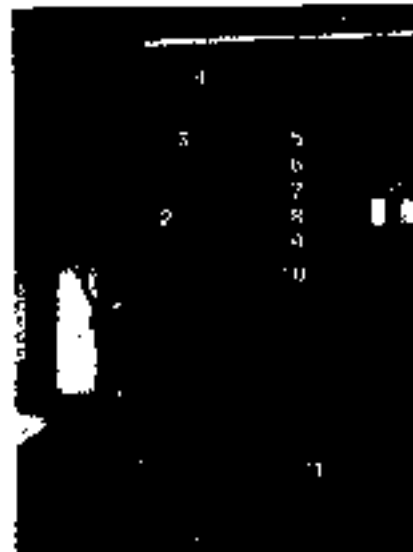


Fig. 3-97 Platform control box

UOP functions - description

A Info panel

The info panel gives information regarding the machine safety status. Many situations, in which operating the machine is dangerous, are checked electrically. For this purpose switches have been integrated in the safety circuit.

If one or more switches in the safety circuit are opened, the ERROR-LED will be illuminated and a number < 20 will appear on the display. The error message label on the box door and paragraph 4.4. of this manual contain the matching descriptions. With these, the situation can easily be restored.

In case more than one switch is open, the lowest number will be displayed first. After the corresponding situation is restored, the number of the next open switch will appear.

A number between 20 and 99 indicates an error detected by the UOP. See paragraph 4.4 for a message overview.

A number >99 indicates an internal UOP error. In this case, consult your dealer.

B Static Overload Protection (SOP)

The Static Overload Protection checks the vertical load of the platform. This check is carried out when the machine is at a standstill and is therefore called a static measurement. This measurement is taken by a measurement axis (load cell) which transfers the combined platform and load weight to the motor plate.

If this system detects an overload, the machine cannot be started. If an overload occurs during the operation of the machine, this system cannot stop the platform.

The maximum load depends upon the configuration and is therefore adjustable (UOP program number).

C Eccentric Overload Protection

The Eccentric Overload Protection checks the difference between the loads on each side of the mast to prevent an excessive eccentric load in a single set-up. This measurement is taken by a measurement axis (load cell) which is activated when a blocking pin is mounted in the lifting beam.

This system works continuously and will stop the platform as soon as a 100% eccentric overload is detected.

In a twin set-up the blocking pin is removed and the Eccentric Overload Protection is inoperative.

D Residual current measurement (EMDS)

Overload and failure of one of the motors can be detected by comparing the current to both motors.

As soon as a 90% eccentric overload is detected, the system gives a warning signal. If an excessive difference is detected, the machine will be shutdown.

E Voltage check

The supply voltage level is measured continuously. If undervoltage or overvoltage occurs, this will be reported. However, in this case the machine can still be operated.

For controlling the machine, only the info panel function is relevant.

Via the info panel, the control system provides the machine status, the program number and the error messages (if present).

The different indications have the following meanings (fig. 3-98):

- 1 display, during normal machine operation, the ERROR-LED (7) is not illuminated, the display shows the set UOP program number (01 - 30).
- 2 Power LED (green), illuminated if voltage on UOP is present.
- 3 GAIN LED (yellow), for calibration purposes (consult your dealer).
- 4 ZS LED (green), for calibration purposes (consult your dealer).
- 5 90% LED (yellow), illuminated if the 90% limit of the maximum permissible vertical or eccentric load is exceeded). At the same time the warning light on top of the platform box will be illuminated. In this situation the machine can still be used. The eccentric load check is only intended for use in a single set-up.



Fig. 3-98 UOP



- 6 100% LED (red)**, illuminated in case the maximum permissible vertical or eccentric load is exceeded. At the same time, the warning light on top of the platform box will be illuminated and the buzzer in the platform box will sound. In this situation the safety circuit will be interrupted so the machine cannot be started.

The eccentric load check is only intended for use in a single set-up.

- 7 Error LED (red)**, illuminated if a switch in the safety circuit is 'opened'. Generally, this means that it is dangerous to operate the platform. The display (1), together with the error message label, will clarify the existing error.

See the error code label or paragraph 4.4 for the complete list of error messages.

4 Warning light

Flashes when 90% of the platform's permissible total or eccentric load is exceeded.

5 Key switch

Required to take the platform out of the buffers and to set the UOP program; not used during normal operation.

6 UP button

The platform will ascend when this button is operated. The platform will stop as soon as the button is released (safety device).

- 7 'Machine safe' indication**
This green light will be illuminated if the safety circuit is closed.
- 8 DOWN button**
The platform will descend when this button is operated. The platform will stop as soon as the button is released (safety device).
- 9 Horn button**
Use this button in case of an emergency to warn the people near the platform.
- 10 Emergency stop button**
After pressing the emergency stop button, the machine will not function any longer. The button remains locked in the pushed-in position. This interlocking will be released by turning the button clockwise.



The emergency stop button should always be pushed-in when working on the facade.

- 11 Buzzer (in platform control box)**
The buzzer gives a warning if the platform's maximum permissible total or eccentric load is exceeded.

3.4.3 Operating the machine



Nobody is allowed under the machine during operation.



Never allow materials to protrude the platform. Secure moveable loads to rolls. Never place loads against the fencing.



The maximum reactive force relative to the facade, caused by performing operations, amounts to 90 lbf in a single set-up and 135 lbf in a twin set-up.



If work is interrupted or abandoned, the main switch should be locked in the OFF-position by means of a padlock.



A mounted platform extension is only intended as a work platform. Only persons and light equipment are allowed on the extension.



Nobody is allowed on the platform extension while ascending or descending.

3.4.3.1 Initialising the machine

- 1 Close the gate.
- 2 Check that the supply voltage is present on the machine.
- 3 Remove the padlock from the main switch.
- 4 Turn the main switch in position I or II, if message **02** appears on the display, turn the switch in the other position. When the machine is started, the buzzer will sound for approximately 3 seconds and the light on top of the control box will flash. This indicates the UOP self test.
- 5 Check that the EMERGENCY STOP button on the control box is disabled (the button should be turned out). Repeat this on the other units in a twin set-up.
- 6 Now the POWER LED on the UOP should be illuminated.
- 7 If the safety circuit is closed, the green light on top of the control box will be illuminated. Check this. If this is not the case, but the ERROR LED on the UOP is illuminated, read the display and compare the number indicated to the number on the error code label or the diagram in paragraph 4.4. By using these, almost every problem can be solved.



In a twin set-up the safety circuit will not be closed until the above-mentioned steps are also performed on the other carriage.

- 6 If the green light and the **ERROR LED** are not illuminated, consult your service engineer.

3.4.3.2 Taking the carriage(s) out of the buffers

When the mast climbing work platform is delivered, the carriage rests on the ground frame or chassis buffers. A safety switch prevents the machine from departing from this position. To take the cabin carriage out of the buffers, you must have key(s) at your disposal for the key switch(es) of the machine. Proceed as follows:

Single set-up

- 1 Ensure that at least one extra mast element has been installed on the basic mast; if not, install this.
- 2 Switch on the voltage by turning the main switch to the left or right. If message **02** appears on the display, turn the switch in the other position.
- 3 If no failures have occurred, the **ERROR LED** is illuminated and the display shows code **08** (lower emergency switch).
- 4 Using the key, turn the key switch (fig. 3-99, item 5) to position 3.
- 5 Press the **UP** button (fig. 3-99, item 6) and move approximately 1.85 ft upwards.
- 6 Turn the key switch (fig. 3-99) back to position 1, and remove the key.



Fig. 3-99 Platform control bar



- 7 If no failures have occurred, the display will now show the setting code of the UOP (between 01 and 30), the ERROR LED will extinguish and the green lamp (8) will be illuminated.
- 8 Check the platform's stopping height and adjust the lower striker plates, if necessary; refer to paragraph 3.4.3.3.

Twin set-up

- 1 Ensure that at least one extra mast element has been installed on the basic mast; if not, install this.
- 2 Switch on the voltage by turning the main switch to the left or right; repeat this on the other control box. If message 02 appears on the display, turn the switch in the other position.
- 3 If no failures have occurred, the ERROR LEDs are illuminated and the display shows code 00 (lower emergency switch).
- 4 Using the key, turn the key switch (fig. 3-99, item 5) to position 3.
- 5 Press the UP button (fig. 3-99, item 6) of one of the carriages and move approximately 1.65 ft upwards.
- 6 Turn the key switch (fig. 3-99, item 5) back to position 1 and remove the keys.
- 7 If no failures have occurred, the display will now show the setting code of the UOP (between 01 and 30), the ERROR LED will extinguish and the green lamp (8) will be illuminated.
- 8 Check the platform's stopping height and adjust the lower striker plates, if necessary; refer to paragraph 3.4.3.3. In a twin set-up, ensure that both carriages stop at the same height.



3.4.3.3 Test run

Before proceeding, carry out the following tests / checks / adjustments:

single and twin set-up

- brake test
- lower striker plate check and adjustment
- functional test of the (safety) switches

additional for a twin set-up

- brake test
- check of the mechanical autolevel protection system
- check of the tracking system

Brake test run

- 1 Ensure that there is sufficient space above the buffers (approx. 0.33 ft) to lower the platform slightly.
- 2 Trigger the brake on one motor by using the brake lifter on the motor, with the specified max. load on the platform. The rotor (fan) can turn slightly, but the platform must not be lowered. Release the brake lifter.
- 3 Trigger the other brake. The platform must not be lowered. Release the brake lifter.
- 4 Carefully push the brake lifter upwards; the corresponding carriage must be lowered now.

- 5 Twin set-up only: repeat step 1 to 4 for the other carriage.

Lower striker plate check and adjustment

The minimum stopping height of the platform at ground level is determined by the ground frame or chassis height.

However, it is possible that obstacles and / or the user's wishes require a higher stopping place. Therefore, the lower striker plate (fig. 3-100, item 1) can be set at the desired height.

Single set-up

Lousen the clamping plate (fig. 3-100, item 2) and push the striker plate along the mast towards the desired height. The machine will stop if the lower striker plate switch (fig. 3-100, item 3) has been operated. The other switch (fig. 3-100, item 4) is the lower emergency switch. Turn the bolts finger-tight and check its operation. Then further tighten the bolts.

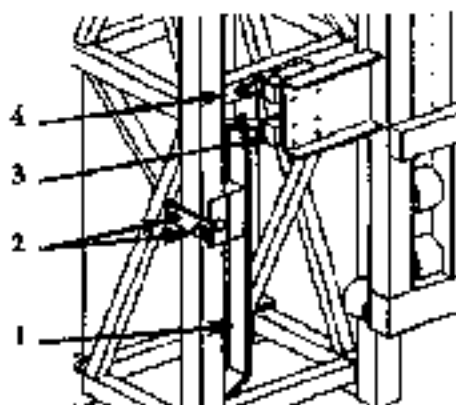


Fig. 3-100 Lower striker plate - adjustment



Twin set-up

Adjusting the stopping height of a twin mast loading platform is identical to the procedure for a single mast loading platform with the following additions:

- 1 Determine the platform's minimum stopping height and adjust the striker plate of one of the carriages.
- 2 Now move the platform approximately 0.99 ft upwards.
- 3 Lower the cabin carriage adjusted with the hand brake lifter until the limit switch just hits the striker plate.
- 4 Now level the platform by lowering the other cabin carriage with the hand brake lifter.



The lowest possible position of the lower striker plate is the position in which the emergency limit switch stops a fully loaded platform at approximately 0.39 in above the buffers if the lower striker plate does not function.

Functional test of the (safety) switches

Test all switches which monitor the safe use of the machine:

- lower striker plate
- lower emergency striker plate
- upper striker plate
- upper emergency striker plate
- gate switch

and in the case of a twin set-up also:

- all tracking switches
- emergency lifting

Do not forget to check any additional switches included in the safety circuit, such as an anchor ramp (optional).

Check of the mechanical autolevel protection system (twin set-up only)

This function can only be tested after at least 4 mast elements have been placed on the basic mast. On an anchored mast this test is carried out after each mast has been anchored at least two times.

- 1 Place the platform at least 19.74 ft above the lowest stopping position.
- 2 Open the bottom hatch in one of the carriages.
- 3 Pull the hand brake lifter towards you. The brakes are now triggered and the carriage will start to descend. This will tilt the platform (fig. 3-101). If the platform tilts approx. 2.5° (angle α), the autolevel system will be activated. The descending speed will decrease. You will also feel the brake lifter getting pulled back. The cabin carriage should be stopped completely if the angle $\alpha =$ approx. 3.5° .



Fig 3-101 Platform not level

The distance over which the cabin carriage descends, depends on the platform length, but amounts to max. 1.85 ft for the shortest possible twin mast platform and max. 4.92 ft for the longest possible twin mast platform.

- 4 Open the bottom hatch of the other cabin carriage and trigger the brakes manually.
- 5 Operate the brake lifter until the cabin carriage stops descending.

The platform is now tilted in the other direction. In this case the angle α should not exceed 3.5° either.

- 6 Place both carriages at level height.



If one of the cabin carriages sags too far, check the traction cable connections. These connections can be restored, but never adjust the cable length yourself. In any case, consult your dealer.



Check of the tracking system (twin set-up only)

A tracking system is included on a twin mast climbing work platform. This system ensures that the tilting position is limited to 1.5° under normal operating conditions. Although this system is adjusted in the factory and normally does not require a further adjustment, its operation should be checked.

This check is carried out as follows:

- 1 Move the platform approximately 9.87 ft upwards.
- 2 Ensure that the platform is level (use the hand brake lifters for correction).
- 3 Lower one of the cabin carriages by using the hand brake lifter.
- 4 Operate one of the UP buttons. The cabin carriage in the lowest position will move upwards. If the platform angle is < 1.5°, the other carriage will also move upwards.
- 5 Repeat 2 and 3 and operate the DOWN button. The cabin carriage in the highest position will now descend. If the platform angle is < 1.5°, the other carriage will also move downwards.
- 6 Repeat this procedure for the other carriage.



3.4.3.4 Setting the UOP program

One of the functions of the UOP is checking the total static vertical load. This is done with SOP (Static Overload Protection). Another function is monitoring the residual current between the motors and the total current to the drive. This is done with EMOS (Electric Motor Overload Protection).

The maximum permissible vertical load and corresponding current values depend on the platform configuration. A specific value applies to each configuration. This value is indicated on the loading plate, TP 531 on the machine and in the loading diagrams in paragraph 3.4.1, 'Loading the machine', of this manual. This value can be adjusted by modifying the SOP/EMOS adjustment.

If no error messages are present (ERROR LED is not illuminated), the UOP display will show the UOP setting again.

For modifying the UOP settings the correct machine key is required and you have to proceed as follows:

- 1 Turn the switch (fig. 3-102, item 6), to position 2 by using the key.

The display (fig. 3-102, item 4) will flash. Using the UP and DOWN button (7 and 9) you can modify the flashing number. Pushing the UP button once will increase the number with one step, etc. The same procedure in reverse order applies to the DOWN button.

- 2 After setting the correct number, turn the key switch back to position 1 and remove the key.



Fig. 3-102 Platform control box

3.4.3.5 Normal use



At the beginning of each day, before using the machine for vertical transportation of persons and materials, the periodical inspections and maintenance produces must be carried out; refer to paragraph 4.1.

- 1 After performing the obligatory inspections and maintenance, a test run must be carried out.

Check the following during the test run:

- If there are no obstacles in the path of the machine.
- The presence of all bolts in mast connections and anchors.
- The presence and position of all striker plates.
- The operation of all switches.
- The operation of all buttons on the switch box(es).
- The free travel of the supply cable(s).

After a positive conclusion of the test run, the machine can be used.

- 2 Control the machine via the control element on the platform control box; refer to paragraph 3.4.2 for the position and function of the various control elements.

Under normal circumstances the POWER LED (2) will be illuminated and the display (1) will show the set UOP program number.



During normal use, error messages can be displayed on the UOP; refer to paragraph 4.4, 'Troubleshooting'.

If the safe use of the machine is threatened, the safety circuit will be interrupted and the machine will no longer move. Then the ERROR LED (7) will be illuminated and the display will show an error message < 20. The problem causing this message can easily be solved by using the error message label and / or paragraph 4.4 of this manual.

- Message 06 on the display indicates an electrical problem detected by the UOP. Often, this type of problem does not produce any immediate safety risk (for example, building site voltage too low) and the machine remains operable. To indicate which problem is arising, 06 is flashing in turn with a message >20. Refer to paragraph 4.4. for the corresponding descriptions. If the problem renders the machine inoperative, you should normally consult an electrician. When the problem is solved, the message will disappear from the display. Other messages, in combination with message 06, refer to the platform overload.
- If the 90% LED (5) is illuminated, the 90% limit of the maximum vertical or eccentric overload is exceeded. This message is accompanied by the illumination of the warning light on top of the platform control box. On the display 06 appears, flashing in turn with message 31 or 33.



Message 33 refers to the total vertical load, message 31 to the eccentric overload. In this situation the machine can still be used. When the load is adapted, the 90% LED and the warning light will be switched off and the message on the display will disappear.

- If the 100% LED (6) is illuminated, the 100% limit of the maximum vertical or eccentric overload is exceeded. This message is accompanied by the illumination of the warning light on top of the platform control box. On the display 06 appears, flashing in turn with message 32 of 34. Message 34 refers to the total vertical load, message 32 to the eccentric overload. In this situation the machine remains switched off and can no longer be used. The load must be adapted before the machine can be operated.

After adapting the situation, the 100% LED and the warning light will be switched off, the buzzer will stop and the message will disappear from the display

3.4.3.6 Operation in an emergency situation

In case of an emergency, try to solve the failure by using the troubleshooting diagram in paragraph 4.4.

If the failure cannot be solved (for example, power failure), you should make an emergency descent as follows. Go to the nearest location from which you can leave the platform.



Avoid long emergency descents.

- 1 Open the bottom hatch in the cabin carriage.
- 2 A handle is located on the motors which can be used to manually trigger both motor brakes.
- 3 Pull this handle upwards. The platform will descend.



In a twin set-up the brake releases on both carriages should be operated simultaneously (by two persons). Keep the carriages at an equal height (descending with the same speed). Do not lower the platform alternately; this will shorten the life of the brake considerably.



If the platform of a twin set-up was tilted while descending in an emergency situation, stop descending and level the platform by using the brake release of the highest carriage.

If the angle tends to become too high, the mechanical tracking system will automatically brakes the fastest descending carriage.

You will be able to feel this in the handle. Release the handle till the platform is in horizontal position again. Release the handle till the platform is in horizontal position again.



The descending speed will be automatically limited by the centrifugal brakes.



The platform must be stopped for at least two minutes after a maximum descent of 16.45 ft to prevent the brakes from overheating. Overheating results in a strong reduction of the brake capacity.



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4 INFO FOR THE SERVICE MECHANIC

This chapter can be divided into the following paragraphs:

- inspection and maintenance diagrams
- lubrication diagram;
- maintenance procedures (detailed information on how to proceed when carrying out maintenance jobs to specific parts of the machine)
- troubleshooting (error code tables and information on how to proceed in the case of a malfunction);
- procedure for the machine disposal at the end of the reliable service life.

4.1 Inspection and maintenance diagrams

4.1.1 Daily maintenance



The daily maintenance as indicated in the diagram below has to be carried out by the building supervisor or an experienced person appointed in writing by the supervisor.

Main group	Item	Action
Ground frame / chassis	Lockings	• Inspection: check for presence.
	General construction	• Inspection: check for loose parts.
	Ground supports	• Inspection: check ground supports and ground quality.
	Chassis motors	• Inspection: check for oil leaks.
Carriage	Lockings	• Inspection: check for presence.
	General construction	• Inspection: check for loose parts.
	Electric connections	• Inspection: general.
	Drive motor	• Inspection: check for oil leaks.
	Motor brakes	• Inspection: check its operation.
Platform	Lockings	• Inspection: check for presence.
	General construction	• Inspection: check for loose parts.
	Electric connections	• Inspection: general.
	Outriggers	• Inspection: check locking.
	Limit switches	• Inspection: check its operation.
	Platform	• Inspection: check for obstacles in the path of the platform.
Fence	Lockings	• Inspection: check for presence.
	General construction	• Inspection: check for loose parts.
	Protective features	• Inspection: check for presence and locking.
Stairs	Lockings	• Inspection: check for presence.
	General construction	• Inspection: check for loose parts.
Mast	Anchors	• Inspection: general.
	Mast elements	• Inspection: check connections between the mast elements.
	Mast	• Inspection: check mast position.
	General construction	• Inspection: check for loose parts.
	Cable guides	• Inspection: general.
	Ground supports	• Inspection: check ground supports and ground quality.

If any defect is found during the inspection, solve the problem.

4.1.2 Weekly maintenance



The weekly maintenance as indicated in the diagram below has to be carried out by the building supervisor or an experienced person appointed in writing by the supervisor.

Main group	Item	Action
Carriage	Gear wheels	<ul style="list-style-type: none"> Maintenance: greasing. Clean if heavily contaminated with sand or grit. For lubricant specifications, see the diagram in paragraph 4.2. Inspection: checking.
	Drive unit	<ul style="list-style-type: none"> Maintenance: cleaning.
Platform	Platform	<ul style="list-style-type: none"> Maintenance: cleaning.
Mast	Rack	<ul style="list-style-type: none"> Maintenance: greasing. Clean if heavily contaminated with sand or grit. For lubricant specifications, see the diagram in paragraph 4.2.

If any defect is found during the inspection, solve the problem.

4.1.3 Monthly maintenance



The monthly maintenance as indicated in the diagram below has to be carried out by the building supervisor or an experienced person appointed in writing by the supervisor.

Main group	Item	Action
Ground frame / chassis	Basic mast bolts	<ul style="list-style-type: none"> Check: bolts tightening torque.
	Jack bolts	<ul style="list-style-type: none"> Check: bolts tightening torque.
Carriage	Guide rolls	<ul style="list-style-type: none"> Inspection: visual check of running surface and lockings.
	Drive unit counter rollers	<ul style="list-style-type: none"> Inspection: visual check of running surface and lockings.
	Electric equipment	<ul style="list-style-type: none"> Inspection: cables, buttons and switch box.
Platform	Platform elements	<ul style="list-style-type: none"> Inspection: check if tightened with proper torque.
	Limit switches	<ul style="list-style-type: none"> Inspection: check its operation.
Mast	Mast bolts	<ul style="list-style-type: none"> Inspection: check if tightened with proper torque.
	Anchoring	<ul style="list-style-type: none"> Inspection: check for proper tightening torque. Maintenance: secure any loose parts.

If any defect is found during the inspection, solve the problem.



4.1.4 Quarterly maintenance



The quarterly maintenance as indicated in the diagram below has to be carried out by the building supervisor or an experienced person appointed in writing by the supervisor.

Main group	Item	Action
Ground frame / chassis	Jacks and stub axles	• Maintenance: greasing.
Carrage	Pinions	• Inspection: visual check.
	Guide rolls	• Inspection: visual check of running surface and lockings. • Inspection: check clearance on guide rolls.
	Drive unit counter rollers	• Maintenance: greasing. • Check: bearings.
Platform	Autolevel protection	• Inspection: check operation for mast climbing work platform with twin mast

If any defect is found during the inspection, solve the problem.

4.1.5 Annual maintenance



The annual maintenance as indicated in the diagram below has to be carried out by the building supervisor or an experienced person appointed in writing by the supervisor.

Main group	Item	Action
Ground frame / chassis	General construction	• Inspection: check condition of paintwork and welded joints and for signs of corrosion.
Carrage	General construction	• Inspection: check condition of paintwork and welded joints and for signs of corrosion.
Platform	General construction	• Inspection: check condition of surface treatment and welded joints and for signs of corrosion.
Fence	General construction	• Inspection: check condition of paintwork and welded joints and for signs of corrosion.
Stairs	General construction	• Inspection: check condition of paintwork and welded joints and for signs of corrosion.
Mast	General construction	• Inspection: check condition of surface treatment and welded joints and for signs of corrosion.
	Rack	• Inspection: check rack mounting bolts.

If any defect is found during the inspection, solve the problem.

4.1.6 Maintenance during storage of the machine



The maintenance during storage of the machine as indicated in the diagram below has to be carried out by the building supervisor or an experienced person appointed in writing by the supervisor.

Hoofdgroep Main group	Item	Action
Ground frame / chassis	General construction	<ul style="list-style-type: none"> • Inspection: fully inspect chassis / carriage. • Inspection: check all vital parts. • Maintenance: replace damaged parts, if required.
	Carriage	<ul style="list-style-type: none"> • Inspection: fully inspect carriage. • Inspection: check all vital parts. • Maintenance: replace damaged parts, if required.
Rack and gear wheels	Rack and gear wheels	<ul style="list-style-type: none"> • Maintenance: greasing and cleaning.
	Basic machine	<ul style="list-style-type: none"> • Maintenance: cover machine with canvas, at least cover control boxes and limit switches.
	Chassis jacks	<ul style="list-style-type: none"> • Maintenance: screw out so wheels no longer have load bearing function.
Platform	General construction	<ul style="list-style-type: none"> • Inspection: fully inspect platform. • Inspection: check all vital parts. • Maintenance: replace damaged parts, if required.
Fence	General construction	<ul style="list-style-type: none"> • Inspection: fully inspect fence. • Inspection: check all vital parts. • Maintenance: replace damaged parts, if required.
Stairs	General construction	<ul style="list-style-type: none"> • Inspection: fully inspect stairs. • Inspection: check all vital parts. • Maintenance: replace damaged parts, if required.
Mast	General construction	<ul style="list-style-type: none"> • Inspection: fully inspect mast. • Inspection: check all vital parts. • Maintenance: replace damaged parts, if required.
	Rack and gear wheels	<ul style="list-style-type: none"> • Maintenance: greasing and cleaning.
	Mast elements (with racks)	<ul style="list-style-type: none"> • Inspection: inspect mast elements. • Inspection: check if detachable connectors are OK.
	Mast bolts between ground frame / chassis and basin mast	<ul style="list-style-type: none"> • Inspection: check for corrosion. • Maintenance: replace, if required.

If any defect is found during the inspection, solve the problem.

4.2 Lubrication diagram and procedure



The major part of the maintenance consists of lubricating the various parts.

Please note that various parts, such as the motors, have been lubricated for life. In the case of a calamity, topping up the oil level or changing the oil may be necessary.

Other parts, such as the rack and pinion drive of the masts, have to be lubricated periodically.

See the diagram below for the lubricants to be used.

Part	Lubricant
motor reducers	according to ISO VG 220
rack and pinion	HEK rack & pinion grease

4.3 Maintenance procedures drive line

4.3.1 Motor brake - checking the rotor thickness and the air gap

The total thickness of the rotor (including the friction material) (fig. 4-01) must be at least 0.41 in. The air gap 'a' is adjusted by the manufacturer to 0.01 in and must never become more than 0.02 in.

Proceed as follows to check the rotor thickness and the air gap:

- 1 Use the manual release levers on the working platform to lower the platform onto the buffers.
- 2 Switch off the mast climbing work platform by means of the main switch and lock the switch with a padlock.
- 3 Remove the release lever (fig. 4-01, item 5).
- 4 Remove the fan cover of the motor.
- 5 Remove the seegering by using a pair of pliers and remove the fan from the motor brake.
- 6 Remove the rubber dust ring (fig. 4-01, item 8).
- 7 Use a vernier calliper gauge to measure the thickness of the rotor (fig. 4-01, item 8). Replace the rotor if the thickness is 0.41 in or less; see paragraph 4.3.2.3. If the rotor is still o.k., check the air gap 'a'.
- 8 Use a feeler gauge to measure the width of the air gap 'a' near the three hollow adjusting bolts (fig. 4-01, item 7).

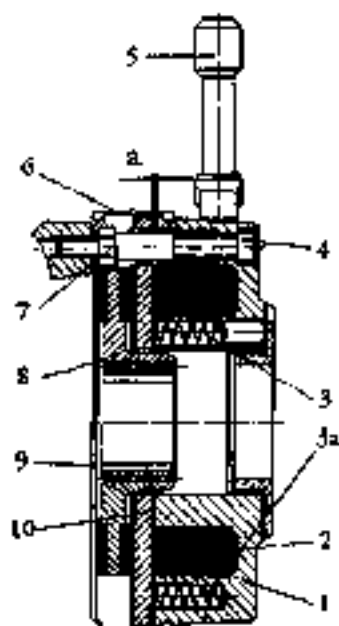


Fig. 4-01 Motor brake

- 9 When the width is between 0.1 in and 0.2 in, you do not have to readjust the air gap. The dust ring, the fan with seegering, fan cover and release lever can be reinstalled. However, it is advised to readjust the air gap as soon as its width is less than 0.2 in; see paragraph 4.3.2.

4.3.2 Motor brake - adjusting the air gap

If the air gap is more than > 0.2 in, it has to be readjusted. Proceed as follows to readjust air gap 'a':

- 1 Loosen the locking bolts (fig. 4-01, item 4).
- 2 Use an open-end spanner socket to screw the three hollow adjusting bolts (fig. 4-01, item 7) further into the stator. Pay attention that those bolts are equally screwed into the stator.
- 3 Fasten the three locking bolts (fig. 4-01, item 4) step by step.
- 4 Use a feeler gauge to check the width of the air gap 'a' at each bolt; if required, readjust the three hollow adjusting bolts until the air gap at each bolt is 0.1 in.
- 5 Mount the rubber dust ring (fig. 4-01, item 6), the fan with the seegering, the fan cover and the brake release lever.



The adjustment of the manual release lever must not be changed after adjusting the air gap. This may have an adverse effect on the safety.

4.3.3 Motor brake - replacing the rotor

If the thickness of the rotor becomes less than 0.4 in, it has to be replaced. Proceed as follows:

- 1 Follow the instructions for the checking of the air gap (paragraph 4.3.1) up to and including step 6.
- 2 Remove the locking bolts (fig. 4-01, item 4) and the stator.
- 3 Remove the worn rotor.
- 4 Clean the various parts (dust and oil).
- 5 Install the new rotor.
- 6 Install the stator and fasten the locking bolts (fig. 4-01, item 4) handtight (torque: 7.39 lb ft).
Ensure that all the pressure springs are present (3 + 3a).
- 7 Adjust the air gap as described in paragraph 4.3.2
- 8 Mount the fan, the rubber dust ring (fig. 4-01, item 6), the fan with the seegerring, the fan cover and the brake release lever.



Never touch the friction material on the rotor. Greasy fingers considerably reduce the reduction brake functioning.



When working on the brakes, you have to ensure not to change the adjustment of the brake release cables. This may have an adverse effect on the autolevel systems



Never change the position of the screw ring at the rear of the brake coil, in order to prevent the brake from functioning insufficiently or even from falling.

4.3.4 Pinion and rack drive - reject limits

The pinion and rack drive has to be cleaned and lubricated periodically; for detailed information, see 'Maintenance intervals'.

Check the measures as specified in the table below.

When a part is under the reject limit, it has to be replaced.

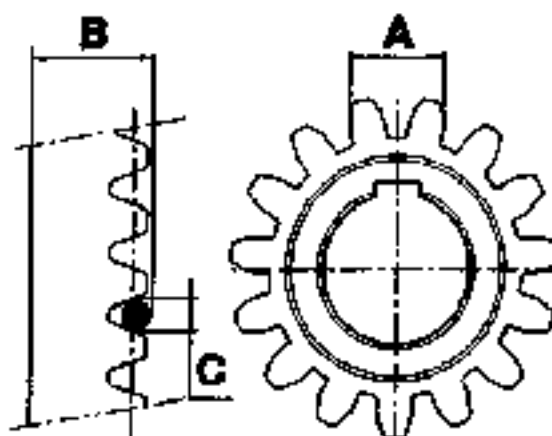


Fig. 4-02 Pinion and rack drive

Pinion pitch circle	4.73 in
Number of teeth	15
Module	8
Dimension A, nominal	1.46 in
Dimension A, minimal	1.43 in
Dimension B, nominal	1.98 in
Dimension B, minimal	1.86 in
Measuring pin C	0.51 x 1.97 in

4.4 Troubleshooting

The display of the UOP (fig. 4-03, item A) also functions as an 'information panel'. Use the codes on the display to troubleshoot the machine in the case of a malfunction.

In combination with the error LED (fig. 4-03, item B), the codes have the following meaning:



Fig. 4-03 UOP display and error LED

code	description	malfunction	solution
01	Automatic fuse 104	Short in 24 VAC circuit	Consult an electrician
02	Phase sequence	Main switch in wrong position	Put main switch in opposite position. If this does not solve the problem, consult an electrician
		One of the phases missing	Consult an electrician
03	Motor temperature	Motor load too high	Reduce load and wait for the motors to cool
		Supply voltage too low	Consult an electrician
04	Emergency stop	Emergency stop button pressed	Release the button
06	Emergency upper switch	Upper striker plate failed	Consult an electrician
06*	LOP message	Internal UOP error	Consult UOP table
07	Autolevel device activated (twin set-up)	One of the autolevel switches failed	Consult an electrician
		Platform tilted after emergency descent	Lower the upper carriage
08	Emergency lower switch	Platform in transport position	Take platform out of the buffers
		Lower striker plate failed	Consult an electrician
09	Additional switch / dummy plug	Safety circuit opened by additional switch (e.g. anchor ramp switch)	Put the switch in safe position (for anchor ramp: open the ramp)
		Round dummy plug (X-9) missing	Mount the plug
10	Gate	Gate is open	Close the gate
11	Other machine / control cable	Error in other carriage (twin set-up)	Check the other carriage
		Control cable not properly connected (twin set-up)	Check the cable connections
		Dummy plug not mounted (single set-up)	Mount the dummy plug
20-99	UOP messages	See UOP table	

06* flashes and the display shows a code >20 (see UOP table on the next page).



List of UOP messages

When error code 08 is shown, also a second code > 20 will be shown intermittently. These codes are related to internal measurements and the actual status of the UOP.

See the table below for detailed information on the codes:

code	description	solution
21	Current too high when ascending	Prevent an excessive voltage drop. Provide a solid supply voltage and a supply cable diameter that matches the cable length.
22	Current too high when descending	Prevent an excessive voltage drop. Provide a solid supply voltage and a supply cable diameter that matches the cable length. When using a generator, make sure it has sufficient capacity.
23	Difference in current too high	Press the UP button while manually lifting the brakes. If the problem does not occur, one of the motor brakes is not electrically lifted. This can be caused by a sticking brake or missing control voltage on the brake. Check the motors for damage or oil leaks. If you find any, shut down the machine and contact your dealer.
24	Supply voltage too high	Provide the correct voltage. If necessary, use a transformer.
25	Supply voltage too low	Provide the correct voltage. If necessary, use a transformer.
26	UOP relay K1	Consult your dealer.
27	UOP relay K2	Consult your dealer.
31	90% eccentric overload	This message shows that the platform eccentric load reaches the max. permissible value. No immediate action required.
32	100% eccentric overload	Distribute the load uniformly over the platforms. If not possible, remove part of the load at the overloaded platform side.
33	90% vertical overload	This message shows that the platform load reaches the max. permissible value. No immediate action required.
34	100% vertical overload	Remove part of the load.
35	(Cable) load cell 1	Visually check the vertical load cell cable for damage. If required, test the cable for continuity. If the cable is OK, the load cell is defective.
36	(Cable) load cell 2	Visually check the eccentric load cell cable for damage. If required, test the cable for continuity. If the cable is OK, the load cell is defective.
37	UOP relay K3	Consult your dealer.
38	UOP relay K4	Consult your dealer.

Except for the codes 31 up to and including 34, only qualified personnel (electricians) are allowed to solve the problems indicated in above-mentioned table. If in doubt, contact your dealer or HEK Manufacturing B.V.