HOEFLON®

USER MANUAL

COMPACT CRANE C30e

Serial no.:

Delivery date:

Type: U.C30.00.00.EN

Version: 2.0

VERSIONPROPERTY

Version 1.0	24-04-2020	Vanaf serienummer
Version 2.0	07-07-2021	Vanaf serienummer

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PROPERTY RIGHTS

PREFACE

This user manual has been written for the type C30e compact crane. Throughout the rest of this document this type will simply be referred to as 'compact crane'. Read this entire user manual carefully to become familiar with the correct operation and maintenance of the compact crane. If you choose to ignore the guidelines and instructions in this user manual you do so entirely at your own risk, and bodily injury and damage to the machine may result.

Hoeflon International B.V. recommends that the original copy of this user manual, including all the annexes, be kept in a safe, central place. It is also a good idea to keep a copy of this user manual near the machine at the workplace. For technical support, please contact the manufacturer (see details on the cover).

NOTES FOR THE READER

The instructions, recommendations and warnings in this user manual are accompanied by the following terms/pictograms. Read these instructions carefully.

TIP

A 'Tip' provides the user with suggestions and advice that will make it easier or more convenient to perform certain tasks.

CAUTION!

'Caution!' The operation may be dangerous. 'Caution!' indicates that damage to the machine may occur if the user does not perform the procedures with due care.

WARNING!

'Warning!' The user may injure himself or seriously damage the machine. A warning indicates a situation in which the user may be harmed or damage may occur to the machine, tool or load if the user does not perform the procedures carefully.

DANGER!

'Danger!' Warns that a hazard or hazardous condition may be life threatening.

Table of contents

1

INTRODUCTION

1.1 Introduction

The purpose/function of this user manual is to establish safe and efficient interaction between man and machine. The information in this user manual plays an important role in ensuring the safe and proper operation of the machine.

Read this user manual carefully from beginning to end. Hoeflon International B.V. also recommends a brief compulsory training and instruction session for all new users (operators, technicians, maintenance personnel and possibly even cleaners), for which this user manual can serve as a starting point.

Contact your supplier's technical department for additional information concerning aspects such as maintenance and repair of specific machine parts. This user manual has been written with the greatest possible care and with the intention of making it as complete as possible. Nevertheless, continuous safety vigilance in both familiar and unfamiliar situations is always necessary.

1.2 EC Declaration of Conformity

Hoeflon International B.V. declares that the compact crane meets the requirements of the applicable European Directives. The EC Declaration of Conformity is attached as an annex.

1.3 Changes

Changes may only be made to the compact crane after written consultation with Hoeflon International B.V. These changes must be documented in the crane logbook.

All changes to the machine must be documented in this user manual as well as in all copies. The party that makes the changes is responsible for doing so.

Hoeflon International B.V. reserves the right to make immediate adaptations or changes that improve the safety of the machine at any time. These adaptations or changes will be documented in an annex to this user manual. The content of this user manual can also be changed without prior notice.

2

GENERAL DESCRIPTION

2.1 Intended use

The compact crane is exclusively intended for lifting loose materials using a hook. The objects to be transported must fall within the specifications described in this user manual and the corresponding crane logbook.

2.2 Major comonents of compact crane

The components of the compact crane are shown below.

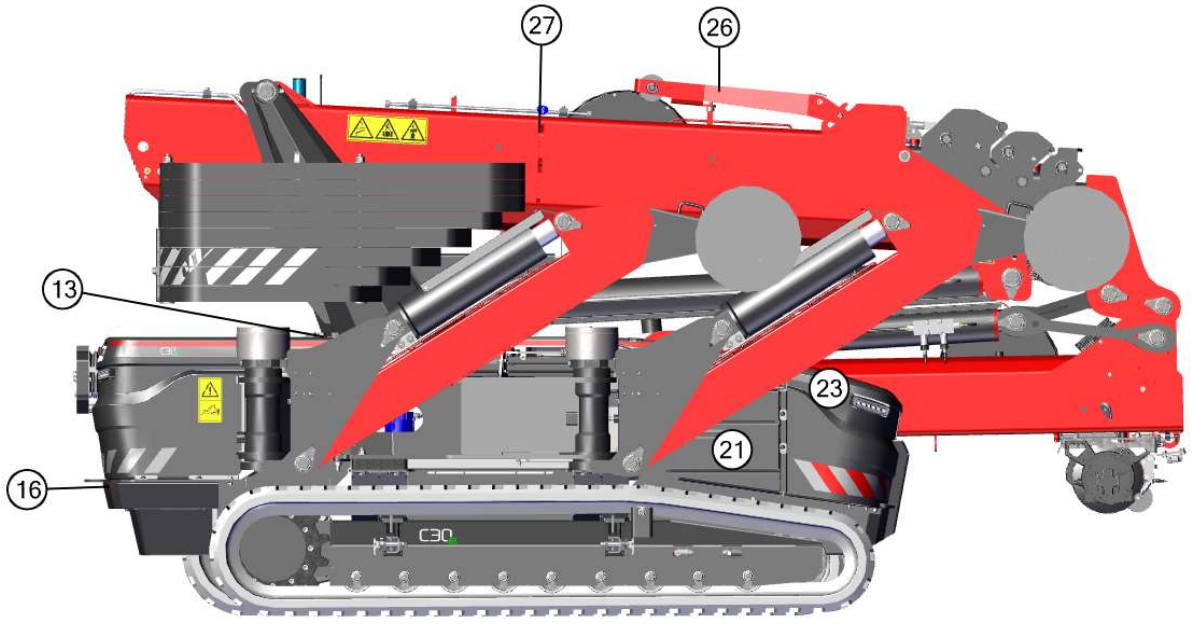

Figure 1: Right-side view C30e

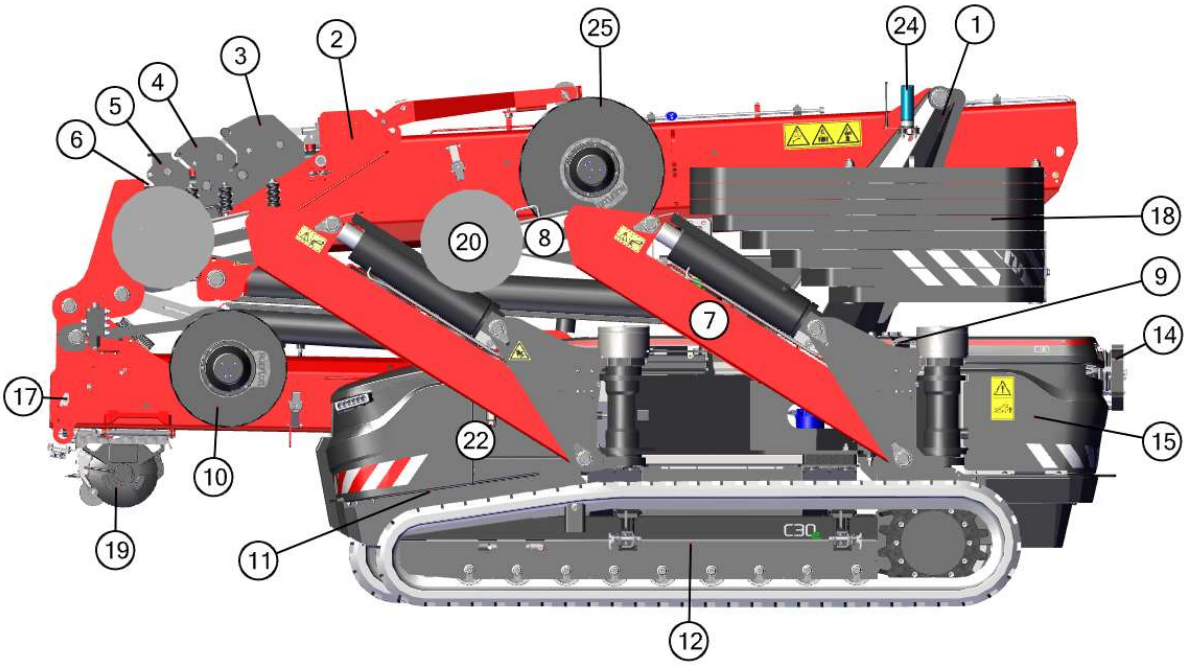

Figure 2: Left-side view C30e

1 Crane column
2 Boom 1
3 Extension jib 1
4 Extension jib 2
5 Extension jib 3
6 Extension jib 4
7 Outrigger leg
8 Outrigger leg extension
9 Charging current connector
10 Data reel
11 Electric motor
12 Track undercarriage
13 Turntable
14 Winch weight
15 Batteries
16 Pulling eye
17 Fly-Jib
18 Ballast
19 Hoisting winch
20 Outrigger pads
21 Toolbox
22 Hydraulic oil tank
23 Battery charger (for transmitter battery)
24 Stack light
25 Hydraulic/electric reel
26 Ballast removal support
27 Lifting point
28 Winch head (development)
29 30° section (development)
30 Manual jib extension (development)

2.3 Technical data

2.3.1 Technical specifications

The technical data for the compact cranes are shown below.

General data		
Machine brand	Hoeflon	
Serial number	2000 1089 C30e *(1089=service number)*	
Fly-jib weight	640	kg
Maximum slope angle	20	°
Clearance angle	Rear 25° and front 23.5°	°
Max. lean angle with outriggers extended	5	°
Ground clearance	200 mm tracks in / 300 mm tracks out	mm
Electric motor	80 V 12 kW	
Battery	2x 12 V, 12 Ah	
Ambient temperature	-10 to 40	°C
Slewing range	360	°
Max. working load and lifting point of crane	See load chart provided in the annexes	
Maximum wind speed	10.8 (6 Beaufort)	m/s

Technical data	C30e	
Transport length without jib	3850	mm
Transport width	1170	mm
Transport height	2000	mm
Max. outer dimensions with outriggers extended at 45°	5080	mm
Total weight incl. jib and any ballast	9000	kg

Total weight jib	640	kg
Total weight ballast	2320	kg
Weight of winch weight with hook	37.5	kg
Weight of winch head	-	kg
Maximum ground pressure per surface area	0.76	kg/cm^2
Maximum outrigger pressure per outrigger	8900	kg
Max. load jib horizontal retracted	3000	kg
Max. load jib horizontal extended	9	kg
Max. winch load	1000	kg
Max. reeving	1x reeving 2000 kg 2x reeving 3000 kg	

2.3.2 Drawings

The dimensions of the compact crane are shown below.

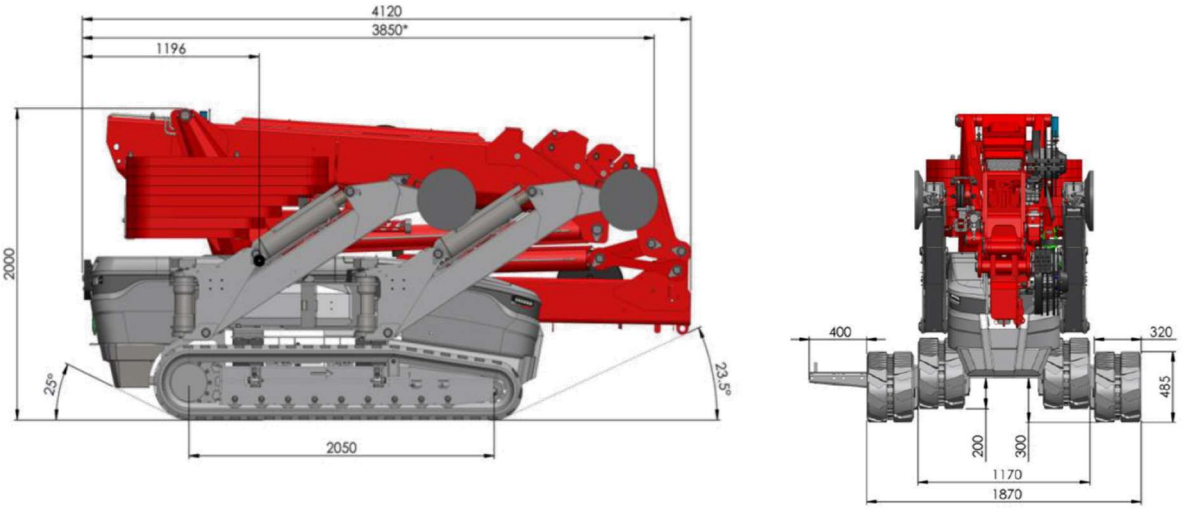

Figure 3 front and side view C30e

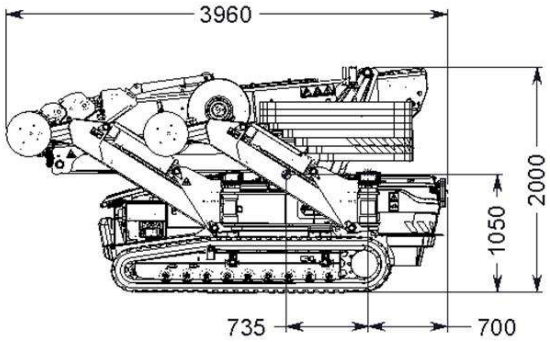

Figure 4: Centre of gravity without

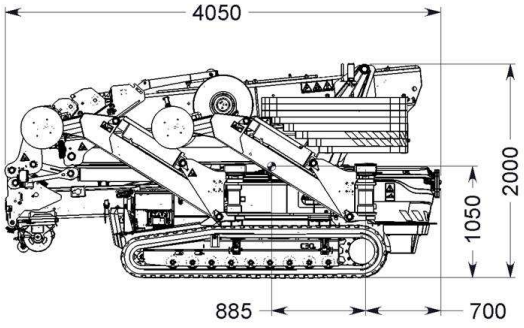

Figure 5: Centre of gravity with Fly jib

2.3.3 Sound pressure level

The noise measurements were conducted on a flat surface.

Noise level dB(A)		8 metres	16 metres
Front, engine side	Electric motor		
Rear	Electric motor		

2.3.4 Hydraulic system

The specifications for the hydraulic system are shown below.

Hydraulic system		
Volume of hydraulic tank	70 litres	
Pump 1	Type	Gear pump
	Max. pressure	250 bar

2.3.5 Electrical system

The specifications for the electrical system are shown below.

Electrical system	
Battery	24 V (2x 12 V)
Battery packs	80 V, 5.5 kW
Electric motor	80 VDC, 12 kW
Remote control	Hoeflon RC6

TIP

For more technical specifications, see the corresponding crane logbook and the user manual for the engine.

2.4 Type plate

A type plate containing the machine data is mounted on the compact crane. This type plate may not be removed.

The CE Marking is shown on the type plate to show that the compact crane meets the requirements of applicable European Directives.

Figure: 6

Type plate explanation	
Type	The type of compact crane (C30e)
Model	The brand of the compact crane
Serial no.	The serial number of the compact crane
Year	The year in which the compact crane was built
Weight	The weight of the compact crane
Max. capacity	Maximum working load

TIP

Please provide the type number and serial number when ordering parts.

3

GENERAL INSTRUCTIONS FOR USE

The compact crane is a machine intended for lifting loads. It is only permitted to use the compact crane for the intended uses. Additionally, you are not permitted to change movement speeds on your own. It is also absolutely forbidden to exceed the maximum working load (see sections 9.1 and 9.2), and it is forbidden to bypass sensors. If changes are desired, you must contact the manufacturer.

Before the machine is put in use the user must be sufficiently familiar with this user manual. All the instructions and safety warnings in this user manual must be followed. Any use other than the permitted use may result in danger to users and bystanders. Moreover, the machine may be damaged. It is not permitted to use the machine in a way other than prescribed without express written permission from Hoeflon International B.V.

Your machine has a self-monitoring safety system. This means that sensors monitor the position/configuration of the machine as well as the load. These data are stored in the crane.

Every employee must be familiar with all the instructions in this user manual. Failure to heed this requirement is considered to be negligence.

4

WARRANTY

A new compact crane is covered by a 12-month warranty.

The warranty starts on the day the compact crane is first put in use. This is also the day that is stated on the delivery receipt (see page 3).

If changes are made to the crane by anyone other than a Hoeflon International B.V. employee, the warranty will be void.

No warranty is given on the following parts:

- Imitation parts or parts that were not ordered from Hoeflon International.
- Labour charges for installation/repair of the compact crane.
- Parts that have become defective due to incorrect/improper use, overloading, lack of maintenance, incompetence, accidents, normal wear, etc.
- Parts required for scheduled maintenance.
- If a filled in delivery receipt is not returned to Hoeflon International B.V.,
- reimbursement will only be provided for the parts.

The full terms and conditions of the warranty are available from your dealer on request.

5

SAFETY

5.1 Operating personnel

Operating personnel may not be under the influence of narcotics or alcohol and must be at least 18 years of age. These persons must be familiar with all the functions and tools associated with this hoisting and lifting tool. Persons who work with the compact crane must wear safety shoes, gloves and a safety helmet.

In the Netherlands, the operating personnel must be in possession of a valid mobile crane operator's licence, TCVT W4-01.

5.2 Warnings

Every employee must heed the following warnings/regulations.

DANGER!

Lifting with the boom below horizontal is prohibited, due to the extension and retraction chains. With the jib lower than horizontal is allowed.

DANGER!

Never allow unauthorised persons to come within the working range of the machine while it is in operation. Never swing a suspended load over people.

DANGER!

It is prohibited to lift loads with a damaged or weakened hook, cable or other lifting equipment.

DANGER!

Avoid contact with rotating and moving parts.

DANGER!

It is prohibited to use the compact crane in the vicinity of high voltage cables!

DANGER!

Never climb on the machine when it is in motion or when it is being used.

DANGER!

It is prohibited to use the compact crane in an explosive environment.

	DANGER!
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	DANGER!
	DANGER!
	DANGER!

Never transport the compact crane without first ensuring that the crane, outriggers and ballast are fully collapsed, retracted and locked, and there is no load on the crane; otherwise there is a risk of dangerous situations and possible damage to the machine!

Make sure the load bearing capacity of the ground is adequate; use access mats or outrigger pads. Caution: never on manholes or beside/in holes.

It is prohibited to use the compact crane to transport or lift persons.

It is prohibited to use the compact crane to pull loads free, cause them to fall, push them or pull them at an angle.

It is prohibited to bypass a sensor; doing so can cause danger to life and damage to the machine. Contact Hoeflon International B.V. immediately in the event of a defective sensor.

It is prohibited to change the pressure settings and the motor/engine speed; this can lead to dangerous situations and damage to the machine and immediately voids the warranty.

Never lift heavier loads than the maximum permitted working load according to the table.

Never leave the compact crane unattended with a load hanging from the machine.

Only move loads that can move freely from the surface they are sitting on and that are located directly beneath the hook!

Remove the keys from the ignition switch when operating the crane; prevent unauthorised persons from switching the machine on or off.

Do not raise the boom more than 60° if the outrigger legs on the ballast side are positioned parallel (180°) to the compact crane! Otherwise the compact crane may tip over.

Never place materials or tools on the engine shroud of the machine or on the crane. These parts can be knocked off by the engine or fall off of the machine.

It is prohibited to use the compact crane in stormy weather and/or in wind speeds in excess of Beaufort Force 6.

High voltage!! (Danger of electrocution) It is prohibited to remove the rear cover and front covers of the undercarriage. Behind them are battery packs, cables and components that operate under high voltage. This may only be done by technicians specially trained by Hoeflon.

 WARNING!	Only suitable, trained persons who are familiar with the content of this user manual and have completed the user training provided by Hoeflon International B.V. may operate or work with the compact crane! (In the Netherlands, the operating personnel must be in possession of a valid mobile crane operator's licence, TCVT W4-01).
 WARNING!	Dangerous situations can arise in which there is intense interaction between the machine, the operator, the load, the surroundings and the ground. Thorough knowledge and preparation is a must.
 WARNING!	It is not advisable to use the electric drive system in rain, snow, or high or wet grass or to drive through water.
 WARNING!	It is prohibited to drive the compact crane on public roads; the compact crane is not equipped with the markings and lights required to do so.
 WARNING!	Hot parts of the engine and components of the hydraulic system can cause burn injuries.
 WARNING!	When disconnecting hydraulic lines and hoses, precautionary measures must be taken to ensure that the line/hose is no longer under pressure once the supply of energy to the system has been switched off.
 WARNING!	Ensure that the outrigger legs are not extended too far to prevent contact between the ballast and outrigger legs during slewing.
 WARNING!	It is prohibited to raise the jib beyond 70°.
 WARNING!	Avoid contact with the outrigger legs when setting or retracting the outriggers (crushing danger).
 WARNING!	Never transport a loaded compact crane, except with pick and carry option.
 WARNING!	Always collapse the crane after use in case of possible windy conditions when not in use.
 CAUTION!	Mind the height restriction in covered areas.
 CAUTION!	When working in a poorly lit environment, artificial light must be used to ensure that operations involving the compact crane can be performed safely.
 CAUTION!	Make sure there are no loose parts present on the boom during lifting operations.
 CAUTION!	The boom is flexible and bends when lifting the load. Be aware that when the load is released the boom will bend back.

CAUTION!	The lifting point on top of the jib is only intended for lifting the loose jib; it is forbidden to use it to lift a load or lash the machine in place.
CAUTION!	Take extra caution and safety measures in situations where the ground, the surroundings or the load strongly influences or restricts the use of the machine. When in doubt about the safe use of the machine, get advice from a specialist or contact your dealer or the manufacturer.
CAUTION!	Maintain a close watch on the active outrigger leg during extension to prevent foot entrapment.
CAUTION!	The compact crane may only be moved by means of hold-to-run control. Always maintain a good view of the surrounding area, to avoid hitting people or objects.

TIP	*Use communication equipment if the operator does not have a complete overview of the working area of the compact crane.*
TIP	*Never leave a machine unattended with the keys and remote control.*
TIP	*Keep the compact crane clean and prevent accumulation of contamination.*
TIP	*Follow national regulations concerning working conditions and work safety when using the compact crane.*
TIP	*It is recommended that the outriggers be positioned 10 cm above the ground and alongside the machine when driving on a soft or inclined surface to prevent tipping over.*
TIP	*It is not possible to fold in the jib when the boom is raised above 45 degrees.*

5.3 Emergency stop

There is an emergency stop on the back of the machine and on the remote control. Emergency stop buttons all have the same function: when activated they stop all movements. **Only operate the emergency stop in the event of an emergency or disaster.**

5.4 Emergency control

WARNING!

Extra caution is required when using the emergency control, because the display screen on the remote control no longer works.

- Only use the emergency control if the remote control cannot make radio contact, the display screen is defective or there is no replacement battery available.
- When the emergency control cable is connected, the display screen no longer works!
- Connect the emergency control cable to the connection on the underside of the transmitter and the connection at the right-rear corner of the crane (see *figures 7, 8 and 9).*
- Operate the transmitter in the usual way, as described in section 6.2.1.

Figure: 7

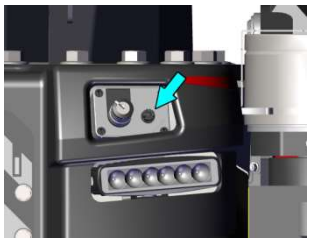


Figure: 8

Figure: 9

5.5 Pictograms

The pictograms used are shown below. These may not be removed. Missing or damaged pictograms must be replaced immediately!

Pictogram	Meaning	Location
	Use of safety shoes, gloves and safety helmet is mandatory.	On electrical cabinet
	Lifting point for lifting the machine	Left and right of the main boom
	L to R: Do not use in the vicinity of high voltage cables; Suspended load; It is prohibited to be under the load.	On the main boom and jib.

Pictogram	Meaning	Location
	It is prohibited for unauthorised persons to be within the working range or danger zone of the machine.	Left and right on the side of the crane.
	Always consult the user manual before taking any action.	On top of the rear cover.
	Attention: Raising and lowering outriggers.	At the sides, at the end of the outriggers.
	Risk of cutting or severing	On the crane at pivot points and on the outrigger legs at the cylinders
	Electrical danger	On the battery packs
	Warning for radio remote control	Below the stack light on the crane column.

5.6 Stack light

A stack light is fitted on the compact crane. The meaning of the colours is shown below. When bypassed by means of the key switch, the stack light produces an audible signal to warn everyone in the vicinity.

Crane operation active
Driving
Load at 90% to 100%
Load at 100%
Bypass 100% to 110%
Bypass without protection

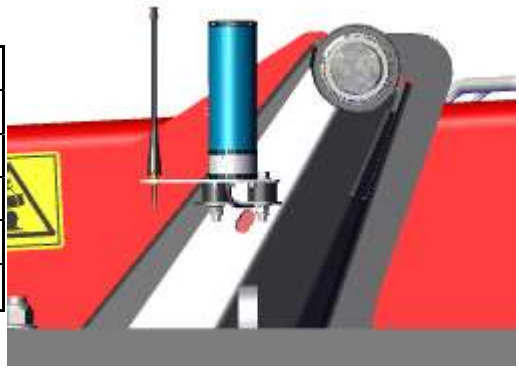


Figure: 10

5.7 LML

The following describes how the crane is protected against overload by the LML (Load Moment Limiter).
When the crane is standing on the outriggers and the ignition switch is put back in position 2 (crane operation) the crane knows exactly how it is standing on the outriggers. Based on this, the crane knows what it can lift where.
When a load is hanging from the crane and the crane's outreach is increased, if the crane enters the range in which it is no longer allowed to lift the load, it will automatically stop increasing the outreach. The red lamp in the stack light will also light up and an acoustic signal will sound.
Now the crane can only be operated in the direction in which the load comes back into the safe range. That is, the direction in which the outreach is reduced.
The following functions can be blocked by the LML: Extension of main boom and fly jib, winching, raising the main boom and fly jib, rotating the superstructure, retracting the ballast.

6

WORKING WITH THE COMPACT CRANE

Every employee must observe the following rules/warnings while working with the compact crane.

	DANGER!	Never enter the working area; this can have serious consequences.
	DANGER!	Do not let unauthorised persons enter the working area of the compact crane.
	DANGER!	It is prohibited to use the compact crane in an explosive environment!
	DANGER!	The user is responsible for safe operation of the crane, the selection of appropriate accessories (based on intended use, capacity, validity of inspection stickers and visual inspection) and the personal safety of the operator and people in the vicinity.
	DANGER!	Outriggers may only be used on a suitable surface. this means it must be adequately horizontal and have sufficient load bearing capacity.
	DANGER!	Never use the 110% button to increase the crane's outreach or to continue winching.
	WARNING!	Work safely at all times, taking into account the crane, surroundings, ground and load. Do not begin working if there is a plausible risk of a dangerous situation developing before appropriate measures have been taken.
	WARNING!	Operate the compact crane carefully; to prevent jolts while driving, never release the levers suddenly. May only be operated by authorised persons!
	WARNING!	When the bypass key switch is switched on (fig. 29, no. 3) the sensors are bypassed. It is prohibited to bypass the winch sensor. If you place a bypass, you do so entirely at your own risk.

	WARNING!	Always perform the daily inspection first!
	WARNING!	Always ensure that no hazardous situation can develop!
	WARNING!	Ensure that the compact crane working area is tidy and cordoned off.
	WARNING!	The charging cable between the crane and the 220 V socket may be up to 5 m long, and the wires must be at least 2.5 mm^2.
	CAUTION!	Do not use the compact crane until precautions have been considered and taken to safeguard the user, the machine, the load, the surroundings and the ground.
	CAUTION!	When it is necessary to perform other related work, switch off the control to prevent unintentional movements.
	CAUTION!	Never leave the control unattended, unless the ignition key is removed.
	CAUTION!	Never place loose parts on moving components of the compact crane.
	TIP	*The directions of movement of the remote control with respect to the compact crane match best if you are behind the compact crane.*
	TIP	*Use the tool drawers only for crane parts and the tools necessary for working with the compact crane (if present).*

6.1 Daily inspection prior to use

DANGER!

High voltage!! (Danger of electrocution) It is prohibited to remove the rear cover and front covers of the undercarriage. Behind them are battery packs, cables and components that operate under high voltage. This may only be done by technicians specially trained by Hoeflon.

For your own safety and to obtain the maximum service life from your equipment, it is of great importance that you always inspect the condition of the compact crane before use. Resolve any problems you find, or have your dealer do so, before you use the compact crane again.

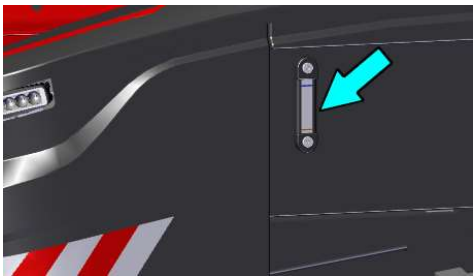


Figure 11

- Before performing the daily inspection, first ensure that the compact crane is horizontal (to ensure oil level indication is correct).
- Check that the crane's emergency stop has been pressed.
- Perform a thorough general visual inspection of the compact crane. Look, in particular, for oil leakage, leaking cylinders, loose connections, dirt accumulation and any damage. Remove any dirt which has accumulated and have necessary repairs performed if you observe a leak.
- Check the oil level in the hydraulic tank with the crane in the transport position; top up with Hydro 46 if necessary (see *figure 11*).
- Check that all protective caps and covers are in position and that all nuts and bolts are in place and firmly tightened.
- Make sure that the pins are present and secure. For example, at the outrigger leg, jib and lifting accessories.
- Visually inspect the tension and condition of the crawler tracks. If defects are found, contact the dealer.

Figure 12

- Raise the machine on the outriggers. When the crawler tracks are raised above the ground they may not sag more than 2 cm at the bottom. If they hang lower, they must be tightened.
- The tracks are tensioned by fitting the grease gun to the grease nipple in the centre of the track and pumping until the grease gun provides greater resistance *(figure 12)*. The crawler tracks must be tight.
- Check if the lamps on the sensors for the boom and jib pulse on/off when the extend function is operated. This is how the boom length is measured.
- Check that the crane control levers return to the centre position automatically and that the manual outrigger controls are automatically locked.
- Make sure all loose parts are stored/secured correctly.
- Check that the emergency stop button functions correctly; never perform lifting operations if the emergency stop button is not functioning properly. If defective, always have this repaired immediately!
- Check all rotating and moving parts for wear and damage.
- Check the chains for wear and damage.
- Check for wear of the winch cable, hook and other lifting accessories.

6.2 Controls

6.2.1 Remote control

The compact crane is operated by remote control; the buttons and functions of the remote control are explained in this section.

- The transmitter is splash- and rain-resistant.
- Never clean the transmitter and receiver with high pressure and do not immerse them.
- Keep transmitter clean; ensure that pictograms, screen and labels remain legible.
- Wear the transmitter on the waist belt around your waist or over the shoulder with a shoulder strap.
- Always keep a second, fully charged transmitter battery at the ready.
- If the transmitter has poor or no contact, switch off the transmitter and the ignition switch of the machine. Switch on again and the transmitter automatically seeks a new frequency.

Figure: 13

Default lever functions						
	Key switch in position 1			Key switch in position 2		
Number	Lever	Backwards	Forwards	Lever	Backwards	Forwards
1	LF outrigger	Up	Down	Slewing	Left	Right
2	LR outrigger	Up	Down	Main boom	Retract	Extend
3	L track	Backwards	Forwards	Fly-jib	Retract	Extend
4	R track	Backwards	Forwards	Winch	Raise	Lower
5	RR outrigger	Up	Down	Fly-jib	Extend	Retract
6	RF outrigger	Up	Down	Main boom	Extend	Retract

Figure: 14

Buttons			
PUSH	Emergency stop	17	Display
	On/off button transmitter		Not used
	Activate receiver and horn		Control panel display: ✓ Confirmation button ▲ Up arrow button ▶ Right arrow button ▼ Down arrow button ◀ Left arrow button ⮌ Back button
	Release left-side outriggers for swinging. Extend/retract: hold while using lever 1 (front outrigger) or 2 (rear outrigger).		Release right-side outriggers for swinging. Extend/retract: hold while using lever 5 (rear outrigger) or 6 (front outrigger).
110%	See next page for explanation*		Engage second driving speed
	Not used		Tracks (outrigger operation position) Extend ballast (crane operation position)
	Not used		Tracks (outrigger operation position) Retract ballast (crane operation position)
	Not used		Work light (optional); see also section 6.2.5.
	Not used		Not used
	Switching between superstructure and undercarriage operation. (Button only works after no handle or button has been operated for two seconds.) After waiting two seconds, press the button and the display will switch over.		

***110% button**
This button may only be used when the crane is in an unsafe situation. Pressing this button will bring the crane back to a safe situation. The LML is temporarily (30 seconds) increased to 110% when this button is pressed. Never use to increase the crane's outreach or to continue winching.

6.2.2 Function mapping

This function allows you to assign different functions to the levers. As standard, it is set to **default**. If you set it to **custom**, then it is set the same as many lorry loader cranes.

- Switch on the remote control and activate the remote control menu by pressing the ✓ button (see *figure 15).*

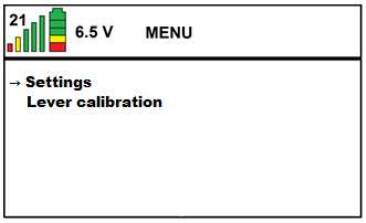


Figure: 15

- Then open **settings** by pressing the ✓ button and use the ▼ button to go to ***function mapping*** (see *figure 16).*

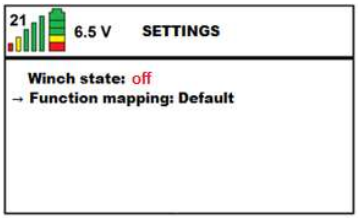


Figure: 16

- Then press the ▶ button to set the **custom** function. (see *figure 16).*

The table below shows the new functions of the levers.

Lever functions in 'custom' mode						
	Key switch in position 1			**Key switch in position 2**		
Number	**Lever**	**Backwards**	**Forwards**	**Lever**	**Backwards**	**Forwards**
1	LF outrigger	Up	Down	Slewing	Left	Right
2	LR outrigger	Up	Down	Main boom	Extend	Retract
3	L track	Backwards	Forwards	Main boom	Retract	Extend
4	R track	Backwards	Forwards	Fly-jib	Extend	Retract
5	RR outrigger	Up	Down	Fly-jib	Retract	Extend
6	RF outrigger	Up	Down	Winch	Raise	Lower

6.2.3 Calibrate levers

If the levers do not respond over the entire range of movement, they must be calibrated. This is done as follows:

- Switch on the remote control and activate the remote control menu by pressing the ✓ button (*see figure 17*).
- Press the ▼ button to move the arrow in the display until it points to 'Lever calibration' (*see figure 17*).

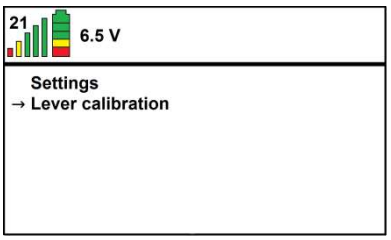


Figure: 17

- Press the ✓ button and you will be taken to the ***calibrate levers*** screen. You see a bar for each lever.
  When you operate a lever the bar turns green. In the maximum position the bar must be 100% green.
  If not, the levers must be calibrated (see *figure 18)*.

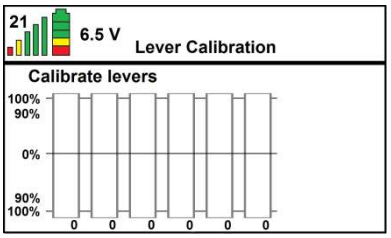


Figure: 18

- Press the ✓ button and you will be taken to the next screen. It says Put levers in center. Leave all the levers in their middle position; do not operate them (see figure 19).

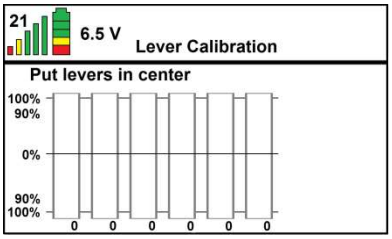


Figure: 19

- Press the ✓ button and you will be taken to the next screen. It says Move levers back and forth. Slowly operate the levers one at a time, from the maximum backwards position to the maximum forwards position (see figure 20).

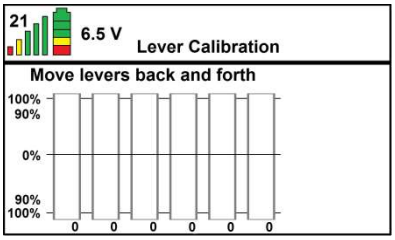


Figure: 20

- Press the ✓ button and you will be taken to the next screen. It says Save calibration. If you now operate a lever, the bar will turn green again in the direction you have chosen. At the maximum forwards or backwards position, the green bar will fill to 100%. If everything is working properly, press the ✓ button and the settings will be saved (see figure 21).

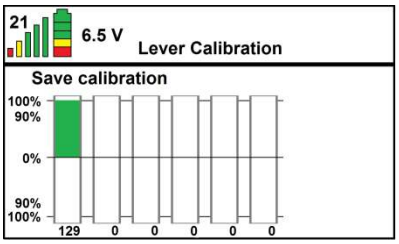


Figure: 21

- Pressing O twice will now take you back to the home screen.

6.2.4 Changing the transmitter battery

To change the battery in the transmitter, proceed as follows:

- Switch off the transmitter and the machine.
- Remove the battery from the transmitter (*figure 22*).

Figure: 22

- Replace the battery in the transmitter with the battery in the battery charger under the cover at the right-front corner of the machine (*see figures 23 and 24*). The battery in the box at the right front will be charged again when the crane is used. Attention! There is a half circle in the plastic on the battery and another on the battery socket. Make sure these are aligned with each other. Otherwise the battery will be backwards.

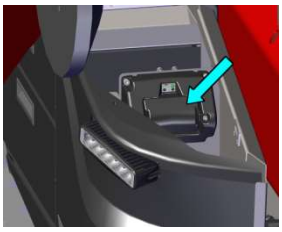
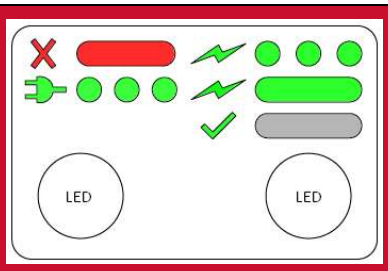


Figure: 23

Figure: 24

- The machine can be started again.
- See table below for meaning of the LEDs.



Left LED Battery charger status, for troubleshooting only		**Right LED** Battery status, for user	
LED status	Meaning	LED status	Meaning
Short green flash every 5 s	24 V connected	LED off	Battery not connected
LED continuous red	Malfunction	LED continuous green	Battery charging 1 A
		LED flashing green	Charging 0.3 A
		LED off	Battery fully charged

6.2.5 Work lights

Work lights undercarriage.

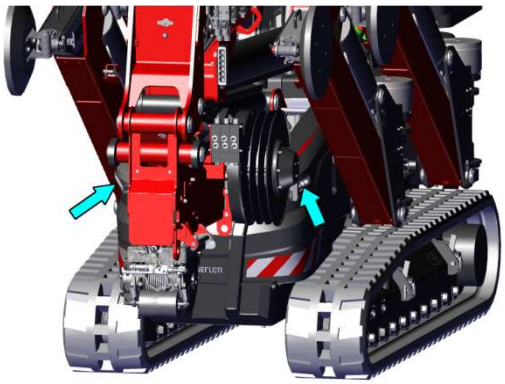


Figure: 25

Figure: 26

The work lights on the undercarriage of the crane (front 2x and rear 2x) can be switched on as follows. *See figures 25 and 26.*

- Set the crane to undercarriage operation (outriggers and driving).
- Now press the work lights button on the remote control and the work lights will switch on.
- Pressing the work lights button again switches them off.

Work lights superstructure.

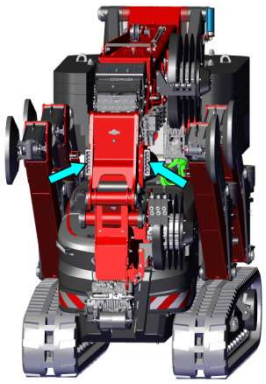


Figure: 27

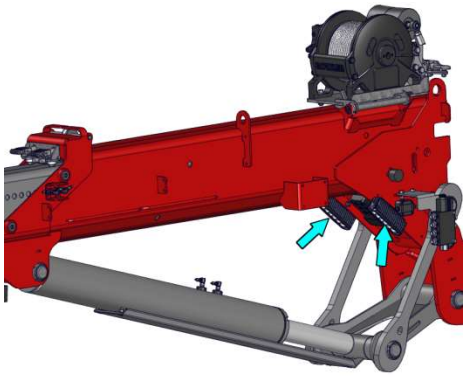


Figure: 28

On the superstructure, there are two work lights on the main boom and two work lights on the jib. These can be switched on as follows.

- Set the crane controls to the crane operation position.
- Pressing the work lights button on the remote control one time switches on the two work lights on the main boom *(see figure 27).*
- Pressing the work lights button on the remote control one more time switches off the two work lights on the main boom and switches on the two work lights on the jib *(see figure 28).*
- Pressing the work lights button on the remote control one more time switches on the two work lights on the main boom and leaves the two work lights on the jib switched on *(see figures 27 and 28).*
- Pressing the work lights button on the remote control one more time switches off all the work lights on the superstructure.

6.2.6 Controls at the rear of the crane

GEVAAR

DANGER!

Remove key from key switch when performing work on the electrical system and prevent unauthorised people from switching on the machine.

Figure 29: Back of the crane

Electrical cabinet		
Number	Component	Function
1	Main switch, implemented as key switch	Left (0): Machine switched off. Right (1): Machine switched on.
2	Emergency stop	Turns off all functions. Including charging.
3	Key switch	Left: Not operated (crane works normally) Right: Complete bypass of control functions
4	Connection for emergency control cable	See section 5.4.

6.2.7 Battery pack charge level

On the crane column at the left front is a LED indicator bar that shows the charge level of the battery packs. When the packs are fully charged, all the LEDs light up: 4x red, 4x orange and 8x green. As the battery packs become discharged, fewer green LEDs will be lit.

6.2.8 Storage space

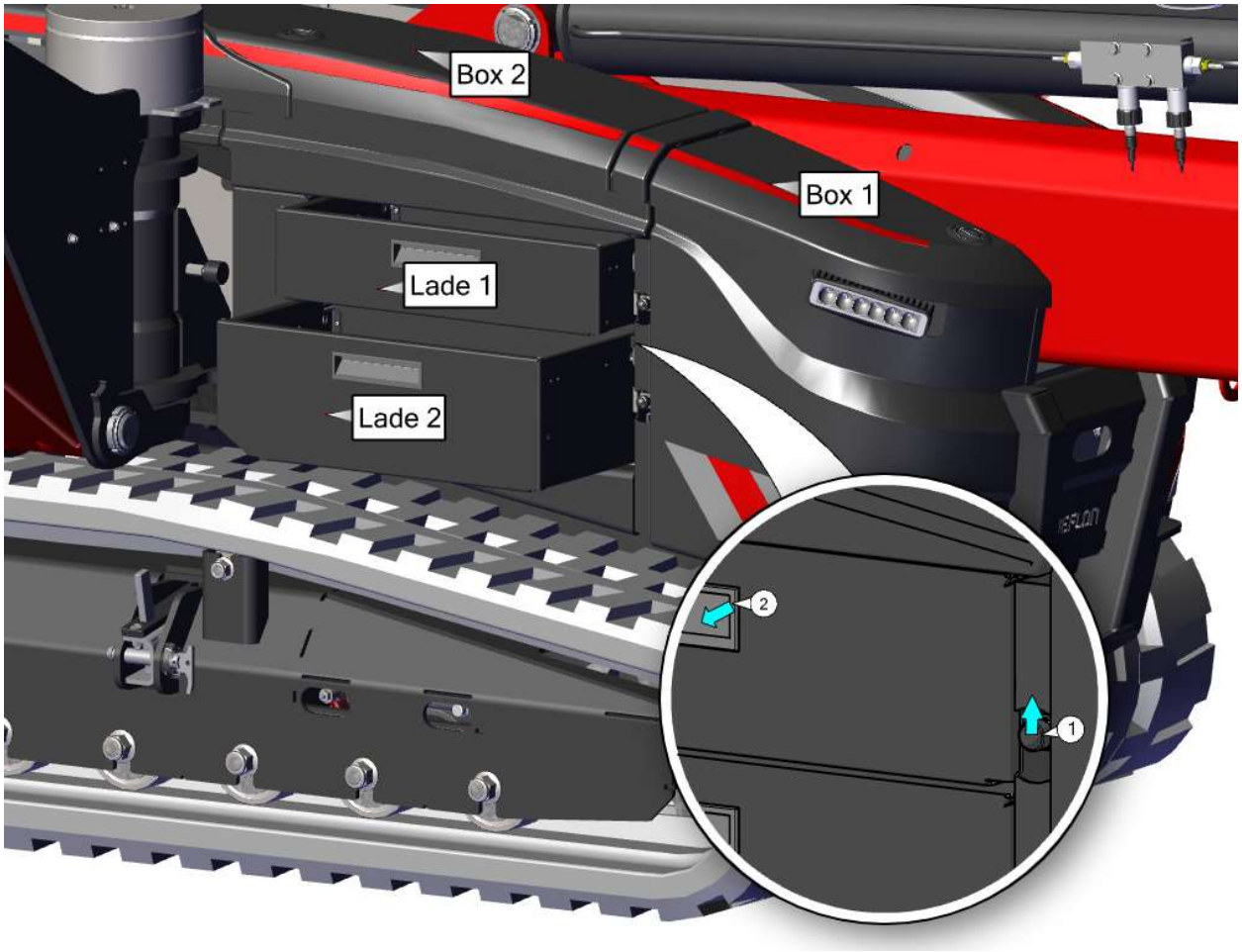


Figure 30: Storage space front of crane

Storage space	
Space	Function
Box 1	Storage location for remote control and remote control battery charger.
Box 2	Storage location for lifting accessories
Drawer 1	Documents (User manual and crane logbook)
Drawer 2	

6.3 Crane functions/operation

TIP

Make sure the crane and the track undercarriage are parallel to one another before collapsing the crane!

TIP

In the event of an overload, retract the extendable sections of the crane or lower the winch cable until the load is once more within the safe operating range of the crane.

6.3.1 Order of operations

To operate the arm of the compact crane, follow these steps in sequence:

- Activate the transmitter as described in section 6.4.
- Check that the outriggers are extended and that the compact crane is level (see section 6.5).
- Switch the remote control to the crane operation position (section 6.2).
- Erect the crane by raising the cylinders of boom 1 and the jib in succession, using the corresponding levers on the transmitter (see section 6.2). The boom and jib can then be extended. Collapse the crane by performing this procedure in reverse order.

6.3.2 Operation

- Operate the crane with the remote control by moving the levers (see section 6.2.1).
- Do not operate more than one crane function at a time.
- An overload warning will be displayed if the crane reaches its maximum upper position. Lower the boom slightly.

6.3.3 Guiding the load

WARNING!

The following load variables must be known: the mass, the location of the centre of gravity and the permissible lift points of the load; these can be used to determine the correct crane configuration and the lifting equipment to be used.

WARNING!

Always operate the machine extremely carefully, and when a load is attached only operate it in the first operating speed. Avoid abrupt movements and maintain contact with any assistants helping to guide the load.

Adhere to the following rules when guiding a load:

- Never place body parts (feet, legs, hands) under the load.
- During horizontal guiding of the load, follow behind the load.
- Never place body parts between the load and obstacles in the surrounding area, and never go between the load and an obstacle without a safe amount of space between them.
- When working near or with fragile material (e.g. stone, glass) where there is a risk of splinters/shards, wear protective clothing and safety glasses.
- Maintain visual contact and open channels of communication between guides and operator.
- When working with tall, unstable loads, never stand in the fall direction of the load.
- Whenever possible, use guide lines to maintain a safe distance.
- When using guide lines for a load at height, never walk under the load and maintain a safe distance, taking into account influence of the fall direction of the load due to obstacles in the environment.
- Make sure you always have an open escape route where you can flee for safety.
- Never stand or hang on the load.
- Make sure the load is properly secured and is and will continue to hang stable.
- Avoid abrupt movements of the machine and load.
- Operate the machine with load only in the slow operating speed.
- When using guide lines, clear the surrounding areas to eliminate the risk of tripping and the risk that the guide line will get caught and/or damaged.

6.4 Driving the compact crane

DANGER!

It is forbidden to drive with the ballast extended, as this creates a risk that the compact crane will tip over backwards.

Machine will tip over if exceeded!

DANGER!

On slopes:	Maximum slope angle
Forwards	20°
Backwards	20°
Sideways	Retracted tracks: 5° Extended tracks: 20°

DANGER!

It is forbidden to be beside the compact crane while driving. This is due to the risk of instability.

WARNING!

Operate the compact crane carefully; to prevent jolts while driving, never release the levers suddenly. May only be operated by authorised persons!

WARNING!

It is forbidden to drive through water more than 10 cm deep.

WARNING!

Always drive with the tracks extended; this minimises the load on the ground and provides the machine with maximum stability.

WARNING!

If the situation necessitates that the tracks be retracted, always use the first driving speed. Be extra cautious.

WARNING!

It is forbidden to pull with boom and jib, both horizontally and vertically, such as pulling out poles or dragging loads. The crane is intended for vertical transport of loads subjected only to the pull of gravity.

Dragging loads from the pulling eye is allowed while driving.

TIP

When driving on a steep slope, it is advisable to keep the outrigger legs on the downhill side 10 cm above the ground. If the compact crane tips, it will be caught by the outrigger legs and will not tip over completely.

6.4.1 Sequence of operations for starting crane

- Ensure that all the control toggles are in the '0' position.
- Ensure that the crane is collapsed and unloaded.
- Turn the key switch on the electrical cabinet to position 1 (see *figure 29)*.
- Switch on the transmitter (*button* ).
- Activate the transmitter by pressing the button  .
- Operate levers 3 and 4 on the transmitter at the same time to drive in the direction indicated by the arrow and operate just one lever to steer.
- The driving direction is indicated by the arrow in *figure 31)*.
- Stop the compact crane by releasing the levers; they return to the centre position automatically.

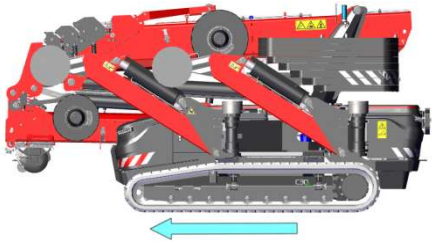


Figure 31

6.4.2 Setting track width

WARNING!

Make sure the compact crane is standing on the outriggers so that the crawler tracks are able to move freely.

WARNING!

Avoid contact with the outrigger legs due to risk of entrapment!

- First raise the crane on the outriggers.
- Press the  button on the transmitter *(figure 14)* to extend the tracks.
- Press the  button on the transmitter *(figure 14)* to retract the tracks.
- Only set the crawler tracks to the maximum or minimum width.

6.4.3 Transport position

The compact crane must be put in the transport position for driving. To do this, follow these steps:

- Retract the jib and main boom.
- Fold the jib under the main boom.
- Lower the main boom.
- Be careful when lowering the boom to the transport position that the boom and jib do not contact the covers at the front.
- Make sure that in the transport position the winch is always rolled up and the attachments are stowed and secured.
- Slide in the ballast.
- Fold in the outrigger legs.
- Flip the outrigger pads over.
- Swing the outriggers so they are next to the machine.
- The crane is now in the transport position (see figure 32).

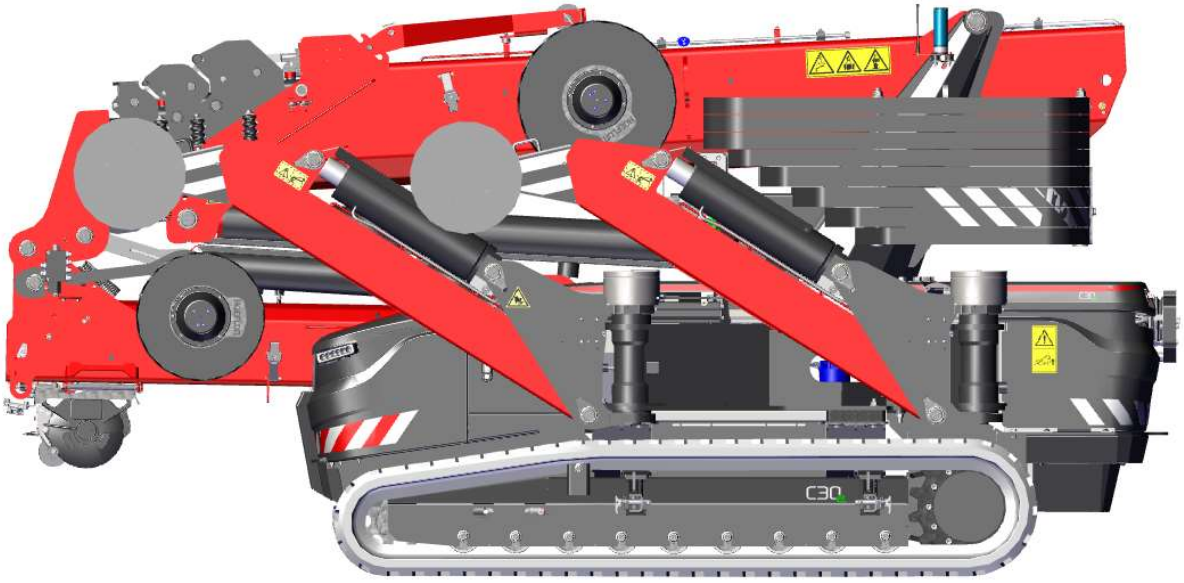


Figure 32: Transport position

6.5 Setting the outriggers

⚠	WARNING!	To prevent contact between the ballast and outrigger legs during slewing make sure that the outrigger legs are not extended too far, e.g. one outrigger placed on an elevation.
⚠	WARNING!	Make sure the outrigger leg is horizontal, with a maximum tilt of 5°, to prevent instability.
⚠	WARNING!	Do not raise the compact crane higher on the outriggers than necessary; once the tracks have been lifted off the ground it is high enough.
⚠	WARNING!	Assess the ground condition and use outrigger pads to reduce the ground pressure.
☞	CAUTION!	Check that the crane is retracted.

6.5.1 Order of operations

GEVAAR	DANGER!	Outriggers may only be used on a suitable surface. this means it must be horizontal and have sufficient load bearing capacity.
⚠	WARNING!	Maintain a close watch on the active outrigger leg during extension to prevent foot entrapment.

Preparation

- Make sure the ground has sufficient load bearing capacity.
- Position the machine in the ideal position; consider safety, obstacles within slewing range, horizontal outreach of the load, capacity and limits of the crane and ground.
- If the crane is raised on the outriggers in the vicinity of a ditch or slope, it is recommended that distance A from the outrigger to the edge be at least twice as long as depth B of the ditch *(see figure 33)*.
- Make sure that people who must be within the working area of the crane can work there safely, by giving them instructions and showing them safe escape routes.

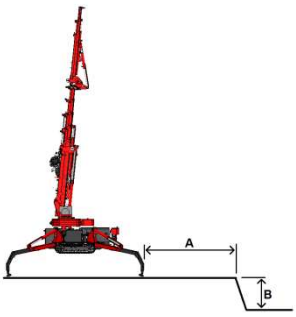


Figure 33

- To operate the outriggers, the boom angle must be less than 40° and the ballast must be retracted

Step-for-step

- Switch on the machine with the main switch of the machine.
- Switch on and activate the remote control.
- Activate undercarriage control (outriggers and driving) on the remote control.
- Set the outrigger angle of each outrigger leg, preferably to 48.5° for 100% outrigger leg range.
- Check the outrigger angle on the display of the remote control.
- Operate the outriggers one at a time and lower them until they are horizontal so the outriggers can be more easily extended. Maintain a clear view of the operated outrigger.
- Adjust the outrigger length by extending the outriggers hydraulically, preferably all the way, for 100% outrigger range.
- Check the outrigger length on the display of the remote control.
- Operate the outriggers one at a time and lower the outrigger legs until they are just above the ground. Maintain a clear view of the operated outrigger.
- Check the ground for unevenness, loose material, slope and other issues that can affect the stability.
- Operate the outrigger legs one at a time and lower them to the ground.
- Now operate the outriggers at the front simultaneously so the machine is just lifted off the ground; do the same with the rear outriggers.
- Check whether the machine is level and correct if necessary. The bubble in the level must be in the middle of the circle.
- Check whether all the outriggers are in contact with the ground and correct if necessary.
- Switch the remote control to crane operation once the machine is standing firmly on the outriggers; the outrigger configuration is now set and is saved.

Verification

- Check the outrigger angle and length on the remote control display.
- Check whether the crane is standing straight (see *figure 34*) after the outriggers have been set.
- Check whether all the outriggers are in contact with the ground after they have been set (see also section 6.5.5, green dot).
-

Figure: 34

6.5.2 Operation

Hydraulic

WARNING!

Hydraulic extension is only possible if all the outriggers are raised off of the ground. Otherwise the extension system will be damaged.

WARNING!

Hold the outrigger pad firmly when releasing the outrigger pad to prevent crushing of the fingers *(see also figure 35)*.

- Switch on the transmitter as described in section 6.4.
- Switch the remote control to the 'outrigger/driving' position.
- Release the outrigger legs with buttons and on the transmitter so that the outrigger leg can be manually swung from 0 to 90°. The compact crane factors in the position of the outrigger legs when calculating the load.
- Turn the outrigger legs to the required position and release the button. The outrigger leg will be locked in place. If the outrigger leg will not swing when the button is pressed, first move the lever of one outrigger towards you (if the outriggers are raised) without pressing the 'release outriggers' button. Press the 'unlock outrigger legs' button again and swing the outrigger leg.
- Release the outrigger pad.
    - Hold the plastic outrigger pad with one hand and turn the plastic ring to the right with the other hand *(see figure 35)* ATTENTION! hold the outrigger pad firmly to prevent crushing of the fingers.
    - Now slowly lower the outrigger pad until the hook comes out of the plastic latch.
    - Now let go of the plastic ring.
    - Then lower the outrigger pad.

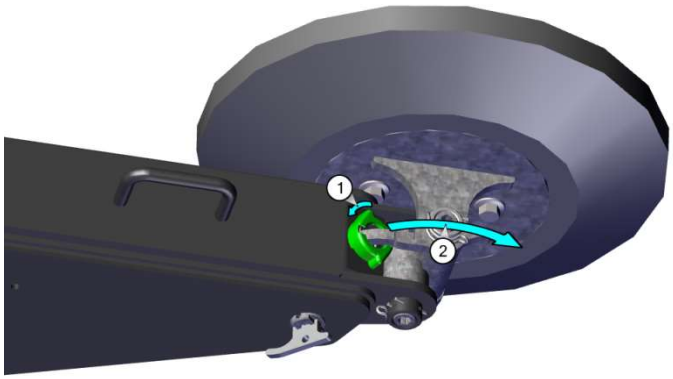


Figure: 35

- Extend the outriggers of the compact crane until the outrigger legs are horizontal by pushing forward levers 1, 2, 5 and 6 on the transmitter one at a time.
- Operate the following buttons on the remote control: button along with levers 1 and 2 for left, and button along with levers 5 and 6 for right.
- Position the four outrigger legs so the compact crane is level, using ground protection plates or outrigger pads if necessary.

6.5.3 Nodding outrigger legs option.

Nodding outrigger leg

- Turn plastic locking ring 1 to the right and pull pin 2 out of the outrigger leg (see figure 36).
- Then manually slide out the nodding section all the way to the end stop (see figure 37).
- Lower the nodding section (see figure 38).
- Now the locking pin must be fitted again. It automatically clicks in place in the plastic locking ring (see figure 39).

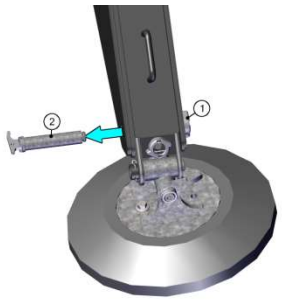


Figure: 36

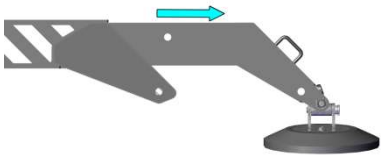


Figure: 37

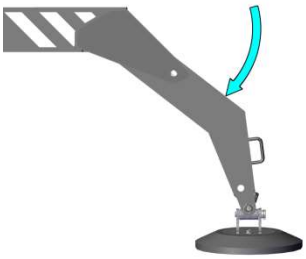


Figure: 38

Figure: 39

6.5.4 Carrier arms

Figure: 40

Steel beams can be transported on the side of the tracks, on the carrier arms provided for this purpose *(see figure 40)*. These arms are normally hidden in the tracks; they can be extended so project 40 cm beyond the tracks. The load capacity of the arms is 2000 kg per side of the machine (2000 kg divided over two arms).

Extending the carrier arms *(see figure 41)*

- Turn the plastic ring of the pin retainer a little bit to release the pin. Remove the pin.
- Pull out the carrier arm as far as possible.
- Secure the carrier arm by fitting the pin again. ATTENTION! Make sure the groove of the pin falls into the retainer.
- There is a steel pin in the carrier arm to prevent the load from slipping off. It can be placed in several positions along the carrier arm.
- To retract the carrier arms, proceed in the reverse order.

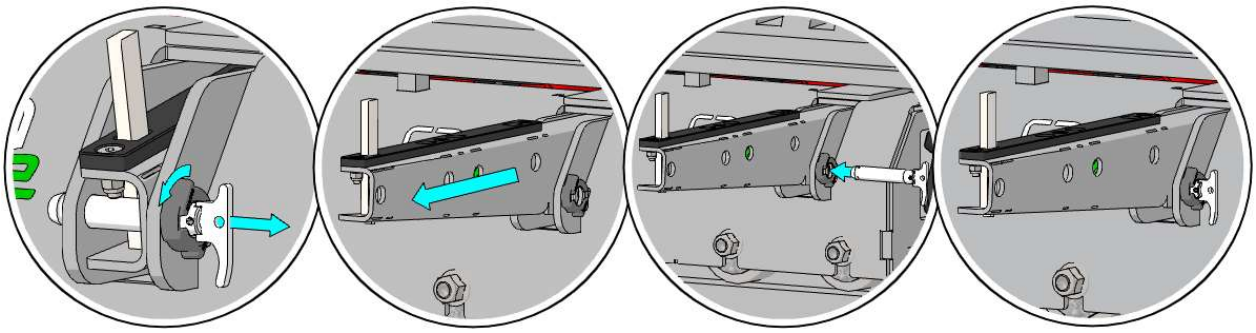


Figure: 41

6.5.5 Interpreting the display while setting the outriggers

While the outriggers are being set, info about how much may be lifted and how the crane is positioned is shown on the display of the remote control. This is explained below.

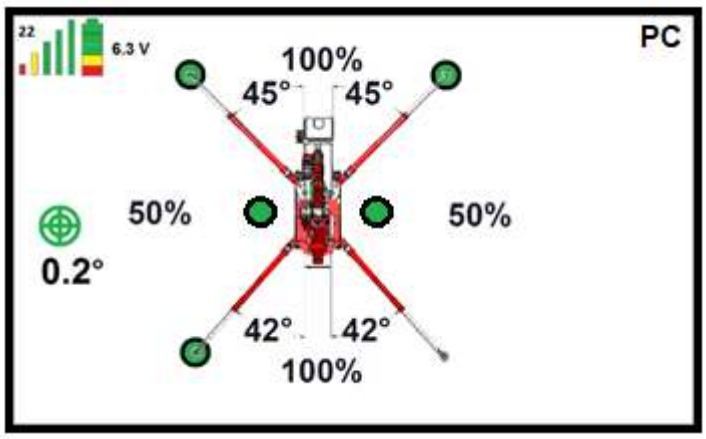


Figure: 42

- The transmission frequency is shown at the top left. See *figure 42*; here it is set to 22.
- The signal strength is indicated by 5 vertical bars. If the strength is good, they are all shown, as in *figure 42*. As the signal weakens, the green bars disappear first, then the yellow and red ones. If the signal is too weak, you can select another frequency by switching the transmitter and machine off and on again. See section 6.2.1.
- The battery state of charge is shown in the battery symbol in the top-left corner of the screen. When the battery is fully charged, 3 green blocks, 1 yellow and 1 red are shown, as in *figure 42*. As the battery discharges, the blocks go out, one at a time.
- The voltage is shown in volts. In *figure 42* this is 6.3 V.
- The degree of levelling of the machine is also shown. This is indicated by the green circles in the middle. In *figure 42* the crane is 0.2° out of level. Which side it is leaning towards is not shown. This can be seen on the level (see figure 34).
- The left-front outrigger leg is set at 45° in *figure 42*.
- The right-front outrigger leg is set at 45° in *figure 42*.
- The left-rear outrigger leg is set at 42° in *figure 42*.
- The right-rear outrigger leg is set at 42° in *figure 42*.
- At the front of the crane 100% of the lifting capacity may be lifted in *figure 42*.
- On the right side of the crane 50% of the lifting capacity may be lifted in *figure 42*.
- At the rear of the crane 100% of the lifting capacity may be lifted in *figure 42*.
- On the left side of the crane 50% of the lifting capacity may be lifted in *figure 42*.
- A green circle is shown by three of the four outrigger legs in *figure 42*. The outrigger leg without a circle is not set properly; it is most likely not in contact with the ground or there is too little pressure on it. When a green circle appears, it is set properly.
- The green dot to the left and right of the crane indicates whether the track is retracted or extended. When the green dot appears, the track on the side with the dot is extended. If the track is not fully extended, the dot disappears.
- The letters PC in the upper-right corner of the screen stand for pick and carry. If PC is shown in the upper-right corner of the screen and the crane is switched to superstructure operation; pick and carry hoisting is possible. PC appears when both tracks are extended (two green dots on the display, to the left and right of the crane).

6.6 Function/operation winch

GEVAAR	DANGER!	Max. winch load is 1000 kg, or 2000 kg with single reeving or, for type C30e, 3000 kg with double reeving. When a reeved cable is used, it is prohibited to lift if the winch cables are twisted. Otherwise the cable may break.
GEVAAR	DANGER!	Make sure the cable runs through the grooves in the cable sheaves and the slot in the winch head stop plate!
GEVAAR	DANGER!	Make sure the winch cable does not have any damage, wear, twists or kinks. If it does, replace the cable before using the crane.
⚠	WARNING!	The winch may only be used for vertical lifting; if lifted at an angle there is a risk of overload.
⚠	WARNING!	As far as possible, leave the winch weight on the cable so that it will roll up tighter.
⚠	WARNING!	The winch will stop automatically when there are 3 rotations of steel cable remaining on the winch drum.

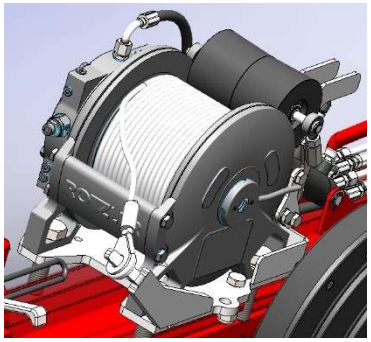


Figure 43: winch

- Reeve the winch cable if the mass of the load exceeds the capacity of the winch. Use one sheave in the winch weight for single reeving (2 cables) and two sheaves in the winch weight for double reeving (4 cables). For reeving, see section 6.6.3.
- Push the winch weight backwards when lifting the winch weight off of the engine shroud bracket. Be careful that the winch weight does not get caught on the support.
- When configuring the winch weight for reeving, be careful to remove the centring bush for the lifting hook while switching from two sheaves to one or to no sheave. It should only be used when two sheaves are used in the winch weight.
- Any time tension has been removed from the winch cable, check that the winch cable is still taught and neatly wound around the winch drum before operating the winch.
- When using the winch, keep in mind the limits of the various machine configurations.
- Remember: the complete winch weight is 33 kg. It is not intended to be lifted or moved by hand.
- With the exception of the winch weight, lifting hook and the ballast removal support, it may not be used to pull on the machine.

6.6.1 Order of operations without options

Check

- Check the cylinder behind the winch for leakage.
- Visually inspect the winch cable for external deficiencies, such as kinks and broken strands.
- Check that the winch cable is taught and neatly wound around the winch drum. If not, unwind it and roll it up neatly (see *figure 44*). Always use a weight when rolling up.

Figure 44

Activating winch operation

- Activate the winch control by pressing the ✓ button on the remote control (see figure 45).

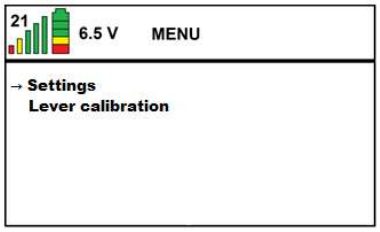


Figure 45

- Then open ***settings*** by pressing the ✓ button. Now move the arrow on the screen to ***winch state*** with the ▼ button. Then press the ▶ button to set the ***winch state*** to *ON* (*see figure 46*).

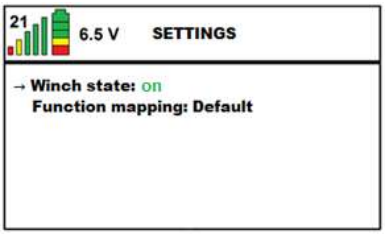


Figure 46

- After activating and setting the winch, return to the main display by pressing the ⮌ button.

Step-for-step

- Activate the remote control as described in section 6.4.
- Check that the outriggers are extended and that the compact crane is level (see section 6.5).
- Switch the remote control to the crane operation position.
- Erect the crane by raising the cylinder of boom 1 using the corresponding levers on the transmitter (see section 6.2.1. The boom can then be extended. Roll out the winch cable as described below.

6.6.2 Fitting winch cable

WARNING!

The use of gloves is mandatory when attaching the winch cable!

- Use one hand to operate the lever for the winch and use the other hand to hold the winch cable and keep it under tension.
- Roll out the winch cable until approximately one metre in front of the machine. Keep the winch cable under tension while rolling it out.
- Switch off the remote control.
- Place the winch cable on the roll in front of the first boom section of the jib. Do this by pushing the winch cable through the diagonal slot in the steel strip above the cable sheave. Place the cable in the groove of the cable sheave *(see figure 47).*

Figure 47

- Now run the cable through the diagonal slot of the plastic block on top of the 2 nd boom section *(see figure 48).*
- Now run the cable through the diagonal slot of the plastic block on top of the 3 rd boom section *(see figure 48).*

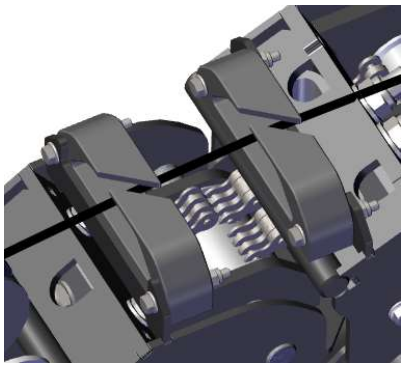


Figure 48

- Put the winch roller support in the upright position if it is laying flat.
- Place the winch cable on the cable sheave at the front end of the 4th boom section of the jib. Do this by pushing the winch cable through the diagonal slot in the steel strip above the cable sheave. Place the cable in the groove of the cable sheave *(see figure 49).*
- Place the cable on the cable sheave of the winch head.

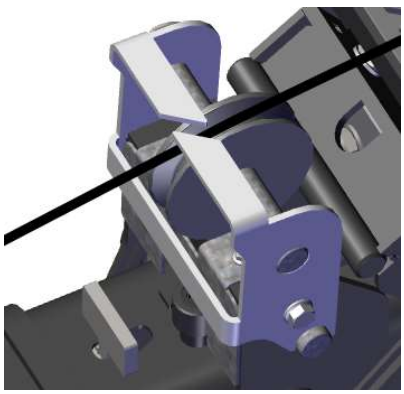


Figure 49

Rolling up winch cable

- When rolling up the winch cable after you are finished using the winch, roll up the winch cable until approximately one metre in front of the machine.
- Remove the cable from the cable sheaves and from the brackets.
- Then pull the cable tight and roll it up (*see figure 50*).
- Hang the eye around the support and carefully roll up the winch cable and gently pull it tight.

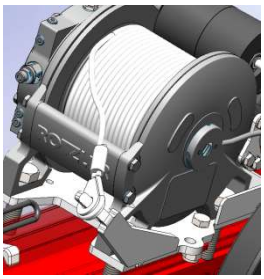


Figure 50

- Deactivate the winch by setting the ***Winch state*** to *OFF* in the remote control menu (*see figure 51*).

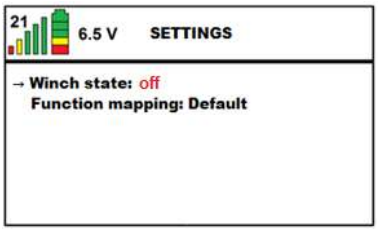


Figure 51

6.6.3 Attaching winch weight

GEVAAR — DANGER!

Max. winch load is 1000 kg, or 2000 kg with single reeving or, for type C30e, 3000 kg with double reeving. When a reeved cable is used, it is prohibited to lift if the winch cables are twisted.

GEVAAR — DANGER!

Make sure the cable runs through the grooves in the cable sheaves and the slot in the winch head stop plate!

WARNING!

The winch will stop automatically when there are 3 rotations of steel cable remaining on the winch drum.

WARNING!

Use the 4 tonne lifting hook on the winch weight; the 10 tonne lifting hook will damage the cable sheaves.

Preparation

- Make sure the machine is supported on the outriggers, with the tracks just above the ground.
- Make sure the winch head is mounted as described (see section 6.6.6).

Mounting winch weight without reeving

- Remove the split pin from the winch weight.
- Take off the front half of the winch weight.
- Remove the two cable sheaves.
- Remove the lifting hook with the centring bush.
- Refit the lifting hook without the centring bush.
- Attach the winch cable eye to the shaft on which the cable sheaves were fitted.

- Fit the front half of the winch weight back in position. Note: the front half must be turned around before it is put in place again. It will now slide the rest of the way over the strips, and the eye of the winch cable will fit nicely in between.
- Fit the split pin in the 2nd hole in front of the front section of the winch weight so it is secured in place.

Attaching winch weight with single reeving

- Remove the split pin from the winch weight.
- Take off the front half of the winch weight.
- Remove one cable sheave.
- Remove the lifting hook with the centring bush.
- Refit the lifting hook without the centring bush.
- Attach the winch cable to the cable roller.
- Fit the front half of the winch weight back in position. Note: the front half must be turned around before it is put in place again. It will now slide the rest of the way over the strips and almost contact the cable roller.
- Fit the split pin in the 2nd hole in front of the front section of the winch weight so it is secured in place.
- Pull the cable eye of the winch cable along the inside of the winch head and place it over the black plastic with the hole in it. Remove the pin at the top of the winch head and fit it again with the pin through the cable eye.

Attaching winch weight with double reeving

- Remove the split pin from the winch weight.
- Take off the front half of the winch weight.
- Lead the winch cable around one cable sheave and then around the outermost cable roller of the winch head. Then around the 2nd cable roller of the lifting weight.
- Make sure the lifting hook is around the centring bush.
- Fit the front half of the winch weight back in position. Make sure it is placed such that the cable rollers can turn freely. If it is mounted incorrectly, the cable sheaves will rub against the steel weight.
- Fit the split pin in the 1st hole in front of the front section of the winch weight so it is secured in place.
- Pull the cable eye of the winch cable along the inside of the winch head and place it over the black plastic with the hole in it. Remove the pin at the top of the winch head and fit it again with the pin through the cable eye.

Check

- Make sure all the pins and loose parts are properly attached and secured.
- Make sure the winch cable does not get caught on the boom and jib structure.

Step-for-step

- Switch on the remote control and position the winch cable above the winch weight by raising the boom, slewing it if necessary and rolling out the winch cable. Use one hand to operate the joystick for the winch and use the other hand to hold the winch cable and keep it under tension.
- Remove the pin from the removable half of the winch weight and remove this half (see figure 52).

Figure 52

- Fit the required number of cable sheaves. For no reeving do not use any sheaves. Attach the eye to the shaft that the sheaves were on (*see figure 53*).

Figure 53

- Position the lifting hook and the winch cable, fit the removable half of the winch weight back in place and secure it in place (*see figure 54*).

Figure 54

- Attach the loop of the winch cable to the winch head. The cable must enter the hole in the plastic from the inside of the winch head, and then the pin can go through the eye of the winch cable. Secure the pin (see figure 55).
- Use one hand to operate the joystick for the winch and use the other hand to hold the winch cable and keep it under tension. Pull the winch cable until it is under tension.
- Use one hand to push the winch weight backwards so it is no longer secured and use the other hand to operate the joystick for the winch. See whether the winch weight can be lifted free of the support, and lift the winch weight off of the support.

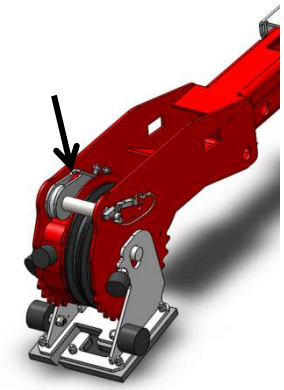


Figure 55

6.6.4 Lifting hook adapter

To be able to lift with the compact crane, the lifting hook adapter must be attached to the main boom or jib.

- The lifting hook adapter is normally stored on the left side of the crane, alongside the column *(see figure 56).*
- To remove the lifting hook adapter from the bracket, push a lip at the back of the bracket towards the column, then pull up the lifting hook adapter and remove it from the bracket.

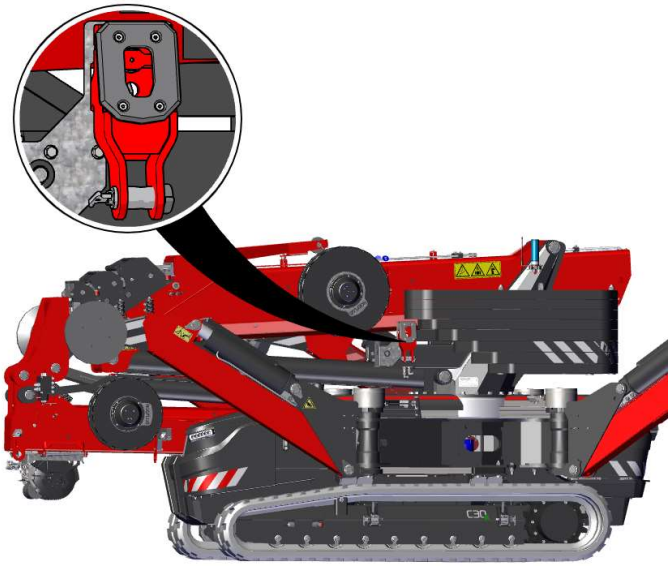


Figure: 56

To attach the lifting hook adapter to the boom or jib, proceed as follows.

- Make sure the front of the boom or jib is horizontal and about 1.2 m from the ground.
- Push the lip at the top of the boom or jib towards the crane. The locking pin will slide backwards (hold the lip in the rearmost position).
- Slide the lifting hook adapter into the two slots on the front of the boom or jib, then lower the adapter into the slots.
- Release the lip of the locking pin and check that the pin falls into the hole of the lifting hook adapter.
- Check that the lifting hook adapter is secure and locked to the boom or jib.

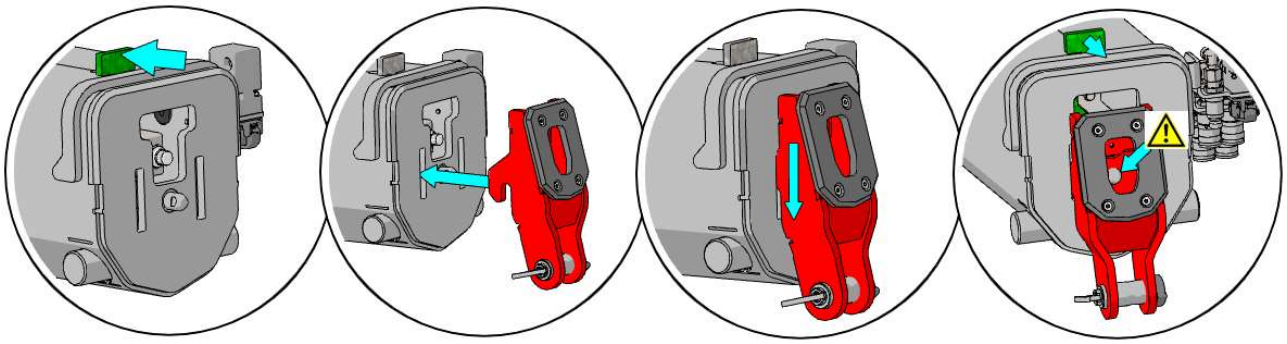


Figure 57: Installing lifting hook adapter

WARNING!

Always use the 10 tonne lifting hook in the lifting hook adapter.

- Turn the plastic ring of the pin retainer at the bottom of the lifting hook adapter and pull the pin out of the adapter.
- Mount the lifting hook in the adapter and slide the pin back into the adapter.
- Check that the pin is securely held by the automatic locking mechanism.
- If necessary, the supplied rubber ring can be slid around the lifting hook to protect the lifting hook.
- To remove the lifting hook adapter, proceed in the reverse order.

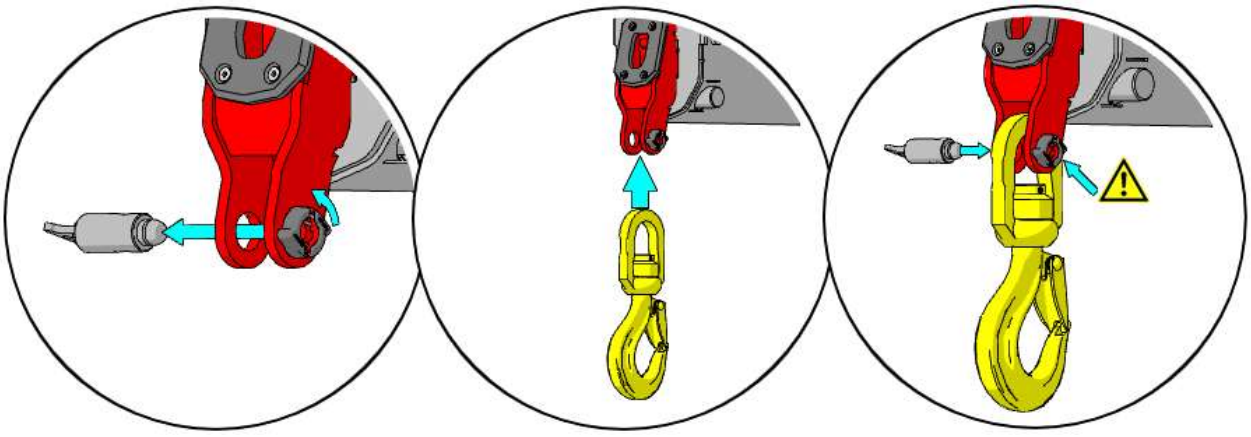


Figure 58: Installing lifting hook

6.6.5 Extending/retracting ballast

DANGER!

Stay clear of the ballast, particularly during retraction of the ballast (risk of crushing).

- If the crane is raised on the outriggers and is set to crane operation, the ballast can be extended.
- Press the  button on the transmitter *(figure 14)* to extend the ballast.
- Slide the ballast all the way out (if the ballast is not extended all the way, the crane will operate as if the ballast were completely retracted!).
- Press the  button on the transmitter *(figure 14)* to retract the ballast.
- The picture on the transmitter display also shows whether the ballast is retracted or extended.

6.7 Various lifting modes

The C30e has a number of different lifting modes.

- The lifting mode for when the crane is standing on the outriggers. In this mode the crane can lift the maximum load.
- Pick and carry. In this mode, the crane can drive with load and lift without outriggers, but limitations are imposed while working in this mode.
- Pick-up mode. In this mode the crane can drive but cannot lift loads.

6.7.1 Lifting mode

When working with the crane while it is standing on the outriggers, the following information is shown on the remote control display. The crane now operates with the standard load diagram (see section 9.1). The values that appear on the display are explained below.

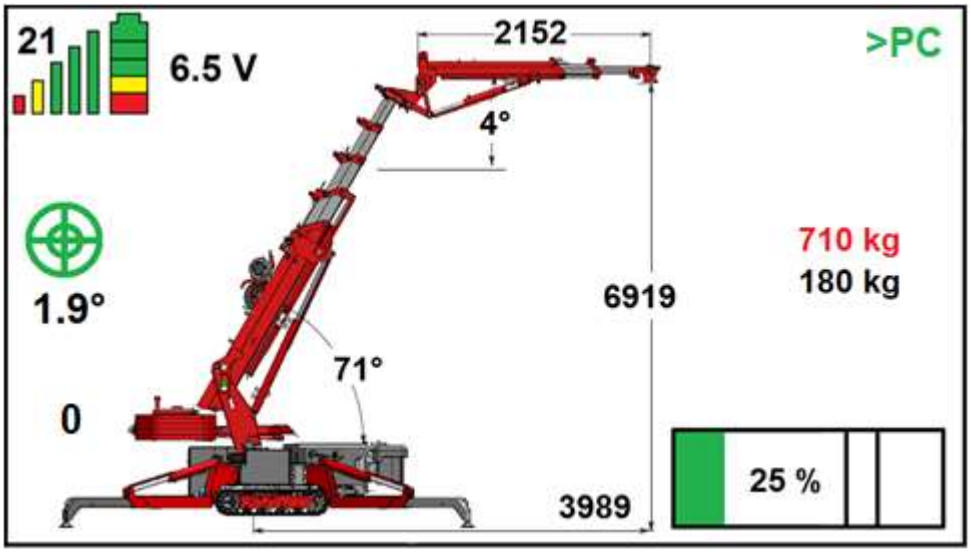


Figure 59

- The transmission frequency is shown at the top left. *See figure 59*; here it is set to 21.
- The signal strength is indicated by 5 vertical bars. If the strength is good, they are all shown, as in *figure 59*. As the signal weakens, the bars disappear: first green, then yellow and finally red.
- The battery state of charge is shown in the battery symbol in the top-left corner of the screen. When the battery is fully charged, 3 green blocks, 1 yellow and 1 red are shown, as in *figure 59*. As the battery discharges, the blocks go out, one at a time.
- The state of charge is shown in volts. In *figure 59* this is 6.5 V.
- The degree of levelling of the machine is also shown. This is indicated by the green circles in the middle. In *figure 59* the crane is 1.9° out of level.
- The position of the main boom is 71° in *figure 59*.
- The position of the jib is 4° in *figure 59*.
- The radius of the outreach is 3989 mm in *figure 59*.
- The lifting height is 6919 mm in *figure 59*.
- The length of the jib is 2152 mm in *figure 59*.
- The crane can lift 710 kg in this position.
- There is 180 kg in the lifting hook.
- The crane is loaded at 25% in *figure 59*.
- As can be seen in *figure 59*, the ballast is extended. As the ballast is retracted the indicator moves, and if the ballast is removed from the crane it is no longer shown on the display. There is also a value next to the ballast. The value shown in figure 59 is 0; this means that the ballast is retracted (extended 0 mm). When you extend the ballast, the distance the ballast is extended is shown here.
- At the top right of the screen, the letters *>PC* appear in green. If this is shown, you can switch to pick and carry mode. The load you have hanging from the crane at that moment can also be lifted in pick and carry mode.

6.7.2 Pick and carry mode

DANGER!

Make sure the load bearing capacity of the ground is adequate; use access mats or outrigger pads. Caution: never on manholes or beside/in holes.

WARNING!

Maintain a clear view of the surroundings and the compact crane while driving with a load hanging from the crane.

WARNING!

Always operate the machine with extra care in the pick and carry mode. Do not allow the load to swing. Avoid abrupt movements and maintain contact with any assistants helping to guide the load.

WARNING!

When driving and lifting in pick and carry mode, the folding legs may not be used, due to the possibility of machine damage during slewing of the superstructure.

WARNING!

When lifting in pick and carry mode, do not raise the outrigger legs more than 20 cm above the ground, due to the possibility of machine damage during slewing of the superstructure.

TIP

In pick and carry mode, extend the jib first and then the main boom.

In order to be able to work in pick and carry mode, a number of conditions must be met.

- Outrigger legs raised from the ground.
- The track undercarriage is extended (tracks in widest position).
- It is possible to lift up to a height of 10 m (total height of boom and jib).
- The boom and jib cannot be raised beyond 60°.
- In addition, the LML will be triggered sooner, because the crane cannot lift the same loads as it can in lifting mode (use the pick and carry load diagram from section 9.2).

While working with the crane in pick and carry mode, the following information is shown on the remote control display. The values that appear on the display are explained below.

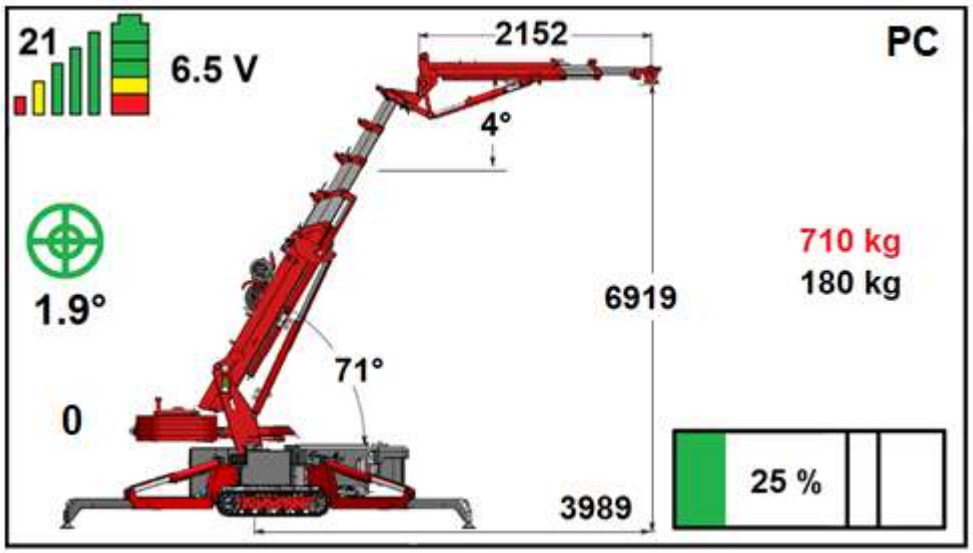


Figure: 60

- The transmission frequency is shown at the top left. *See figure 60*; here it is set to 21.
- The signal strength is indicated by 5 vertical bars. If the strength is good, they are all shown, as in *figure 60*. As the signal weakens, the green bars disappear first, then the yellow and red ones.
- The battery state of charge is shown in the battery symbol in the top-left corner of the screen. When the battery is fully charged, 3 green blocks, 1 yellow and 1 red are shown, as in *figure 60*. As the battery discharges, the blocks go out, one at a time.
- The voltage is shown in volts. In *figure 60* this is 6.5 V.
- The degree of levelling of the machine is also shown. This is indicated by the green circles in the middle. In *figure 60* the crane is 1.9° out of level.
- The position of the main boom is 71° in *figure 60*.
- The position of the jib is 4° in *figure 60*.
- The radius of the outreach is 3989 mm in *figure 60*.
- The lifting height is 6919 mm in *figure 60*.
- The length of the jib is 2152 mm in *figure 60*.
- The crane can lift 710 kg in this position.
- There is 180 kg in the lifting hook.
- The crane is loaded at 25% in *figure 60*.
- As can be seen in *figure 60*, the ballast is extended. If the ballast is retracted, the indicator moves, and if the ballast is removed from the crane, it is no longer shown on the display. There is also a value next to the ballast. The value shown in figure 60 is 0; this means that the ballast is retracted (extended 0 mm). When you extend the ballast, the distance the ballast is extended is shown here.
- At the top right of the screen, the letters PC are shown *(see figure 60)*. This means that the crane is in the pick and carry mode. It is now using the pick and carry load diagram.

6.7.3 Pick up mode

If the conditions of the standard load diagram and those of the pick and carry load diagram are not met and you switch to crane operation, PU will appear in the top-right corner of the screen (see figure 61). For example, if the crane is not properly supported by the outriggers and the tracks are not fully extended, then pick-up mode is activated.

In this mode you can cannot lift loads. This is also shown along the right edge of the screen. In red and black you see **- - kg.**

Ensure that the crane meets the requirements of the standard or pick and carry load diagram again.

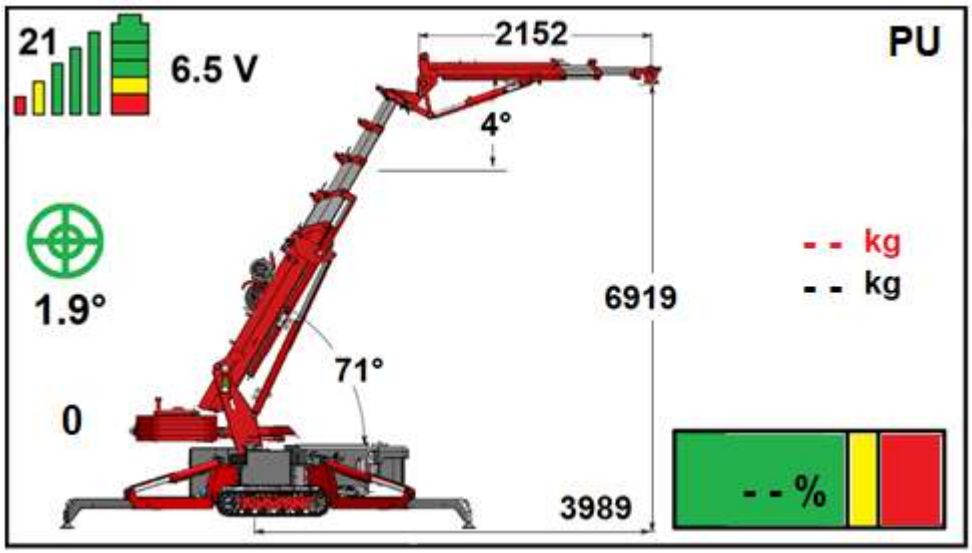


Figure: 61

7

MAINTENANCE/TROUBLESHOOTING

7.1 General

	DANGER!	Remove the key from the key switch before performing work on the compact crane.
	DANGER!	Never use your hand to locate a leak in the hydraulic system; use a piece of paper or cardboard instead. Oil under high pressure can penetrate the skin and cause poisoning.
	DANGER!	When topping up the oil, always switch off the crane and press the emergency stop on the remote control.
	DANGER!	Always correctly reinstall any protection measures that have been removed!
	WARNING!	Only the dealer or Hoeflon International may perform work on the electrical or hydraulic system of the machine.
	WARNING!	Attention! The parts of the electric motor and motor controllers can still be hot. Let them cool down first!
	CAUTION!	Consult your dealer

The maintenance instructions are presented in this chapter. Proper maintenance is the key to keeping the machine operating properly. It is very important that these instructions are followed, to ensure your safety and that of others who are present.

Unusual noises or vibrations can indicate a defect in the machine. It is then necessary to perform a repair or maintenance without delay. Consult your dealer about this.

Contact your dealer's technical department for additional information concerning aspects such as maintenance and repair of specific machine parts.

7.2 Maintenance work

The risk of accidents with machines is generally greater during maintenance, cleaning and service. Have your dealer perform the maintenance work on the compact crane. In the Netherlands you can choose to enter a maintenance contract with Hoeflon International B.V. The maintenance intervals and work required are shown in the lubrication chart and maintenance schedule.

Weekly maintenance

- See maintenance chart.
- Grease the compact crane in accordance with the lubrication chart.
- Clean the compact crane with water and a mild cleanser such as car wash shampoo. Never use solvents or other flammable liquids as a cleanser. Never direct the nozzle of a pressure washer directly at the engine/motor or electrical parts.
- Clean the machine daily after use in or transport through a salty/briny environment. Be sure to remove all the salt/brine, to prevent corrosion of the machine.

Monthly maintenance

- See maintenance chart.
- Grease the compact crane in accordance with the lubrication chart.

Scheduled service

- The first scheduled service must be performed after 2 weeks or 50 hours of operation.
- Thereafter the compact crane requires scheduled service annually or every 250 hours of operation.
- It must also be inspected annually.
- It is recommended that you have the scheduled service and inspections performed by your dealer or Hoeflon International B.V.

First use

- Perform the daily inspection (see section 6.1).
- Test the following aspects of the compact crane:
    - Operation of emergency stop.
    - All functions work properly.
    - Safety provisions work properly.

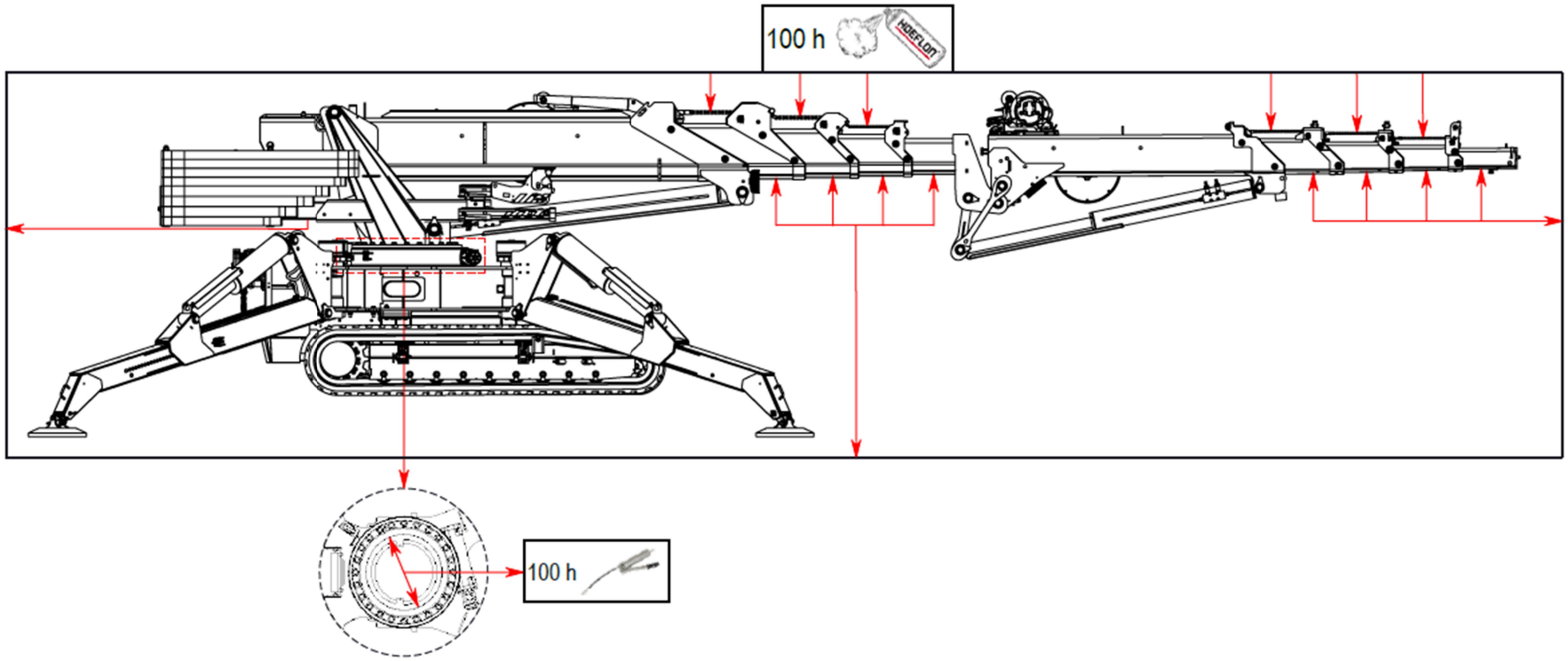
7.3 Maintenance schedule

Description of maintenance	Action	Interval in hours (o = manufacturer/dealer, ● = owner)							
		Daily	First 50 hours	50	100	250	500	1000	4000
Crawler track undercarriage									
Tension of crawler tracks	Check/adjust			●					
Oil level track motors	Check/top up					o			
	Replace						o		
General									
Machine	Clean			●					
Safety devices	Check	●							
Lifting accessories (cables, hooks etc.)	Check/replace	●							
Control levers	Check	●							
Condition and presence of pictograms	Check					o			
Mechanical components	Check	●							
Boom clearance	Check/adjust							o	
Turntable	Check/tighten		o				o		
	Lubricate			●					
Construction incl. pins, shafts etc.	Check					o			
Boom extension and retraction chains	Check				●				
	Lubricate				●				
Plastic slide plates on boom	Check					o			
	Lubricate			●					
Boom guide bolts	Check					o			
Pivot points and extendable sections	Lubricate			●					
Bolt connections	Tighten						o		
Boom wear parts (completely disassemble)	Replace								o
Hydraulic system									
Hydraulic oil	Check	●							
	Replace							o	
Leaks	Check	●							
Hydraulic hoses	Check					o			
	Replace								o
Pressure levels	Check							o	
Hydraulic return filter	Replace		o				o		
Hydraulic pressure filter	Replace						o		
Stop valves and pressure relief valve	Test							o	
Hydraulic system	Flush								o
Electrical system									
Wiring connectors	Check					o			
Emergency stop and sensors	Check	●							
Voltage	Check					o			

7.4 Lubrication chart

Lubricate the compact crane as shown in the lubrication chart below, paying particular attention to the following:

- Clean the grease nipples thoroughly before lubrication.
- Remove excess/old grease from the booms.
- Use clean greases, stored in sealed packaging.
- Lubricate the top side of the plastic guide on the boom by inserting a grease gun fitted with a pointed tip through the holes, when the boom is fully extended.
- **Use only prescribed greases; see lubricant specifications.**



7.5 Lubricant specifications

Manufacturer:	Hydraulic oil		Final drives	Lubrication points	Chains	Sliding sections	
	Universal	Bio				Lubricating grease	Spray
Q8	Heller 32	Q8 Holbein HP SE Bio 46	T 55	EP 2	Industrial chain spray	EP2	PTFE
Total	Equavis AF 32 / ZS 46	BioHydran TMP 32	EP-B 80W90	EP 2	Industrial chain spray	EP2	PTFE
Shell	Shell Tellus S2/S3	Shell Naturelle HF-E 32	Spirax S3 AX 80W-90	EP 2	Industrial chain spray	EP2	PTFE
Kroon oil	Perlus ZF 46	Perlus Biosynth 46	Gearlube GL-5 80W-90	EP 2	Industrial chain spray	EP2	PTFE

7.5.1 Boom extension and retraction chains

- Do not repair chains or insert links; if deficient, completely replace.
- If there are two extension or retraction chains, replace both, along with the connections, at the same time.
- If the chains are soiled to the point that lubrication no longer helps, clean with petroleum ether or diesel. Do not clean with acidic agents or a high pressure hose. These can damage the chains.
- Check the chain regularly for lubrication, rust, breaks in the pins/plates and wear and tear.
- Lubricate the chain every 100 hours (see maintenance schedule).

7.6 Removing/installing ballast

7.6.1 Removing with your own equipment

Preparation

- Make sure the machine is supported on the outriggers in a square configuration, with the tracks just above the ground and no load on the hook.
- The following are required when removing the ballast: ballast removal cable, 2x D-shackle, 2-leg lifting chain with a chain length of 1 m and a lifting hook that can be rotated. (Be sure to use lifting accessories with sufficient load capacity to lift the ballast.)
- Make sure the tracks are retracted.
- Make sure the ballast is extended.
- Make sure the boom is horizontal.
- Make sure the ballast is placed in a safe spot, not on walking or driving paths and not within the working range of the compact crane, other machines or workers.

Figure 62: Removing the ballast

Step-for-step

- Set boom crosswise on the machine with the ballast on the left or right side.
- Attach the D-shackle to the ballast removal cable and the eye on the front of the 4th boom section.
- Loosen the nut that secures the ballast removal support to the boom and set the ballast removal support upright as follows. Tilt the support so that it is perpendicular to the boom and lower the two locking heads into the slots so that the ballast removal support remains upright.
- Operate the twistlock of the pin at the top of the ballast removal support and pull out the pin until the outer groove of the pin engages.
- Slide the plastic disc to the side so that the opening is above the sheave.
- From the D-shackle, place the cable in the groove of the plastic sheave without loops.
- Slide the plastic disc with the cable to the centre and loosen the twistlock. Push the pin further into the support so the twistlock engages in the 2nd groove of the pin. Now the plastic disc can no longer slide to the left or right.
- Run the other end of the ballast removal cable over the boom to the rear of the boom.
- Raise the boom to 90° and set the jib at 90° too (make sure the ballast removal cable does not come into contact with anything).
- Connect the lifting hook to the ballast removal cable using a D-shackle.
- Attach each hook of the two-leg sling to a hook on top of the ballast.
- Attach the eye of the two-leg sling to the hook of the ballast removal cable.
- Extend the main boom of the crane until the ballast removal cable with two-leg sling is almost but not quite tight.
- Remove the two bolts and plate from the back of the ballast.
- Extend the main boom further so the ballast is released from the ballast frame. (ATTENTION! Do not lift the ballast too far, otherwise the ballast frame could be bent by the bottom ballast plate.)
- Retract the ballast frame.
- Set the main boom at 95°.
- Lower the ballast to about 50 cm above the ground (just above the track beam, otherwise the ballast will be on the track beam).
- Now rotate the ballast 90° by hand.
- Lower the ballast to the ground. (Attention! Do not get too close to the ballast, because there is a danger of crushing between the crane and the ballast or the ground and the ballast.)
- Disconnect the two-leg sling from the ballast and then lower the main boom.
- Remove the two-leg sling, lifting hook, D-shackles and ballast removal cable.
- Lower the ballast removal support back onto the boom and secure it with the nut.
- Set the superstructure in the transport position.
- Fold in the outriggers.
- Now the crane can be driven away from the ballast.

7.6.2 Fitting ballast with your own equipment

Preparation

- Position the machine with retracted tracks so the tracks are as close as possible to the ballast, with the ballast on the left or right side, alongside the machine's tracks.
- Make sure the machine is supported on the outriggers in a square configuration, with the tracks just above the ground and no load on the hook.
- The following are required when fitting the ballast: ballast removal cable, 2x D-shackle, 2-leg lifting chain with a chain length of 1 m and a lifting hook that can be rotated. (Be sure to use lifting accessories with sufficient load capacity to lift the ballast.)
- Make sure the tracks are retracted.
- Make sure the ballast frame is retracted.
- Make sure the boom is horizontal.

Step-for-step

- Set the boom crosswise on the machine with the ballast frame towards the ballast. Attach the D-shackle to the ballast removal cable and the eye on the front of the 4th boom section.
- Loosen the nut that secures the ballast removal support to the boom and set the ballast removal support upright as follows. Tilt the support so that it is perpendicular to the boom and lower the two locking heads into the slots so that the ballast removal support remains upright.
- Operate the twistlock of the pin at the top of the ballast removal support and pull out the pin until the outer groove of the pin engages.
- Slide the plastic disc to the side so that the opening is above the sheave.
- From the D-shackle, place the cable in the groove of the plastic sheave without loops.
- Slide the plastic disc with the cable to the centre and loosen the twistlock. Push the pin further into the support so the twistlock engages in the 2nd groove of the pin. Now the plastic disc can no longer slide to the left or right.
- Run the other end of the ballast removal cable over the boom to the rear of the boom.
- Raise the boom to 95° and set the jib at 90° (make sure the ballast removal cable does not come into contact with anything).
- Connect the lifting hook to the ballast removal cable using a D-shackle.
- Attach each hook of the two-leg sling to a hook on top of the ballast.
- Attach the eye of the two-leg sling to the hook of the ballast removal cable.
- Extend the main boom of the crane until the ballast is 50 cm above the ground.
- Rotate the ballast 90° so the open side is facing the crane.
- Extend the main boom of the crane until the top of the bottom ballast plate is even with the bottom of the ballast frame.
- Lower the main boom to 90°. ATTENTION! Make sure the ballast does not swing and damage the column or sensors alongside the column.
- Position the ballast at the correct height by extending or retracting the boom. The top of the bottom ballast plate must be even with the bottom of the ballast frame.
- Carefully extend the ballast frame.
- Make sure the ballast is hanging parallel to the ballast frame and the back of the ballast frame is against the back of the second ballast plate.
- Carefully lower the ballast until there is no more tension on the ballast removal cable.
- Check that the ballast is hanging horizontally.
- Secure the ballast by fitting the plate behind the ballast and screwing the bolts through this plate into the ballast frame.
- Retract the boom until two-leg sling can be removed from the ballast.
- Remove the two-leg sling from the ballast removal cable.
- Carefully retract the ballast. (ATTENTION! Make sure the ballast does not hit the column and sensors.)
- Lower the main boom. Remove the two-leg sling, lifting hook, D-shackles and ballast removal cable.
- Lower the ballast removal support back onto the boom and secure it with the nut.
- Set the superstructure in the transport position.
- Fold in the outriggers.

Verification

- Check whether the ballast appears on the display of the remote control, both in the extended and retracted positions.
- Check that the loose parts have been put away or are attached.

7.7 Troubleshooting

DANGER!

Remove the key from the key switch when performing work on the compact crane.

DANGER!

Never use your hand to locate a leak in the hydraulic system; use a piece of paper or cardboard instead. Oil under high pressure can penetrate the skin and cause poisoning.

DANGER!

High voltage! (Danger of electrocution) It is prohibited to remove the rear cover and front covers of the undercarriage. Behind them are battery packs, cables and components that operate at high voltage. This may only be done by technicians specially trained by Hoeflon.

WARNING!

Hydraulic oil can be hot; wear gloves and safety glasses when troubleshooting the hydraulic system.

WARNING!

When a leak has developed in the hydraulic system, not only repair the leak immediately but also top off the oil reservoir.

WARNING!

When disconnecting hydraulic lines and hoses, precautionary measures must be taken to ensure that the line/hose is no longer under pressure once the supply of energy to the system has been switched off. This can be achieved by moving the control levers back and forth.

CAUTION!

Consult the dealer

Correct operation and careful maintenance ensure that the compact crane will have a long life with fewer problems.

The warnings above must be heeded for all work performed in connection with a malfunction.

A number of possible malfunctions are shown hereafter. If a malfunction occurs that is not listed in this user manual, contact your dealer or Hoeflon International B.V.

Malfunction	Cause	Solution
The compact crane does not function properly, jerks	Too little oil in the hydraulic system Hesitation when operating lever on remote control.	Check the hydraulic oil level.
Vibrations in the crane	Oil temperature too low	Increase oil temperature by raising and lowering an outrigger leg
Telescopic section does not extend or retract fully or does not do so easily	Guides not sufficiently lubricated	Lubricate the guides
The crane does not slew well	Turntable not sufficiently lubricated Damaged or worn rotation mechanism	Lubricate the turntable Overhaul the turntable mechanism
A number of functions do not work	Problem in electrical system Malfunction of load moment limiter	Check sensors Check emergency stop button Reduce the load on the crane
Winch cable pulling force is incorrect	Leaking winch cylinder	Repair leak
Movements are slower than usual	Oil filter restricted Hydraulic pump defective	Clean oil filter Replace hydraulic pump
Crunching sound during movements	Pivot points not sufficiently lubricated	Lubricate pivot points in accordance with the lubrication chart

7.7.1 Fault codes

Fault code	Problem	Possible solution. If this does not work, contact Hoeflon.
E001	Connection between GW1 and GW3 has been lost.	1. Restart Gateway3 2. Restart Gateway1 (contact switch off/on)
E006	Warning: The angles of the outriggers do not meet the requirements for lifting mode.	Set in the outriggers in the accepted configuration.
E010	Outrigger I/O module LF not responding	Reset I/O module
E011	Outrigger I/O module RF not responding	Reset I/O module
E012	Outrigger I/O module RR not responding	Reset I/O module
E013	Outrigger I/O module LR not responding	Reset I/O module
E014	Undercarriage front I/O module not responding	Reset I/O module
E015	Undercarriage rear I/O module not responding	Reset I/O module
E016	Boom I/O module not responding	Reset I/O module
E030	Outrigger leg LF extension sensor out of range	Calibrate
E031	Outrigger leg LF angle sensor out of range	Check sensor connection.
E032	Outrigger leg RF extension sensor out of range	Calibrate
E033	Outrigger leg RF angle sensor out of range	Check sensor connection.
E034	Outrigger leg RR extension sensor out of range	Calibrate
E035	Outrigger leg RR angle sensor out of range	Check sensor connection.
E036	Outrigger leg LR extension sensor out of range	Calibrate
E037	Outrigger leg LR angle sensor out of range	Check sensor connection.
E040	Boom angle sensor out of range	Check sensor connection.
E041	Boom extension sensor out of range	Calibrate
E042	Pressure sensor lift cylinder base out of range	Check sensor connection.
E043	Pressure sensor lift cylinder rod out of range	Check sensor connection.
E044	Pressure sensor extension cylinder base out of range	Check sensor connection.
E045	Pressure sensor extension cylinder rod out of range	Check sensor connection.
E046	Turntable rotation sensor out of range	Check sensor connection.
E051	Chassis inclination sensor out of range	Check sensor connection.
E052	Ballast extension sensor out of range	Calibrate
E053	Ballast present sensors inconsistent	Check ballast presence sensors.
E054	Inconsistency in stable-on-ground sensor outrigger leg LF	Check stable-on-ground sensors LF
E055	Inconsistency in stable-on-ground sensor outrigger leg RF	Check stable-on-ground sensors RF
E056	Inconsistency in stable-on-ground sensor outrigger leg RR	Check stable-on-ground sensors RR
E057	Inconsistency in stable-on-ground sensor outrigger leg LR	Check stable-on-ground sensors LR
E060	Jib1 angle sensor out of range	Check sensor connection. Zero sensors.
E061	Jib1 extension sensor out of range	Calibrate. If the problem persists, check sensor adjustment.
E062	Jib1 pressure sensor base end of cylinder	Check sensor connection. Check sensor configuration.
E063	Jib1 pressure sensor rod end of cylinder	Check sensor connection. Check sensor configuration.
E064	Pressure sensor winch jib1 out of range	Check sensor connection.
E070	Jib2 angle sensor out of range	Check sensor connection. Zero sensor.
E071	Jib2 extension sensor out of range	Calibrate. If problem persists, check sensor adjustment.
E100	Motor controller has major fault	Check fault code and sub fault code in PCAN explorer
E110	One or more CANopen valves not in operational mode.	Wait a while until the valves are automatically reinitialised. If this does not happen, reset gateway 3.
E121	Charger: Communication error	
E122	Charger: Hardware error	
E123	Charger: Incorrect input voltage	
E124	Charger: Battery not connected or incorrectly connected	
E125	Charger: Temperature too high	
E130	Outrigger leg LF in backup mode with sensor a	Check or replace sensor b.
E131	Outrigger leg LF in backup mode with sensor b	Check or replace sensor a.
E132	Outrigger leg LF in quadrature mode: calibration required	Fully extend and retract outrigger leg.

Fault code	Problem	Possible solution. If this does not work, contact Hoeflon.
E133	Outrigger leg RF in backup mode with sensor a	Check or replace sensor b.
E134	Outrigger leg RF in backup mode with sensor b	Check or replace sensor a.
E135	Outrigger leg RF in quadrature mode: calibration required	Fully extend and retract outrigger leg.
E136	Outrigger leg RR in backup mode with sensor a	Check or replace sensor b.
E137	Outrigger leg RR in backup mode with sensor b	Check or replace sensor a.
E138	Outrigger leg RR in quadrature mode: calibration required	Fully extend and retract outrigger leg.
E139	Outrigger leg LR in backup mode with sensor a	Check or replace sensor b.
E140	Outrigger leg LR in backup mode with sensor b	Check or replace sensor a.
E141	Outrigger leg LR in quadrature mode: calibration required	Fully extend and retract outrigger leg.
E142	Boom extension in backup mode with sensor a	Check sensor b
E143	Boom extension in backup mode with sensor b	Check sensor a
E144	Boom extension in quadrature mode: calibration required	Fully extend and retract boom. Warning should disappear on its own.
E145	Ballast in backup mode with sensor a	Check sensor b
E146	Ballast in backup mode with sensor b	Check sensor a
E147	Ballast in quadrature mode: calibration required	Fully extend and retract ballast. Warning should disappear on its own.
E148	Jib1 extension in backup mode with sensor a	Check sensor b
E149	Jib1 extension in backup mode with sensor b	Check sensor a
E150	Jib1 extension in quadrature mode: calibration required	Fully extend and retract jib1. Warning should disappear on its own.
E151	Jib2 extension in backup mode with sensor a	Check sensor b
E152	Jib2 extension in backup mode with sensor b	Check sensor a
E153	Jib2 extension in quadrature mode: calibration required	Fully extend and retract jib2. Warning should disappear on its own.
E154	No attachment detected on boom	Fit attachment on the boom.
E155	Attachment on the boom unknown	Fit valid attachment on the boom.
E156	No CAN device (or no valid CAN device) found on boom. RFID tag is valid.	Connect the attachment/jib plug.
E157	No RFID tag (or no valid RFID tag) found on boom. CAN device is valid or not required.	Check that the attachment/jib is properly locked.
E158	RFID tag and CAN device detected on the boom but data does not match.	Check that a valid combination is connected.
E159	No attachment detected on attachment/jib	Fit attachment on attachment/jib
E160	Attachment on attachment/jib unknown	Fit valid attachment on attachment/jib
E161	No CAN device (or no valid CAN device) found on attachment/jib. RFID tag is valid.	Connect attachment/jib2 plug.

E162	No RFID tag (or no valid RFID tag) found on attachment/jib. CAN device is valid or not required.	Check that attachment2/jib2 is properly locked.
E163	RFID tag and CAN device detected on attachment/jib but data does not match.	Check that a valid combination is attached to the jib.
E164	Outrigger angle slip detected since switch to lifting mode at LF outrigger	Check friction of outrigger lock coupling
E165	Outrigger angle slip detected since switch to lifting mode at RF outrigger	Check friction of outrigger lock coupling
E166	Outrigger angle slip detected since switch to lifting mode at RR outrigger	Check friction of outrigger lock coupling
E167	Outrigger angle slip detected since switch to lifting mode at LR outrigger	Check friction of outrigger lock coupling
E168	Batteries almost discharged (<10%)	Charge batteries.

8

TRANSPORT, STORAGE, DISPOSAL

8.1 Transport

8.1.1 General

WARNING!

Only use suitable lifting accessories with the correct capacity for the lifting application. The lifting accessories must be accompanied by a certificate, have a periodic inspection, be visually inspected and have been found to be suitable for use.

WARNING!

The clearance angle of the loading ramps must not exceed 20°.

WARNING!

When transporting the compact crane, make sure the crane is in transport position and that any load is removed: no load on the hook, outriggers stowed in transport position and boom retracted.

- Make sure the outriggers are fully retracted and in transport position and that the crane is fully collapsed.
- There must not be any load on the compact crane.
- Use loading ramps of sufficient size and capacity. The loading ramps must be long enough so that the clearance angle with the ground is less than 20°.
- Drive the machine forwards onto a means of transport intended for this purpose in the way described in section 6.4; when driving the machine up the ramps the operator must be assisted by a person who provides instructions concerning the driving direction.
- Stop the crane as described in section 6.4.
- Set the key switch on the back of the crane to position 0.
- Remove any loose parts from the machine.

- Secure the machine by attaching four lashing straps to the slots in the main boom as shown below (see figure 63).

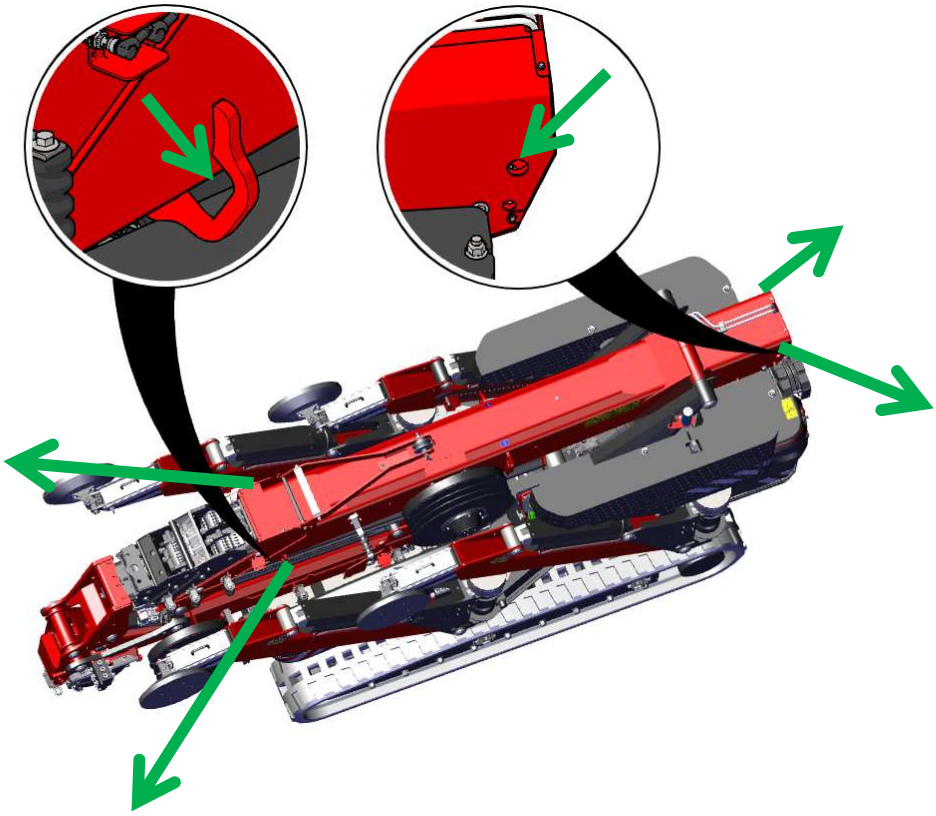


Figure 63: Attaching to the main boom

- Make sure the outriggers are fully retracted and locked in position and that the crane is fully collapsed.
- There must not be any load on the compact crane.
- Lift the compact crane using web slings or two-leg sling with a capacity of at least 9500 kg. Fasten these to the two lifting points to the left and right of the boom (*see figure 64*).

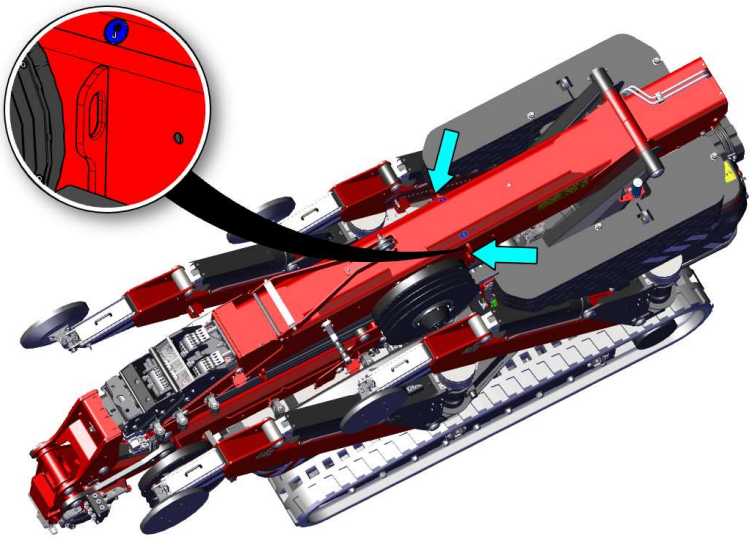


Figure 64

8.1.2 Attaching

WARNING!

Overloaded eyes can cause damage to the machine. Therefore always heed the following instructions.

WARNING!

Folding a lashing strap double also doubles the applied tension.

Point	Load on attachment point
Lashing points on superstructure	Front max. 1500 kg per eye Rear max. 2500 kg per eye

- Towards the front and sides, lash down at least 0.5x the machine's weight; towards the rear lash down at least 1x the machine's weight.
- It is recommended that the space between the headboard of the transport vehicle and the front of both tracks be filled, in connection with braking forces. Otherwise, use lashing provisions that can hold at least 1.5x the machine's weight at the rear.
- Make sure the tracks of the compact crane are resting directly on the deck of the transport vehicle, because access mats or anything similar in between will reduce the sliding resistance of the crane relative to the transport vehicle.

8.2 Storage

Perform the following procedure before storing the compact crane for longer than 3 months:

- Remove any dirt and clean the machine with water and e.g. car wash shampoo. The crawler track undercarriage may be cleaned at high pressure.
- Grease the compact crane in accordance with the lubrication chart in section 7.4.
- Touch up any damage to the paintwork.
- Oil parts that may rust easily, such as exposed sections of hydraulic piston rods.
- Place the compact crane in a dry location, protected from rain, heat and cold.
- Connect the plug of the EV charging station to the crane so it keeps the battery packs and the 24 V system in good condition.
- Do not press the crane's emergency stop.
- Ensure that the compact crane cannot be activated by unauthorised persons.
- Cover the compact crane with a tarpaulin; keep a strip along the floor uncovered to allow ventilation.

After the compact crane has been in storage for an extended period (longer than 3 months), follow these instructions:

- Remove the tarpaulin.
- Perform the daily inspection.

CAUTION!

If the compact crane will be placed in storage for more than six months, contact Hoeflon International B.V. for the procedure to be followed.

8.3 Disposal

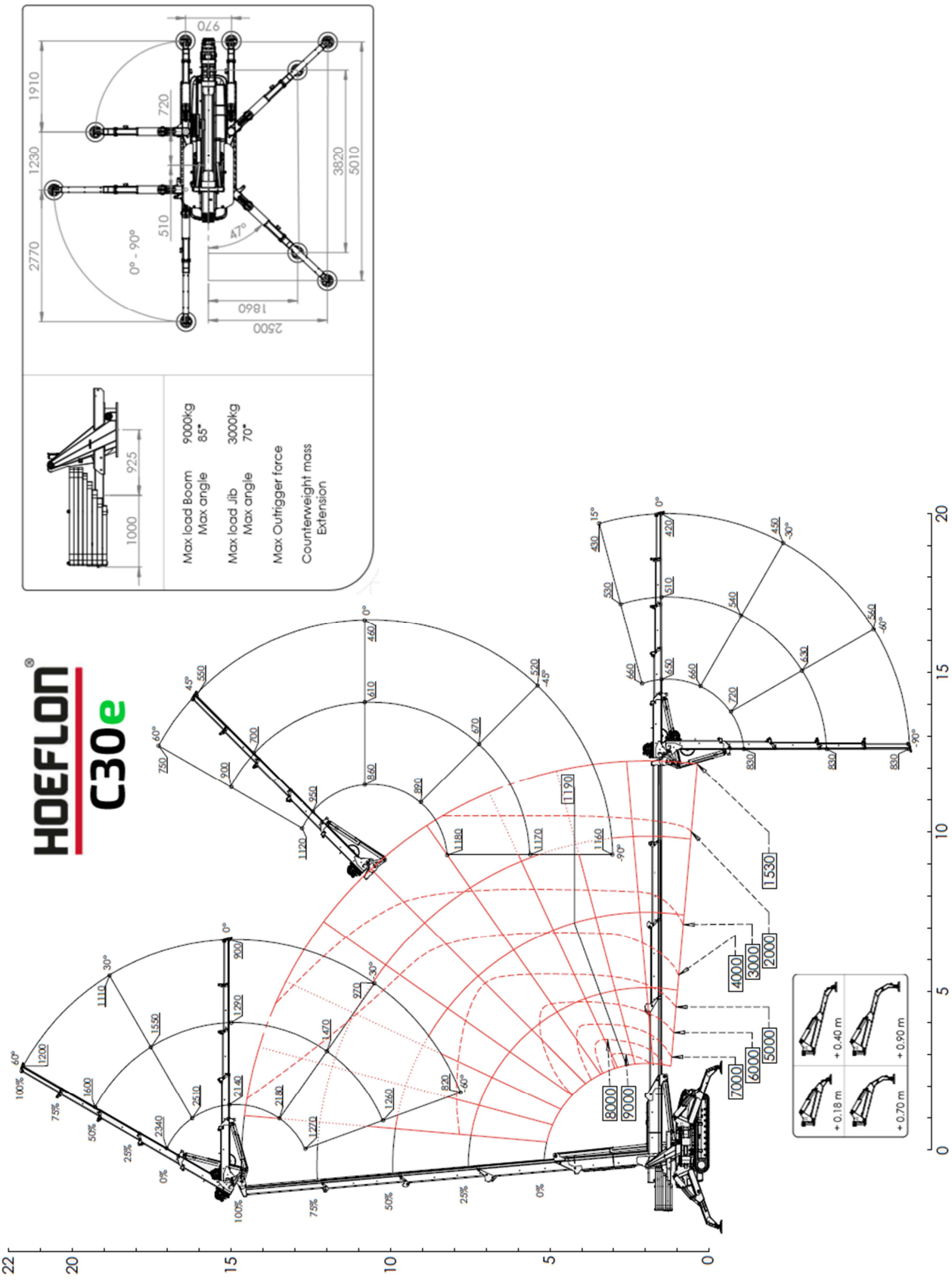
Dispose of waste in accordance with the applicable local regulations. Incorrect disposal of waste can be harmful to the environment. Environmentally harmful waste includes: engine oil, diesel fuel, hydraulic oil, differential oil, coolant, filters, batteries and greases.

The OX battery packs must be submitted to Hoeflon.

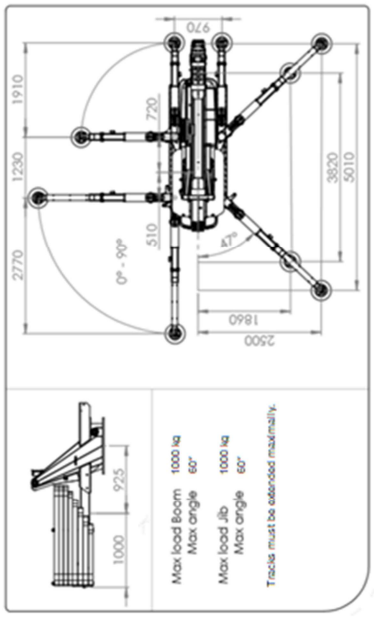
9

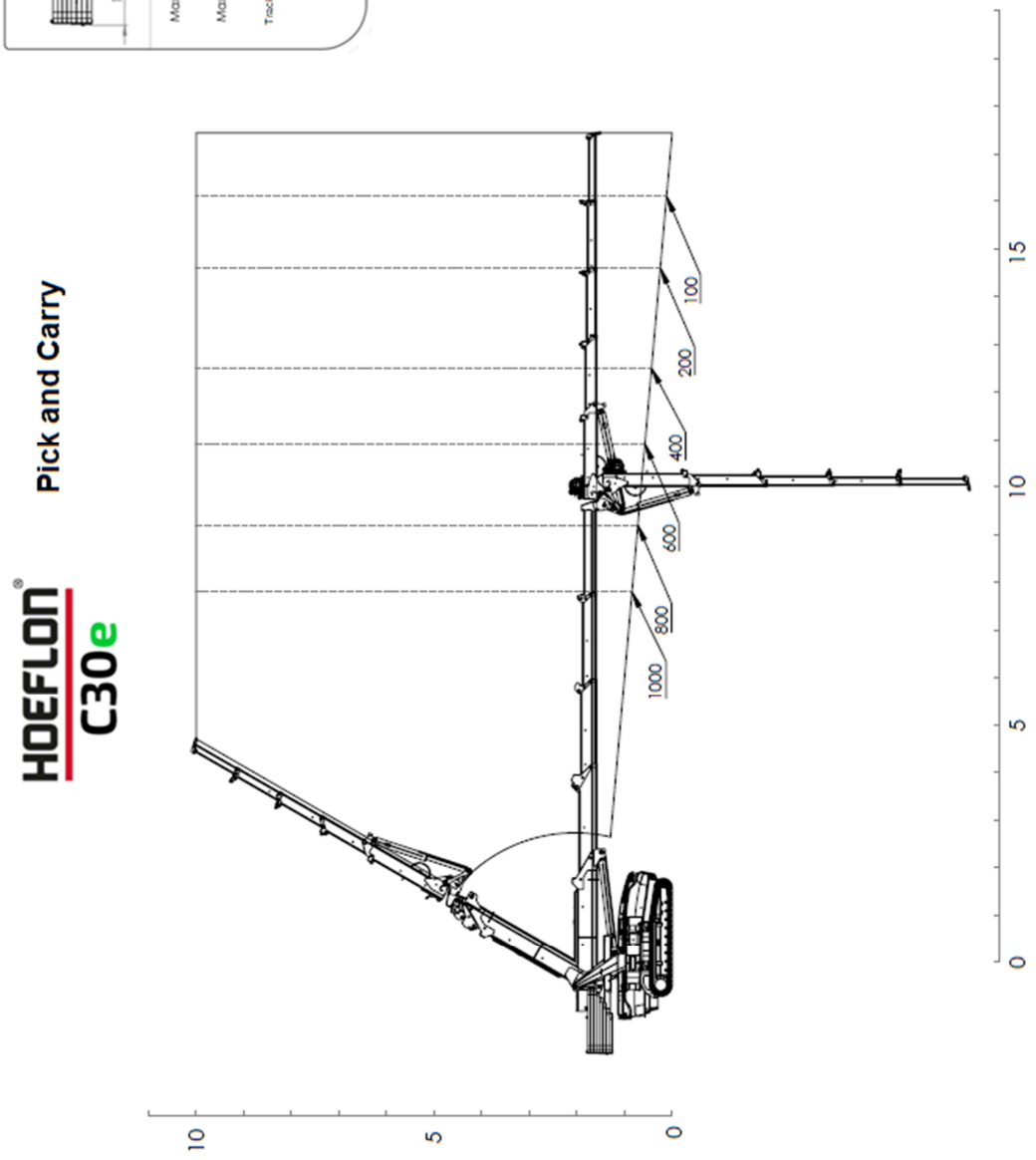
ANNEXES

9.1 Load chart C30e


HOEFLON
C30e
970
1910
720
1230
3820
5010
510
0° - 90°
47°
2770
1860
2500
925
1000
Max load Boom 9000kg
Max angle 85°
Max load Jib 3000kg
Max angle 70°
Max Outrigger force
Counterweight mass
Extension
1 530
2000
3000
4000
5000
6000
7000
8000
9000
+ 0.18 m
+ 0.40 m
+ 0.70 m
+ 0.90 m
100%
75%
50%
25%
0%
0
5
10
15
20
22

9.2 Load chart C30e in pick-and-carry mode





9.3 Annexes

- Crane logbook