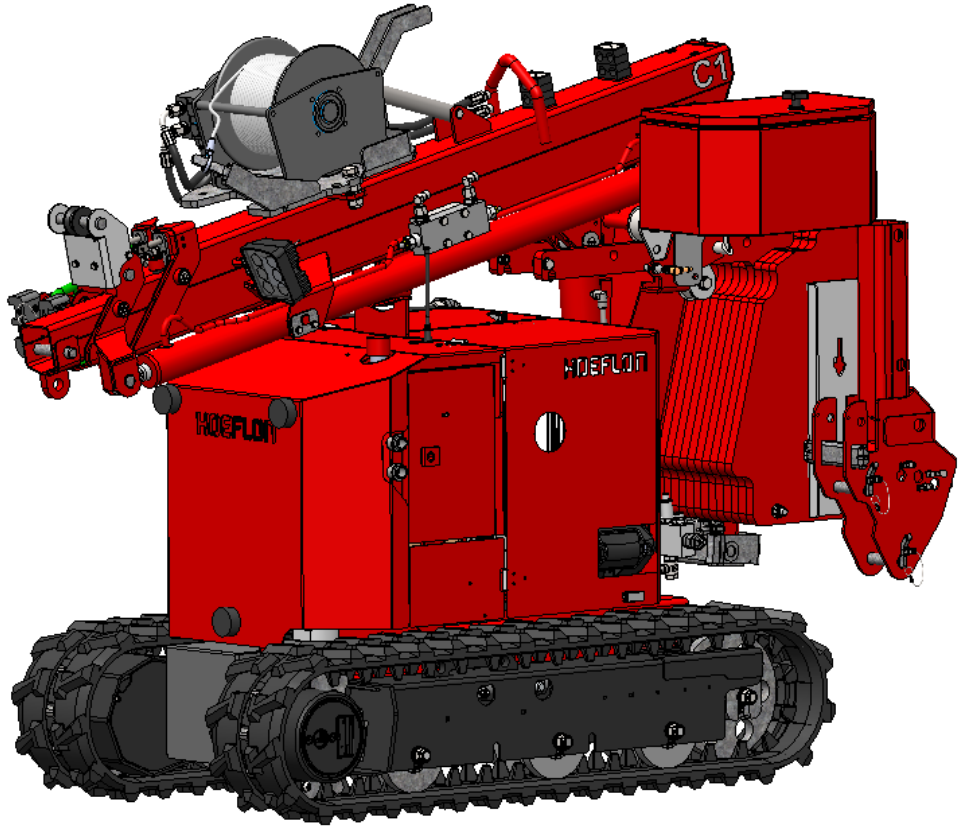
USER MANUAL

COMPACT CRANE C1



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Type	
Serial no.:	
Delivery date:	

27-11-2018 version 01

HOEFLON®

Aflevering kwitantie / Receipt of delivery / übergabeerklarüng / Aavis de livraison / Resguardo de entrega

Machine serie nr. / Machine serial no. / Maschinen seriennummer / Numéro de série / Número de serie	Datum van aflevering / Date of delivery / Lieferdatum / Date de livraison / Fecha de entrega ..... - ..... - .....
Klantnaam / Customer Name / Kundenname / Nom du client / Nombre del cliente ..... Adres / Address / Adresse / Adresse / Dirección ..... Postcode / Zip code / Postleitzahl / Code postal / Código postal ..... Plaats / Place / Ort / Lieu / Lugar ..... Land / Country / Land / Pays / Pais	Dealer naam / Dealer Name / Händlers name / Nom du revendeur / Nombre del distribuidor ..... Adres / Address / Adresse / Adresse / Dirección ..... Postcode / Zip code / Postleitzahl / Code postal / Código postal ..... Plaats / Place / Ort / Lieu / Lugar ..... Land / Country / Land / Pays / Pais .....

Bij de hierboven genoemde machine ontving ik de gebruikershandleiding. Tevens zijn mij de gebruik, veiligheid en onderhoudsvoorschriften uit gelegd. / In the above machine I received the user manual. I also laid down the use, safety and maintenance instructions. / In der obigen Maschine habe ich die Bedienungsanleitung erhalten. Ich habe auch die Gebrauchs-, Sicherheits- und Wartungsanweisungen festgelegt. / Dans la machine ci-dessus, j'ai reçu le manuel de l'utilisateur. J'ai également défini les instructions d'utilisation, de sécurité et de maintenance. / En la máquina de arriba recibí el manual de usuario. También establecí las instrucciones de uso, seguridad y mantenimiento.

Handtekening van de klant Signature of the client Unterschrift des Kunden Signature du client Signatura del cliente		Handtekening van de dealer Signature of the Dealer Unterschrift des Händlers Signature du revendeur Signatura del distribuidor	

Dit formulier ingevuld en ondertekend terug zenden naar Hoeflon B.V. Bij voorkeur inscannen en mailen of een foto van dit ingevulde formulier mailen. / This form filled in and signed back to Hoeflon B.V. Preferably scan and mail or mail a picture of this completed form. / Dieses Formular wurde ausgefüllt und an Hoeflon B.V. Scannen und mailen Sie am besten ein Bild dieses ausgefüllten Formulars. / Ce formulaire rempli et signé à Hoeflon B.V. De préférence, numériser et poster ou poster une photo de ce formulaire rempli. / Este formulario se completó y se firmó nuevamente con Hoeflon B.V. Preferiblemente escanee y envíe por correo o correo una foto de este formulario completo.

Zonder ingevuld en retour ontvangen formulier nemen wij geen garantie aanvragen van de machine in behandeling. / Unless filled in and returned, we will not accept any warranty requests from the machine. / Sofern nicht ausgefüllt und zurückgesendet, akzeptieren wir keine Garantieanforderungen von der Maschine. / Sauf si rempli et retourné, nous n'accepterons aucune demande de garantie de la machine. / A menos que se complete y devuelva, no aceptaremos ninguna solicitud de garantía de la máquina

PREFACE

This user manual has been written for the type C1 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.

PROPERTY RIGHTS

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 hoisting and lifting loose materials using a hook. The objects to be transported must fall within the specifications stated in this user manual.

2.2. Major components of compact crane

The components of the compact crane are shown below.

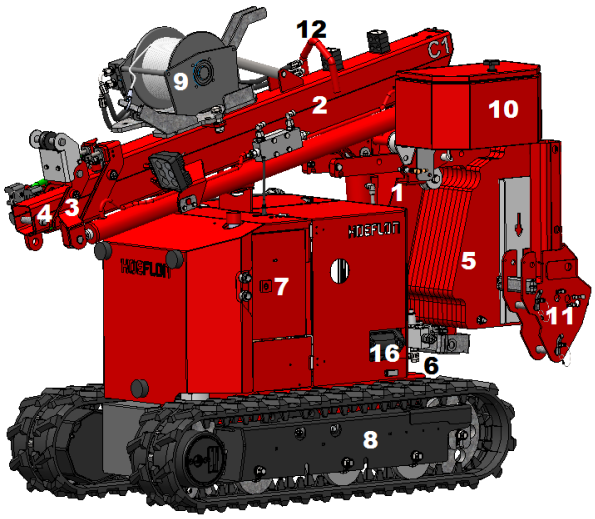


Figure: 1

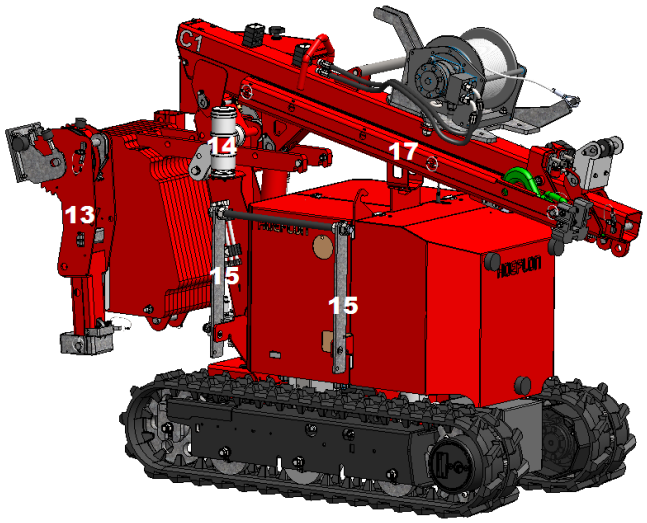


Figure: 2

1 Crane column
2 Boom
3 Extension jib 1
4 Extension jib 2
5 Ballast
6 Power plug 230V
7 Electrical cabinet
8 Track undercarriage
9 Winch
10 Storage box
11 Storage location 30° section
12 Compact crane lifting point
13 Winch head
14 Signal column
15 Transport support
16 Battery charger transmitter battery
17 Manual jib extension

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	03 12 1089 C1 *(1089=service number)*
Maximum slope angle	15°
Clearance angle	20°
Maximum lean angle	2°
Ground clearance	65 mm
Petrol engine (option)	*Honda GX390* 9.6 kW
Diesel engine (option)	Yanmar 1 cylinder 5.7 kW
Electric motor (option)	230 V 50 Hz 2.2 kW
Electric motor	24 V 2 kW
Battery pack	24 V
Fuel tank volume Honda	5.3 L
Engine oil volume Honda	1.1 L
Fuel tank volume Yanmar	4.7 L
Engine oil volume Yanmar	1.6 L
Battery (230 V motor)	12 V , 44 Ah
Ambient temperature	-10 – 40 °C
Slewing angle	136°
Max. working load and lifting point of crane	See load table provided in the annexes
Maximum wind speed	10.8 m/s (6 Beaufort)

Technical data	C1
Transport length	1700 mm
Transport width	700 mm
Width with extended crawler tracks	1100 mm
Transport height	1400 mm
Total weight with ballast, excl. winch	960 kg
Total weight ballast	290 kg
Weight of winch weight with hook	2.5 kg
Weight of winch head	13 kg
Weight 30° section	10 kg
Weight of manual jib extension	11 kg
Maximum ground pressure per surface area	Kg/cm^2
Max. load horizontal retracted	550 kg
Max. load horizontal extended	190 kg
Max. winch load	420 kg

2.3.2. Drawings

The views of the compact crane are shown below.

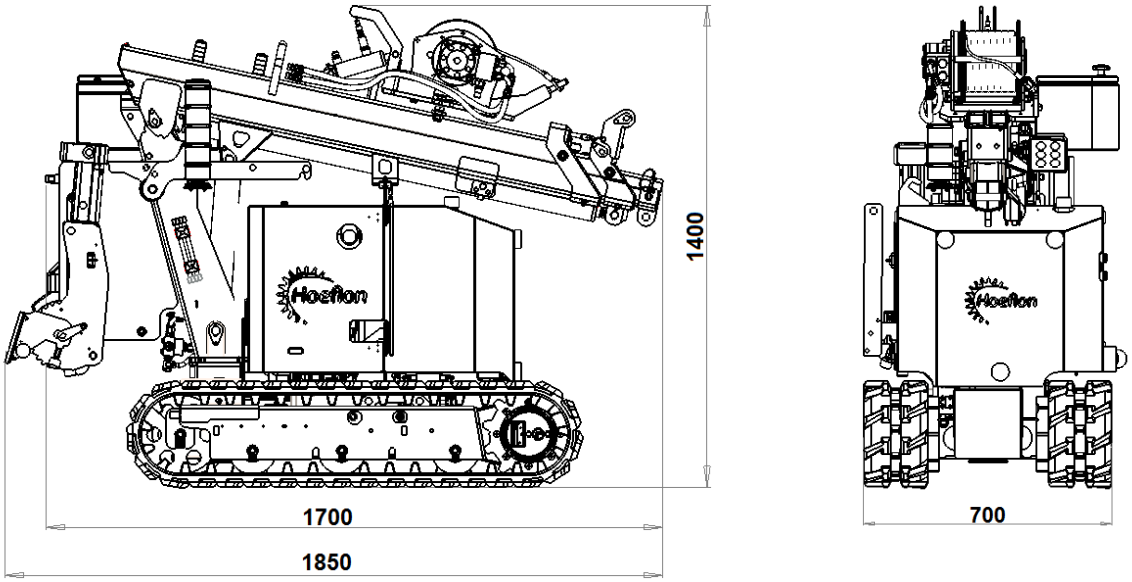


Figure 3: front and side view C1

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, battery version		
Rear, control side	Electric motor, battery version		

2.3.4. Hydraulic system

The specifications for the hydraulic system are shown below.

Hydraulic system		
Volume of hydraulic tank	26 litres	
Pump 1	Type	gear pump
	Max. pressure	170 bar
Pump 2	Type	gear pump
	Max. pressure	170 bar

2.3.5. Electrical system (230 V drive)

The specifications for the electrical system are shown below.

Electrical system	
Battery	12V 44Ah
Electric motor	230 V 50 Hz 2.2 kW
Remote control	Hoeflon

2.3.6. Electrical system (battery pack drive)

The specifications for the electrical system are shown below.

Electrical system	
Batteries	2x 12 V 225 Ah
Electric motor	24 V 2 kW
Remote control	Hoeflon

2.4. Type plate

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

Figure: 4

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

Type plate explanation	
Type	The type of compact crane (C1)
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. Also it is absolutely prohibited to exceed the maximum working load (see section 9.1), 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 also 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.

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 warranty form.
If changes are made to the Tracked Carrier 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 completed warranty form 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.

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.

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 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!	Never transport the compact crane without first ensuring that the crane is 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!
DANGER!	Make sure the load bearing capacity of the ground is adequate; use access mats. Caution: never drive over manholes or alongside/through holes.
DANGER!	It is prohibited to use the compact crane to transport or lift persons.
DANGER!	It is prohibited to use the compact crane to pull loads free, cause them to fall, push them or pull them at an angle.
DANGER!	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.
DANGER!	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.
DANGER!	Do not lift loads that exceed the maximum permitted working load.
DANGER!	The machine will tip over if the boom is raised with a heavier load than specified in the load table.
DANGER!	Never leave the compact crane unattended with a load

hanging from the machine.

DANGER!

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

DANGER!

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

DANGER!

The compact crane may be driven with boom raised to a maximum angle of 55°; if this angle is exceeded the crane may tip over backwards.

DANGER!

When lifting a load above a boom angle of 55°, raise and lower the boom carefully!

DANGER!

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

DANGER!

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

DANGER!

It is forbidden to use the manual jib extension for loads exceeding 150 kg.

DANGER!

Make sure the compact crane is level during lifting; otherwise the crane may tip over.

DANGER!

The compact crane must be driven with the ballast on the front side (i.e. backwards) when travelling uphill or onto a transport vehicle.

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!

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 in rain, snow, high or wet grass or when driving through water deeper than 5 cm.

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!

Be careful when slewing if the glass carrier is attached to the machine.

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!

Never transport a loaded compact crane.

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!

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!

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.

5.3. Emergency stop

An emergency stop is installed on top of the electrical cabinet 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 on the electrical cabinet (*see figures 5 and 6*).
- Operate the transmitter in the usual manner, as described in (section 6.2.1).

Figure 5

Figure: 6

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	On 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 crane
	It is prohibited for unauthorised persons to be within the working range or DANGER ZONE of the machine.	On the cover of the electrical cabinet
	Check that all safety devices are installed correctly before starting up the machine.	On the cover of the electrical cabinet
	Always consult the user manual before taking any action.	On the cover of the electrical cabinet

Pictogram	Meaning	Location
	Risk of cutting or severing	On the crane at pivot points and on the outrigger legs at the cylinders
	Risk of trapping hands	On the ballast
	Warning for radio remote control	On superstructure electrical cabinet

5.6. Signal column

A signal column is fitted on the compact crane. If the red light is on, the crane is at or above 100% load capacity. At 100% the signal column produces an audible signal.

		Crane operation
		100% load (red lamp lights)
		100% load (an audible signal sounds)

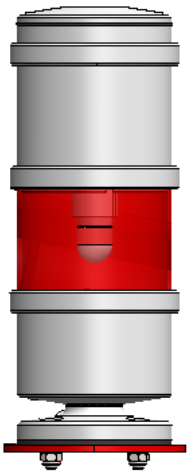


Figure 7: Signal column

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.
	**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!**	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!**	Use an extension cable having a conductor cross-sectional area of at least 2.5 mm^2 and measuring no more than 25 m in length.

	**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!**	The compact crane is intended for indoor and outdoor use. Indoor use with a combustion engine powered crane is only permitted if the exhaust gases are ducted outside.
	**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 toolbox only for crane parts and the tools necessary for working with the compact crane (if present).*

6.1. Daily inspection prior to use

DANGER!

The engine must be stopped when topping off oil, coolant or fuel; DO NOT smoke while performing these tasks.

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 maintenance dealer do so, before you use the compact crane again.

- Before performing the daily inspection, first ensure that the compact crane is horizontal (to ensure proper oil levels).
- Check that the combustion engine / electric motor is off.
- Perform a thorough general visual inspection of the compact crane. Look, in particular, for oil and/or coolant leaks, 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 engine oil level **before starting**, and top up if necessary. Running the engine while the oil level is too low can result in engine damage.
- Yanmar engine: Unscrew the dipstick/oil fill cap from the engine and wipe it off. Insert the dipstick into the hole until the thread of the dipstick touches the thread of the block (do not screw it in!). Now remove it again and take the reading. The oil level must be between (2) and (3) on the dipstick (1). If the oil level is too low, top it off through the dipstick opening (4). (See *figure 8*).

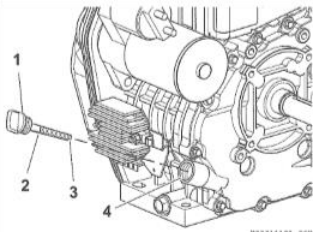


Figure: 8

- Honda engine: Unscrew the black dipstick/oil fill cap from the engine and wipe it off. Insert the dipstick into the hole until the thread of the dipstick touches the thread of the block (do not screw it in!). (*See figure 9*). Now remove it again and look to see whether the oil level falls within the cross-hatched area. If the oil level is too low, top it off through the dipstick opening (see *figure 9).*

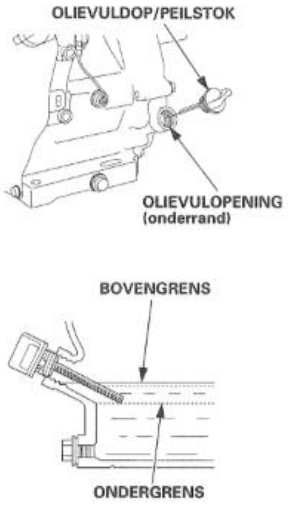


Figure: 9

- Check the oil level in the hydraulic tank: The oil level must be between the upper and lower sight glasses on the left side of the machine. Top up with Hydro 32 if necessary (see *figure 10*).
- Check that all protective caps and covers are in position and that all nuts and bolts are in place and secured firmly.
- Make sure that the locking pins are present and secure.

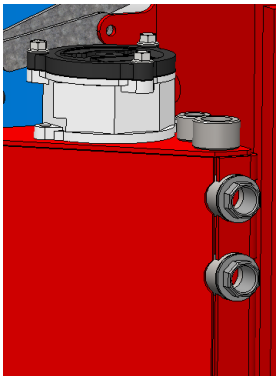


Figure: 10

- Check the fuel level and top up if necessary:

  Honda engine unleaded petrol (see *figure 11*).

  Yanmar engine EN 590 diesel fuel (see *figure 12*).

  See section 7.5 for the diesel fuel specifications.

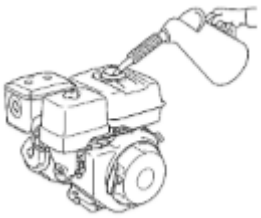


Figure: 11

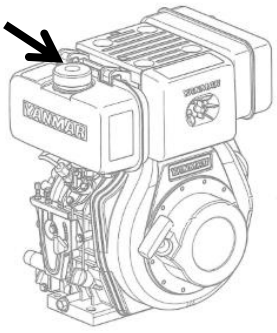


Figure: 12

- Remove the air filter cover, where present, and inspect the air filter elements. Clean or replace contaminated air filter elements. Always replace damaged air filter elements.
- Visually inspect the tension and condition of the crawler tracks; If defects are found, contact the dealer.
- Drive the front of the crawler tracks onto a wooden beam. The middle part of the crawler tracks is lifted off of 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 (see *figure 13*). The crawler tracks must be tight.

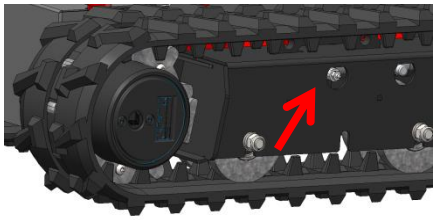


Figure: 13

- Check whether the toggles for operating the crane automatically return to the centre position.
- Make sure that all loose parts are correctly stored/secured.
- 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 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-proof.
- 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: 14

Levers in standard Default			
Number	Lever	Backwards	Forwards
1	Slewing	Left	Right
2	Main boom	Retract	Extend
3	L track	Backwards	Forwards
4	R track	Backwards	Forwards
5	Winch	Raise	Lower
6	Main boom	Extend	Retract

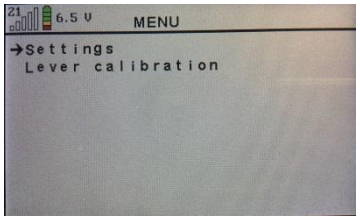
Figure: 15

Buttons			
	Emergency stop	7	Display
	On/off button transmitter		Engage second operating speed
	Activate receiver and horn		Control panel display: ✓ Confirmation button ▲ Up arrow button ▶ Right arrow button ▼ Down arrow button ◀ Left arrow button ⮌ Back button
	This function is not used		This function is not used
	This function is not used		This function is not used
	On/off button electric motor		Extend crawler tracks.
	Not used		Retract crawler tracks.
	On/off button Yanmar diesel engine		Work light (optional)
	Preheat button Yanmar diesel engine		This function is not used
	This function is not used		

6.2.2. Function mapping

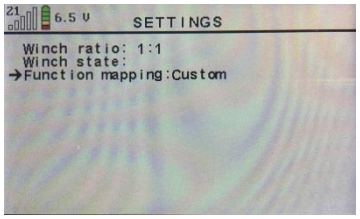
This function allows you to assign different functions to the levers. As standard, it is set to **default**. If you set it to **custom**, then it is set the same as many lorry loader cranes.

- Switch on the remote control and activate the remote control menu by pressing the ✓ button (see *figure 16).*



igure: 16

- Then open **settings** by pressing the ✓ button and use the ⍰ button to go to **function mapping** (see *figure 17*).



igure: 17

- Now press the (▶) button to set the function to **custom** (see *figure 17*).

The table below shows the new functions of the levers.

Levers functions in 'custom' mode			
	Key switch in position 1		
Number	**Lever**	**Backwards**	**Forwards**
1	Slewing	Left	Right
2	Main boom	Extend	Retract
3	Main boom	Retract	Extend
4	Jib	Extend	Retract
5	Jib	Retract	Extend
6	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 15*). Press the ⍰ button to move the arrow in the display until it points to 'Lever calibration' (*see figure 18*).

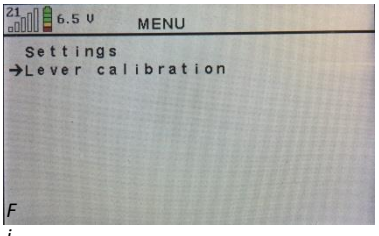


Figure: 18

- 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 should be 100% green.
  If not, the levers must be calibrated (see *figure 19)*.

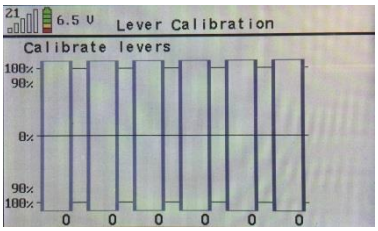


Figure: 19

- 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 20)*.

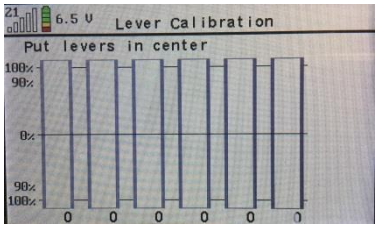


Figure: 20

- 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 21*).

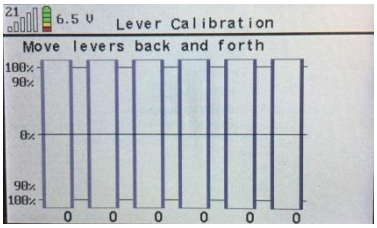


Figure: 21

- 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 22*).
- Pressing ⮌ twice will now take you back to the home screen.

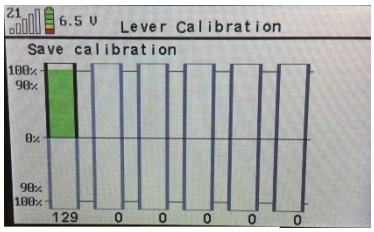


Figure: 22

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 23*).

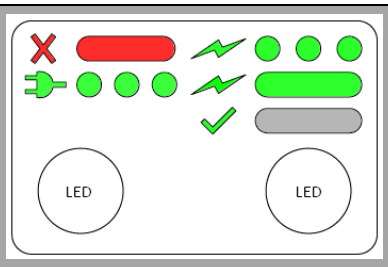
Figure: 23

Replace the battery in the transmitter with the battery in the battery charger on the inside of the engine shroud (*see figure 24*). The battery in the battery charger on the inside of the engine shroud charges up again during use of the crane. 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: 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 every 5 s	12V connected	LED off	Battery not connected
LED continuous red	Malfunction	LED continuous green	Battery charging 1A
		LED flashing green	Charging 0.3 A
		LED off	Battery fully charged

Electrical cabinet

DANGER!

Remove the keys from the key switch when during work on the electrical system to prevent unauthorised persons from switching the machine on.

There are a number of functions present on the electrical cabinet. These functions are shown and explained below.

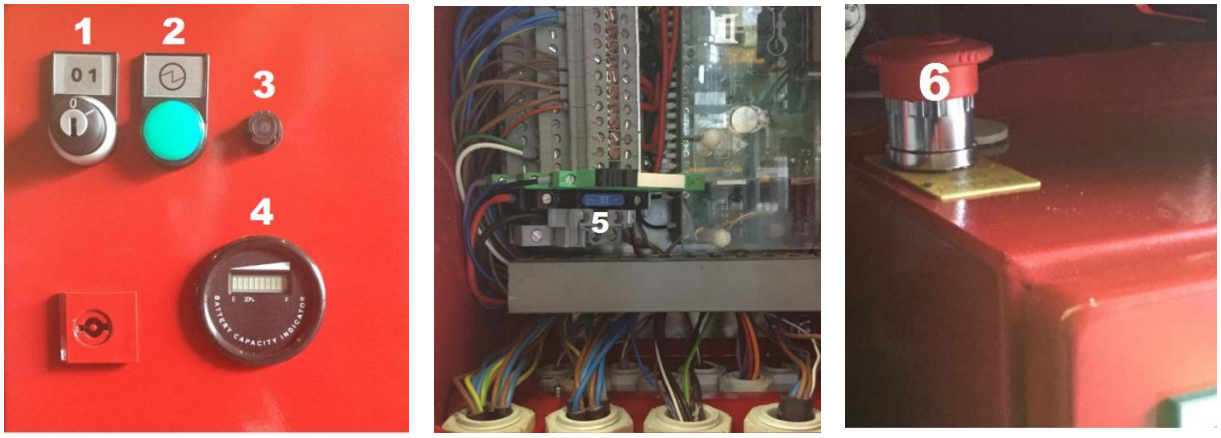


Figure: 25

Electrical cabinet		
Number	Component	Function
1	Main switch, implemented as key switch	Left (0): Machine switched off. Centre (1): In this position the drive and lift systems are active.
2	'Power on' indicator	Lit when key switch is on.
3	Connection for emergency control cable	-
4	Battery meter	Indicates how much charge is left in the battery (for battery version only)
5	Blade-type fuse	15A, printed circuit boards
6	Emergency stop	Switches the machine off as quickly as possible.

6.3. Crane functions/operation

TIP

Make sure the crane and the track undercarriage are parallel to one another before use of the boom!

TIP

In case of overload, retract the extendable sections of the crane until the load is once more within the safe working area of the crane.

TIP

Make sure the battery is fully charged after use (applies to battery version only).

6.3.1. Order of operations

To operate the boom of the Compact Crane, follow these steps in sequence:

- Start the drive system and activate the transmitter as described in section 6.4.1.
- Check that the compact crane is level.
- Increase the speed of the Honda/Yanmar engine with the throttle lever.
- Begin to extend the cylinder to raise the boom with the corresponding lever on the transmitter (see section 6.2.1). The boom can then be extended. Perform this procedure in reverse when finished using the crane.

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.

6.3.3. Guiding the load

WARNING!

The mass, centre of gravity and permissible lift points of the load must be known. The proper crane configuration and lifting accessories can be determined accordingly.

WARNING!

Always operate the machine with great care and only 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, wearing 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.
- Only operate the machine 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!

On slopes:	Maximum slope angle
Forwards	15°
Backwards	23°
Sideways	Retracted tracks: 15° Extended tracks: 23°

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 6 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 the boom, 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.

WARNING!

The compact crane is by no means suitable for dragging objects. This can lead to dangerous situations and damage to the machine!

6.4.1. Sequence of operations for starting crane.

- Ensure that all the control toggles are in the '0' position.
- Check that there is no load on the crane.
- Turn the key switch on the electrical cabinet to position 1 (see *figure 25)*.
- Switch on the transmitter (*figure 15) with button* .
- Push the button (*figure 15*) on the transmitter to activate the receiver; the receiver is now activated.
- Start the Honda engine as follows:
    - Open the fuel shut-off *(see figure 26).*
    - Close the choke lever for a cold start (see figure 27). For a restart/warm engine the choke lever may be left in the open position.
    - Set the throttle control to 1/3 open *(see figure 28).*
    - Set the ignition switch on the engine to the 1/ON position *(see figure 29)*.
    - Start the engine by pressing the button on the transmitter.
    - The Honda engine can also be started using the ignition switch on the engine itself *(see figure 29)*.
    - Use the pull cord *(see figure 30)* if the electric start does not function.
    - Once the engine is running and if you had the choke in the **CLOSED** position for a cold start, gradually move the choke to the **OPEN** position as the engine warms up *(see figure 30).*

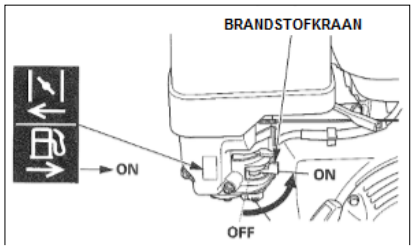


Figure: 26

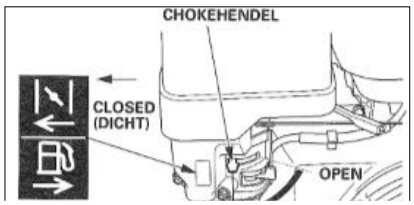


Figure: 27

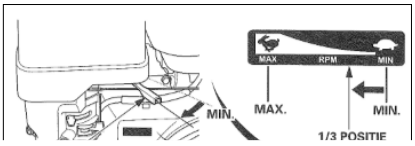


Figure: 28

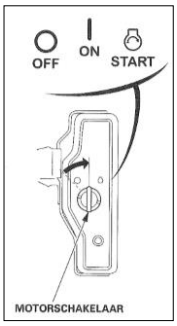


Figure: 29

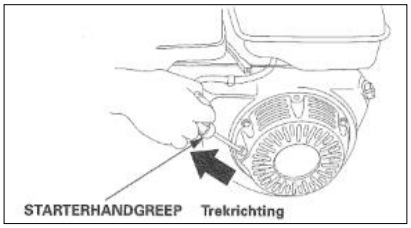


Figure: 30

- Start the Yanmar engine as follows:
  - Open the fuel shut-off *(see figure 31).*
  - Set the throttle knob to the correct position by loosening the black knob (twist anticlockwise) and sliding it down. When it is in the correct position, turn it clockwise again to secure it in place *(see figure 32).*
  - Start the engine by pressing the button on the transmitter.

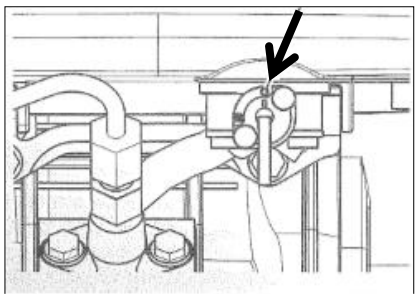


Figure: 31

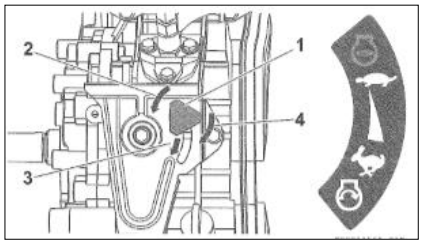


Figure: 32

- Start the 220 V electric motor as follows:
  - Connect a power cable to the socket provided for this purpose on the back of the machine.
  - Switch on the electric motor from the transmitter (*figure 15) with button* .
  - Use a power cable with a conductor cross section of at least 2.5 mm^2, and for optimal operation use a cable with a maximum length of 25 m.
- Start the electric motor used with a battery pack as follows:
  - The electric motor starts to run when a function is operated.
- 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 an arrow on the crawler track undercarriage (see *figure 33*).

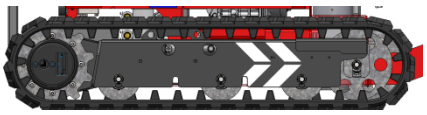


Figure: 33

- Increase the speed of the Honda engine with the throttle lever (see *figure 28)*. Increase the speed of the Yanmar engine by loosening the knob in *figure 32*, sliding it in the direction of the hare pictogram and tightening it again.
- Stop the compact crane by releasing the levers; they return to the centre position automatically.
- Stop the Honda engine by setting the throttle lever to the MIN position *(see figure 28)* and pressing the button on the transmitter.
- Stop the Yanmar engine by loosening the throttle knob, sliding it to the stop position, tightening it again *(see figure 32)* and pressing the button on the transmitter.
- Stop the engine by pressing the button on the transmitter.

6.4.2. Setting track width

WARNING! Only adjust the tracks while driving.

- Press the  button while driving forwards or backwards to extend the tracks.
- Press the  button while driving forwards or backwards 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 placed in transport position before transporting it. To do this, follow these steps:

- Secure attachments in the intended locations during transport: 30° section and winch head left and right beside the ballast. The manual jib extension alongside or in the boom.
- Make sure the winch is always rolled in the transport position and the loop of the winch cable is attached to the appropriate hook.
- The C1 can also be driven if the boom is raised, but the boom angle may not exceed 55°. If raised further, it will no longer drive (due to the risk of tipping over backwards).

6.5. Function/operation winch

DANGER!

Max. winch load is 420 kg.

DANGER!

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

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.

- For the correct selection of attachments and turning angles, follow the table in section 6.5.2; other use is not allowed.
- Make sure both pins are attached and secured when using the winch head in the 30° section.
- 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.
- With the exception of the winch weight and the ballast removal bracket the winch may not be used to pull on parts of the machine.

6.5.1. Order of operations without options

Check

- 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 34*).

Preparation

- Make sure the crawler tracks are fully extended.
- Make sure the boom is horizontal and retracted.

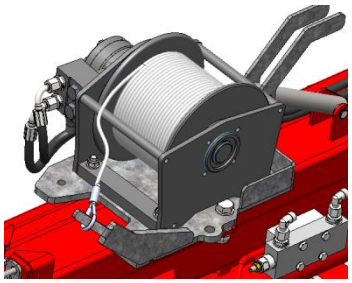


Figure: 34

Attachment of winch head

- Remove the winch head from the ballast support (see figure 35).

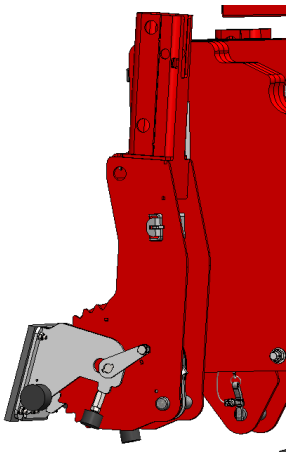


Figure: 35

- Attach it to the boom with the locking pin. Secure the pin (see figure 36).

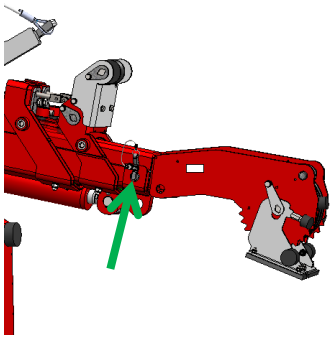


Figure: 36

Activating winch operation

- Activate the winch control by pressing the ✓ button on the remote control (see figure 37).

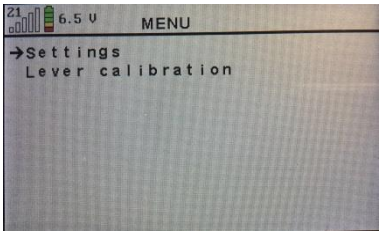


Figure: 37

- Then open **settings** by pressing the ✓ button. Now move the arrow on the screen to **winch state** with the ⍰ button. Then set the **winch state** to **Enabled** by pressing the (▶) button *(see figure 38)*.

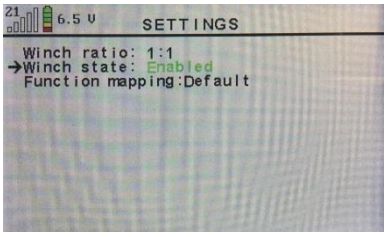


Figure: 38

- For the correct current load indication on the display while using the winch, the **winch state** must be set properly. This must be set to 1:1 *(see figure 38).*
- After activating and setting the winch, return to the main display by pressing the ⍰ button.

Step-for-step

- Start the drive system and activate the transmitter as described in section 6.4.1.
- Check that the compact crane is level.
- Use the appropriate lever on the transmitter to raise the boom until it is horizontal (see section 6.2.1). Then extend the boom slightly. Roll out the winch cable as described below.
- Perform this procedure in reverse when finished using the crane.
- Make sure that the winch cable does not come into contact with the ground, as this may prevent the cable from winding up correctly.
- When the winch is not being used, attach the loop of the winch cable to the hook provided for this purpose on the winch (*see figure 39*).

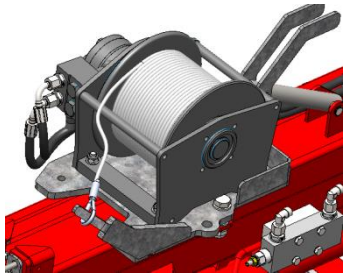


Figure: 39

Fitting winch cable

WARNING!

The use of gloves is mandatory when attaching 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.
- 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.
- Run the winch cable over the winch cable sheaves of the boom as shown in the figures. Make sure that the winch cable is guided properly over the winch sheaves (*see figure 40)*.
- Run the winch cable over the winch head. First remove the upper pin in the winch head. Place the winch cable over the middle winch cable sheave and fit the upper pin again. Position the cable properly through the winch-weight stopper (*see figure 41*).
- Attach the winch weight to the winch cable.

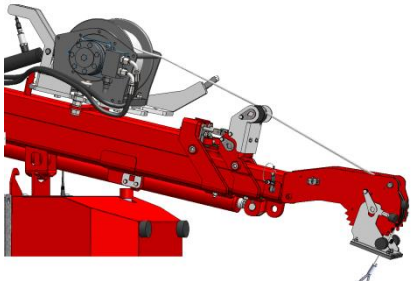


Figure: 40

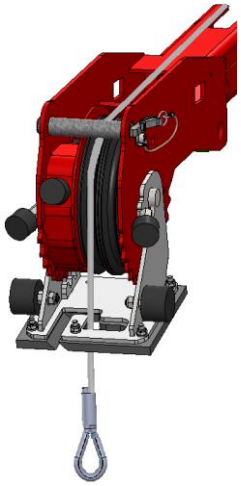


Figure: 41

Rolling up winch cable

- When rolling up the winch cable after using the winch, roll up the winch cable up to about one metre from the front of the machine, then guide it off of the winch sheaves, then pull the cable tight and roll it up (*see figure 42*).
- Hang the eye around the support and carefully roll up the winch cable and gently pull it tight.

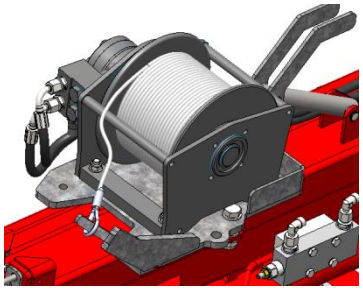


Figure: 42

- Deactivate the winch by setting the **Winch state** to **Disabled** in the remote control menu (*see figure 43*).

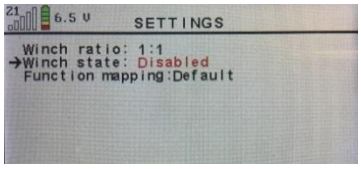


Figure: 43

6.5.2. Order of operations winch head and manual jib extension plus additional 30 degree adjustable section.

Preparation

- Make sure the attachments are removed from the boom, stored properly and secured in place.
- Make sure the boom is horizontal and retracted.

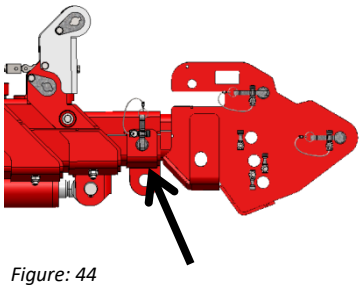


Figure: 44

Attaching 30° adjustable section

- Remove the 30° section from the ballast support.
- Attach the 30° adjustable section in the boom and secure it with the locking pin and locking clip *(see figure 44).*
- Now the winch head or manual jib extension can be attached in the 30° section with the two pins (see figure 45).

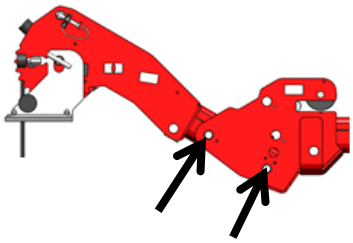


Figure: 45

Attaching manual jib extension

- Remove the manual jib extension from the boom support (see figure 46).
- Place the manual jib extension in the boom and secure it with the locking pin and locking clip.

Attaching winch head

- Remove the winch head from the support on the ballast.
- Place the winch head in the boom and secure it with the locking pin and locking clip.

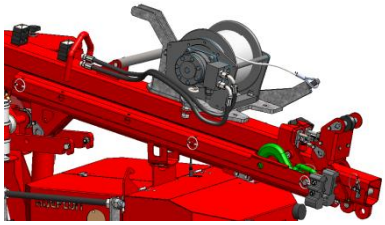


Figure: 46

6.5.3. Limits

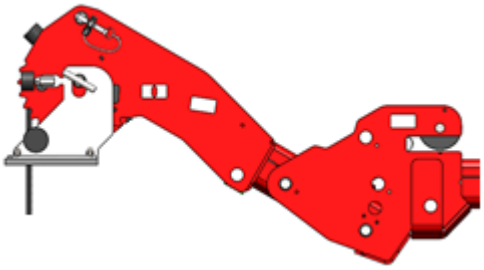


Figure 47: 30° adjustable section raised

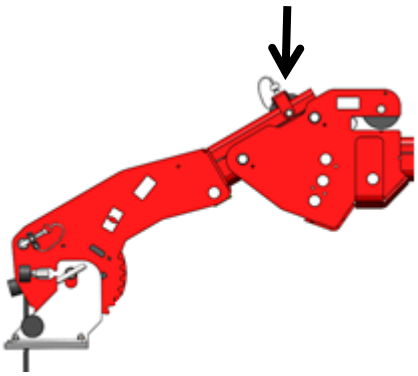


Figure 48: 30° adjustable section lowered

	USE WINCH HEAD AND 30° SECTION	
	Min. boom angle	**Max. boom angle**
Winch head without lifting weight	Not permitted	Not permitted
Winch head	0 degrees	70 degrees
30° adjustable section with winch head lowered (see Figure 48). (Attention! Fit the extra roller in the winch head – see arrow.)	0 degrees	75 degrees
30° adjustable section with winch head raised (see Figure 47).	0 degrees	60 degrees

6.5.4. Attaching winch weight

DANGER!	Max. winch load is 420 kg.
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.

Preparation

- Make sure the crawler tracks are extended and the machine is level.
- Make sure the winch head is mounted as described (see section 6.5.1).

Step-for-step

- Switch on the remote control and position the winch cable over the roller on the boom and through the winch head as described (see section 6.5.1).
- If the eye of the cable is below the winch head, the winch weight can be attached *(see figure 49).*
- Remove the pin from the bush on the winch weight.
- Insert the eye of the winch cable in the bush of the winch weight and secure it with the pin and split pin.
- The lifting hook hangs on the bottom of the winch weight *(figure 50).*
- The crane is now ready to lift with the winch.
- Perform this procedure in reverse to remove the winch weight.

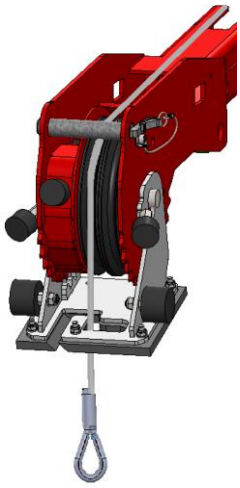


Figure: 49

Figure 50

6.5.5. Explanation of display during lifting and driving

While working with the crane the following information is shown on the remote control display. The values that appear on the display are explained below.

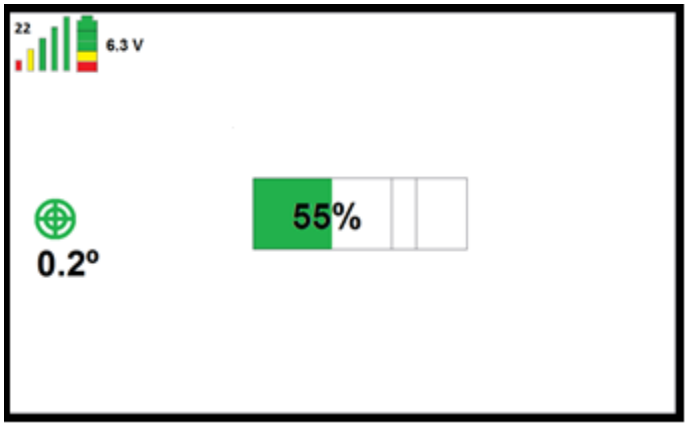


Figure: 51

- The transmission frequency is shown at the top left. *See figure 51*; 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 51*. 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 51*. As the battery discharges, the blocks go out, one at a time.
- The voltage is shown in volts. In *figure 51* 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 51* the crane is 0.2° out of level.
- The crane is loaded at 55% in *figure 51*.

6.5.6. Extend ballast.

- The ballast of the C1 must be extended manually.
- Release the ballast by turning the lip on the locking pin or pulling it out *(figure 52).*
- Pull the ballast to the rear until it does not go any further (pull on the black handle located in the centre on the back side of the ballast).
- Lock the ballast by turning the lip on the locking pin again. The pin is spring-loaded and will snap back into place.
- Perform the steps in reverse to slide the ballast in again.

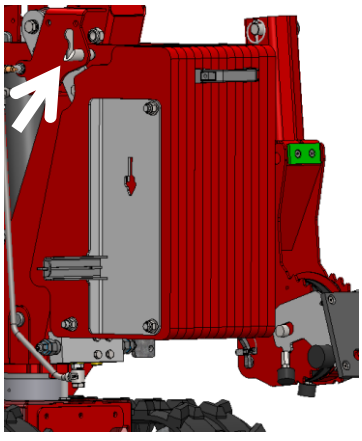


Figure: 52

6.5.7. Charging battery version

WARNING!

During the charging process an explosive gas mixture is formed in the battery pack. Short circuits, open flame and spark discharge in the immediate vicinity of the battery may cause an explosion.

The battery version is powered by a 48 volt battery pack located in the crane.
A meter on the electrical cabinet shows the state of charge of the battery pack *(figure 53).*
This is displayed as a bar graph. With each step an additional bar is lit. The rightmost bar (at the 'F') indicates 100% charged, and the leftmost (at the 'E') is 0%.
It is important to connect the crane to the charger as quickly as possible once the battery state of charge falls below 20% so that the battery pack will be recharged.
Charging of the machine's battery will begin when the plug at the rear of the machine is connected to a mains socket *(see figure 54).*

Figure: 53

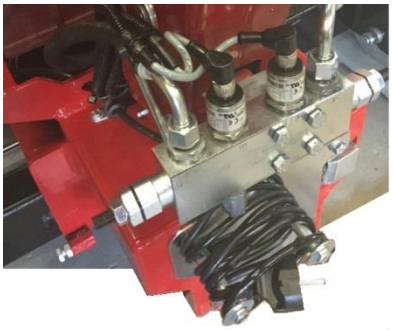


Figure: 54

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 off oil, coolant or fuel, shut off the engine. Smoking during these operations is prohibited.

DANGER!

Always correctly reinstall any protection measures that have been removed!

WARNING!

Only your dealer or Hoeflon International may perform work on the machine's electrical and hydraulic systems.

WARNING!

Attention! Parts of the engine may still be hot. Let them cool 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 activities are shown in the lubrication schedule 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. When spray cleaning, never aim directly at the engine 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.

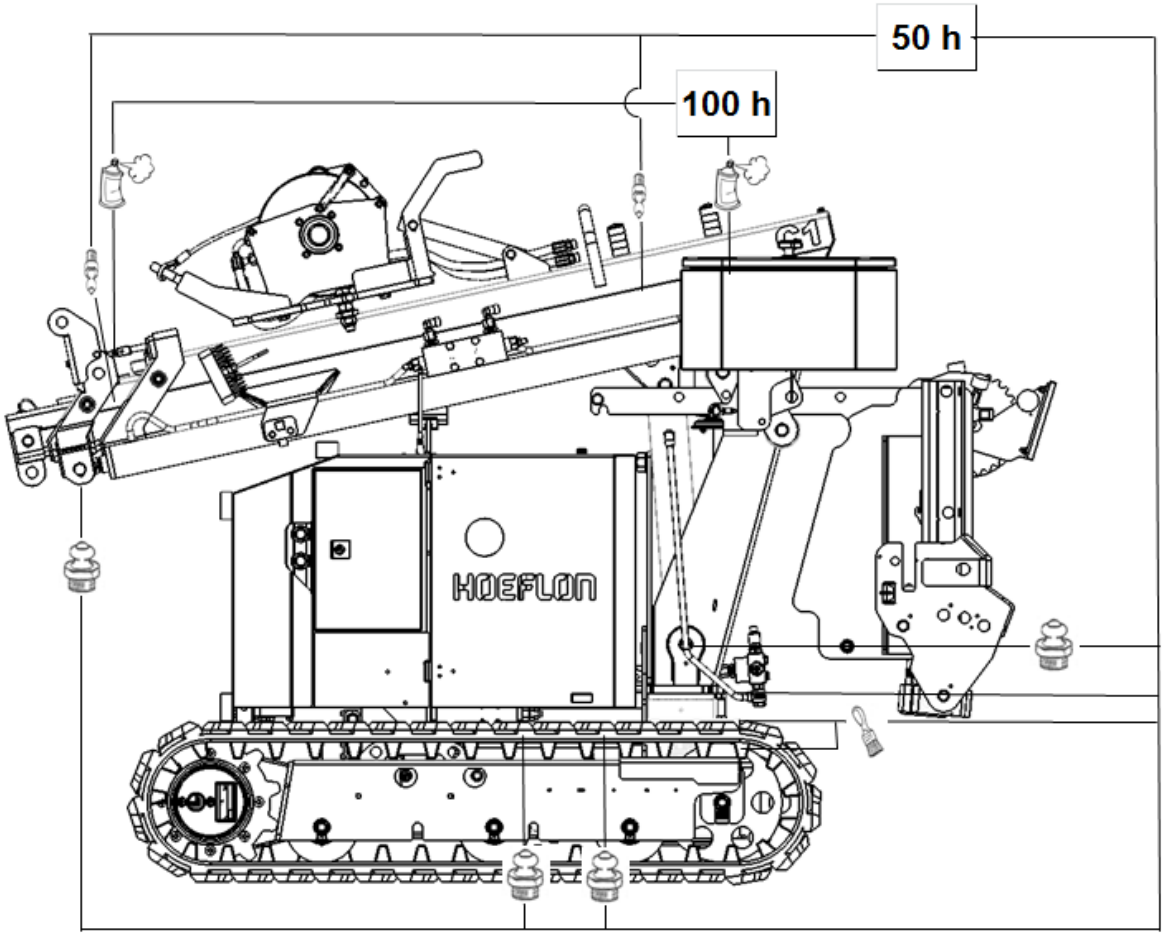
7.3. Maintenance schedule

Description of maintenance		Action	Interval in hours (o = manufacturer/dealer, ● = owner)							
Honda/Yanmar engine			Daily	First 50 hours	50	100	250	500	1000	4000
Yanmar engine	Air filter	Check	●							
		Clean			●					
		Replace						o		
	Engine oil	Check	●							
		Replace		o			o			
	Engine oil filter	Replace		o			o			
	Fuel strainer	Check/clean	●							
	Fuel filter	Replace					o			
	Valve clearance	Adjust		o				o		
	Injector	Test							o	
Honda engine	Air filter	Check	●							
		Clean			●					
		Replace					o			
	Engine oil	Check	●							
		Replace		o		o				
	Sediment cup	Clean				o				
	Fuel strainer	Check/clean	●							
	Spark plug	Check/adjust				o				
		Replace					o			
	Valve clearance	Adjust					o			
Fuel tank		Clean					o			
fuel hoses		Check/replace							o	
Engine speed		Adjust					o			
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		
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			
Electrolyte level of battery pack		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 masts.
- 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 spot nozzle through the holes, when the boom is fully extended.
- **Use only prescribed greases; see lubricant specifications.**



7.5. Lubricant specifications

Manufacturer:	Engine oil		Hydraulic oil		Final drives	Lubrication points	Chains	Sliding sections	
	Yanmar (diesel)	Honda (petrol)	Universal	Bio				Lubricating grease	Spray
Q8	Q8 Formula Advanced SAE 10W-40	Formula V Long Life 5W-30	Heller 32	Q8 Holbein HP SE Bio 46	T 55	EP 2	Industrial chain spray	EP2	PTFE
Total	Total Quartz 7000 Diesel SAE 10W-40	Quartz Ineo Long life 5W-30	Equavis AF 32 / ZS 46	BioHydran TMP 32	EP-B 80W90	EP 2	Industrial chain spray	EP2	PTFE
Shell	Shell Helix Plus 10W-40	Shell Helix Ultra AV-L 5W-30	Shell Tellus S2/S3	Shell Naturelle HF-E 32	Spirax S3 AX 80W-90	EP 2	Industrial chain spray	EP2	PTFE
Kroon oil	Emperol 10W-40	Helar SP 5W-30 LL-03	Perlus ZF 46	Perlus Biosynth 46	Gearlube GL-5 80W-90	EP 2	Industrial chain spray	EP2	PTFE

The diesel fuel used in the Yanmar engine must meet the following specifications.

- The cetane number must be 45 or higher.
- Use clean fuel.
- The diesel may not be more than 7% bio diesel.

Diesel fuel specifications	Location
ASTM D975 No. 1D S15, S500 No. 2D S15, S500	USA
EN 590:96	European Union
ISO 8217 DMX	International
BS 2869-A1 or A2	United Kingdom
JIS K2204 Grade No.2	Japan
KSM-2610	Korea
GB252	China

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.

7.6. Battery charger

- This battery charger is present on a C1 with 230 V electric motor.
- This battery charger ensures that the battery of the compact crane is always charged when the crane is operated from 230 V rather than from the Yanmar or Honda engine.
- The battery charger will begin charging as soon as the power cable *(see figure 54)* is connected. An orange LED is lit.
- The charger monitors the battery voltage to determine whether or not it requires charging. If the voltage is low, it will be topped up. When the battery has reached the correct voltage again, the charger will automatically stop charging. During charging a white LED is lit beside the battery symbol, with '12 V' above it. A number of charge LEDs will also be lit. See table below.

Figure: 55

LED	explanation
25% Red LED 25% 50% 75% 100% ● ○ ○ ○	The 25% charging LED flashes slowly when the battery has less than 25% of its charge remaining. When the battery is 25% charged, the red LED remains lit continuously.
50% Red LED 25% 50% 75% 100% ● ● ○ ○	The 50% charging LED flashes slowly when the battery has less than 50% of its charge remaining. When the battery is 50% charged, the red LED remains lit continuously.
75% Orange LED 25% 50% 75% 100% ● ● ● ○	The 75% charging LED flashes slowly when the battery has less than 75% of its charge remaining. When the battery is 75% charged, the orange LED remains lit continuously.
100% Green LED 25% 50% 75% 100% ○ ○ ○ ●	The 100% charging LED flashes slowly when the battery has less than 100% of its charge remaining. When the battery is 100% charged, the green LED remains lit continuously and the 25%, 50% and 75% LEDs go out.
Green maintenance LED 25% 50% 75% 100% ○ ○ ○ ●	During maintenance charging the 100% LED flashes slowly. When the battery is 100% charged, the green 100% LED remains lit continuously.

- The charger can provide a number of fault codes. The fault codes are indicated by the error LED (with the ! above it) and the stand-by LED (by the 'on' symbol). These light up or flash alternatingly. ? Information about the fault code and the possible solution is provided.

Fault	Cause / solution
Single flashes	Battery does not hold a charge. Have the battery checked by your dealer.
Double flashes	Possible short-circuit in the battery. Have the battery checked by your dealer.
Triple flashes	The battery voltage is too high for the selected charging mode. Check the battery and charging mode.
Continuously lit error LED	Reversed polarity. Swap the battery connections.
Continuously lit orange LED	The battery voltage is too low to detect the state of charge. Temporarily connect an extra battery to the machine via the start assistance terminals or contact your dealer.

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.

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 your 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 toggle on remote control	Check the hydraulic oil level.
Vibrations in the crane	Oil temperature too low	Increase the oil temperature by raising and lowering the boom.
Telescopic section does not extend or retract fully or does not do so easily	Guides not sufficiently lubricated	Lubricate the guide.
The crane does not slew well	Gear rack not sufficiently lubricated Damaged or worn gear rack	Lubricate the gear rack and guide.
A number of functions do not work	Problem in electrical system	Check sensors. Check emergency stop button. Reduce the load on the crane.
A function does not work	Problem in electrical system, electrical motor has stopped working	Check fuses or emergency stops, 15A blade-type fuse in the electrical cabinet.
Movements are slower than usual	Oil filter restricted Hydraulic pump defective	Clean oil filter. Replace hydraulic pump.
Engine does not start	Empty battery	Check whether the battery charger is indicating a fault code. Reset battery charger by disconnecting 230 V plug, waiting 10 sec. and plugging it in again.
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	Problem in software	Contact Hoeflon
E002	Problem in software	Contact Hoeflon
E003	Problem in software	Contact Hoeflon
E004	Problem in software	Contact Hoeflon
E005	Problem in software	Contact Hoeflon
E006	Problem in software	Contact Hoeflon
E007	Problem in software	Contact Hoeflon
E008	Problem in software	Contact Hoeflon
E009	Problem in software	Contact Hoeflon
E010	Problem in software	Contact Hoeflon
E011	Not used	
E012	Not used	
E013	Not used	
E014	Not used	
E015	Not used	
E016	Not used	
E017	Not used	
E018	Not used	
E019	Not used	
E020	Not used	
E021	Not used	
E022	Not used	
E023	Not used	
E024	Not used	
E025	Not used	
E026	Not used	
E027	Not used	
E028	Crane is not supported properly by outriggers	Set outriggers again
E029	Not used	
E030	Not used	
E031	Not used	
E032	Not used	
E033	Not used	
E034	Not used	
E035	Not used	
E036	Not used	
E037	Not used	
E038	Not used	
E039	Not used	
E040	Not used	
E041	Not used	
E042	Not used	
E043	Not used	
E044	Not used	
E045	Not used	
E046	Not used	
E047	Not used	
E048	Not used	
E049	Not used	
E050	Not used	
E051	Not used	
E052	Not used	
E053	Not used	
E054	Not used	
E055	Not used	
E056	Not used	
E057	Not used	
E058	Not used	
E059	Problem with connection	Contact Hoeflon or your dealer
E060	Problem with connection	Contact Hoeflon or your dealer
E061	Problem with connection	Contact Hoeflon or your dealer
E062	Not used	

Fault code	Problem	Possible solution. If this does not work, contact Hoeflon.
E063	Not used	
E064	Not used	
E065	Not used	
E066	Problem with connection	Switch machine off and on again.
E067	Problem with connection	Switch machine off and on again.
E068	Not used	
E069	Not used	
E070	Problem with connection	Switch machine off and on again.
E071	Problem with connection	Switch machine off and on again.
E072	Not used	
E073	Not used	
E074	Problem with connection	Switch machine off and on again.
E075	Problem with connection	Switch machine off and on again.
E076	Not used	
E077	Not used	
E078	No contact with left-front angle sensor	Switch machine off and on again.
E079	Incorrect value left-front angle sensor	Switch machine off and on again.
E080	Incorrect value left-front angle sensor	Switch machine off and on again.
E081	Problem left front	Contact Hoeflon or your dealer.
E082	Problem left-front length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E083	Problem left-front length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E084	Not used	
E085	No contact with right-front angle sensor	Switch machine off and on again.
E086	Incorrect value right-front angle sensor	Switch machine off and on again.
E087	Incorrect value right-front angle sensor	Switch machine off and on again.
E088	Problem right front	Contact Hoeflon or your dealer.
E089	Problem right-front length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E090	Problem right-front length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E091	Not used	
E092	No contact with right-rear angle sensor	Switch machine off and on again.
E093	Incorrect value right-rear angle sensor.	Switch machine off and on again.
E094	Incorrect value right-rear angle sensor.	Switch machine off and on again.
E095	Problem right front	Contact Hoeflon or your dealer.
E096	Problem right-rear length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E097	Problem right-rear length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E098	Not used	
E099	No contact with left-rear angle sensor	Switch machine off and on again.
E100	Incorrect value left-rear angle sensor	Switch machine off and on again.
E101	Incorrect value left-rear angle sensor	Switch machine off and on again.
E102	Problem right front	Contact Hoeflon or your dealer.
E103	Problem left-rear length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E104	Problem left-rear length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E105	Not used	
E106	No contact with jib angle sensor	Switch machine off and on again.
E107	Incorrect value jib angle sensor	Switch machine off and on again.
E108	Incorrect value jib length sensor	Activate the bypass and extend farther. The fault code disappears. Switch the bypass off.
E109	Not used	
E110	No contact with boom angle sensor	Switch machine off and on again.
E111	Incorrect value boom angle sensor	Switch machine off and on again.
E112	Not used	
E113	No contact with pressure sensor boom lift cylinder	Switch machine off and on again.
E114	No contact with pressure sensor boom lift cylinder	Switch machine off and on again.
E115	Not used	
E116	No contact with bin angle sensor	Switch machine off and on again.

Fault code	Problem	Possible solution. If this does not work, contact Hoeflon.
E117	Incorrect value bin angle sensor	Switch machine off and on again.
E118	Incorrect value bin dummy sensor	Check whether dummy plug is connected correctly
E119	Not used	
E120	No contact with boom rotation sensor	Switch machine off and on again.
E121	Incorrect value boom rotation sensor	Switch machine off and on again.
E122	Incorrect value boom rotation sensor	Switch machine off and on again.
E123	Not used	
E124	Low oil pressure in Yanmar engine	Check engine oil level
E125	Engine temperature too high	Check coolant level
E126	Alternator not charging	Check alternator
E127	Not used	
E128	Not used	
E129	Not used	
E130	Not used	
E131	Ballast is crooked	Slide ballast in and out
E132	Ballast is crooked	Slide ballast in and out
E133	Ballast is crooked	Slide ballast in and out
E134	Not used	
E135	Oil pressure winch sensor out of range	Contact Hoeflon or your dealer
E136	No contact with pressure sensor	Switch machine off and on again.
E137	Incorrect value pressure sensor	Switch machine off and on again.
E138	Pressure too high	Wind out winch cable, reduce lifting weight
E139	Problem in winch switch	Winch cable can only be wound out
E140	Problem in winch switch	Winch cable can only be wound up
E141	Not used	
E142	Not used	
E143	Not used	
E144	Not used	
E145	Not used	
E146	Not used	
E147	Not used	
E148	No contact with level sensor	Switch machine off and on again.
E149	Unequal value level sensor	Switch machine off and on again.
E150	Not used	
E151	Not used	
E142	Maintenance (minor service)	Contact Hoeflon or your dealer
E153	Maintenance (major service)	Contact Hoeflon or your dealer
E154	Maintenance	Contact Hoeflon or your dealer

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!

Drive the compact crane backwards onto a trailer (ballast first) and forwards off of it.

WARNING!

The clearance angle of the loading ramps must not exceed 15 degrees.

WARNING!

When transporting the compact crane, make sure the crane is in transport mode and that any load is removed: No load on the hook and the boom down.

- Make sure the crane is in the transport position.
- 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 angle with the ground is less than 15°.
- 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 motor/engine as described in section 6.4.
- Set the switch on the electrical cabinet to position '0'.

- Secure the machine by attaching four lashing straps to the machine. Attach two lashing straps to the eye at the bottom of the inner mast (see figure 56) and pull it towards the front (one to left front and one to right front). Attach the other two lashing straps to the eye at the top of the mast (see figure 57) and pull it towards the rear (one to left rear and one to right rear).

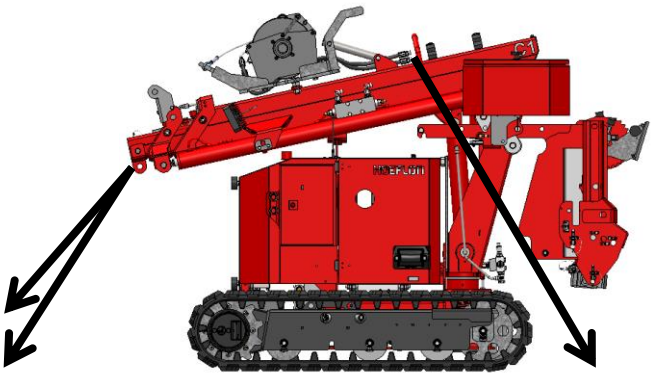


Figure: 56

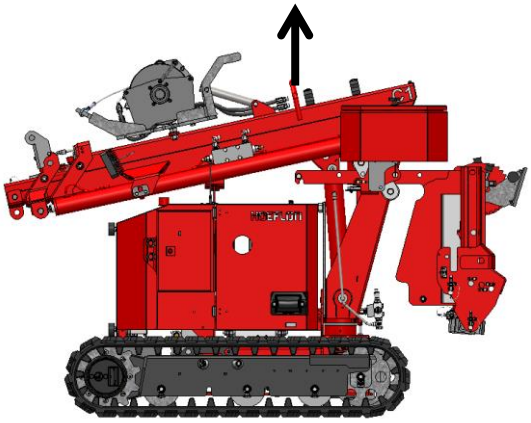


Figure: 57

- Make sure the crane is in the transport position.
- There must not be any load on the compact crane.
- Lift the compact crane using lifting straps or chain slings with a capacity of at least 2000 kg. Fasten these to the lifting point on the boom (*see figure 57*).

8.1.2. Securing

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	Max. 1000 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 track undercarriage can be cleaned with a pressure washer.
- Grease the compact crane in accordance with the lubrication chart in section 7.3.
- 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.
- Disconnect both battery terminals; for the battery version disconnect the main plug from the battery pack.
- 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.
- Check the battery voltage and charge if necessary.
- Connect the battery cables; pay attention to the polarity.
- Perform the daily inspection.

CAUTION!

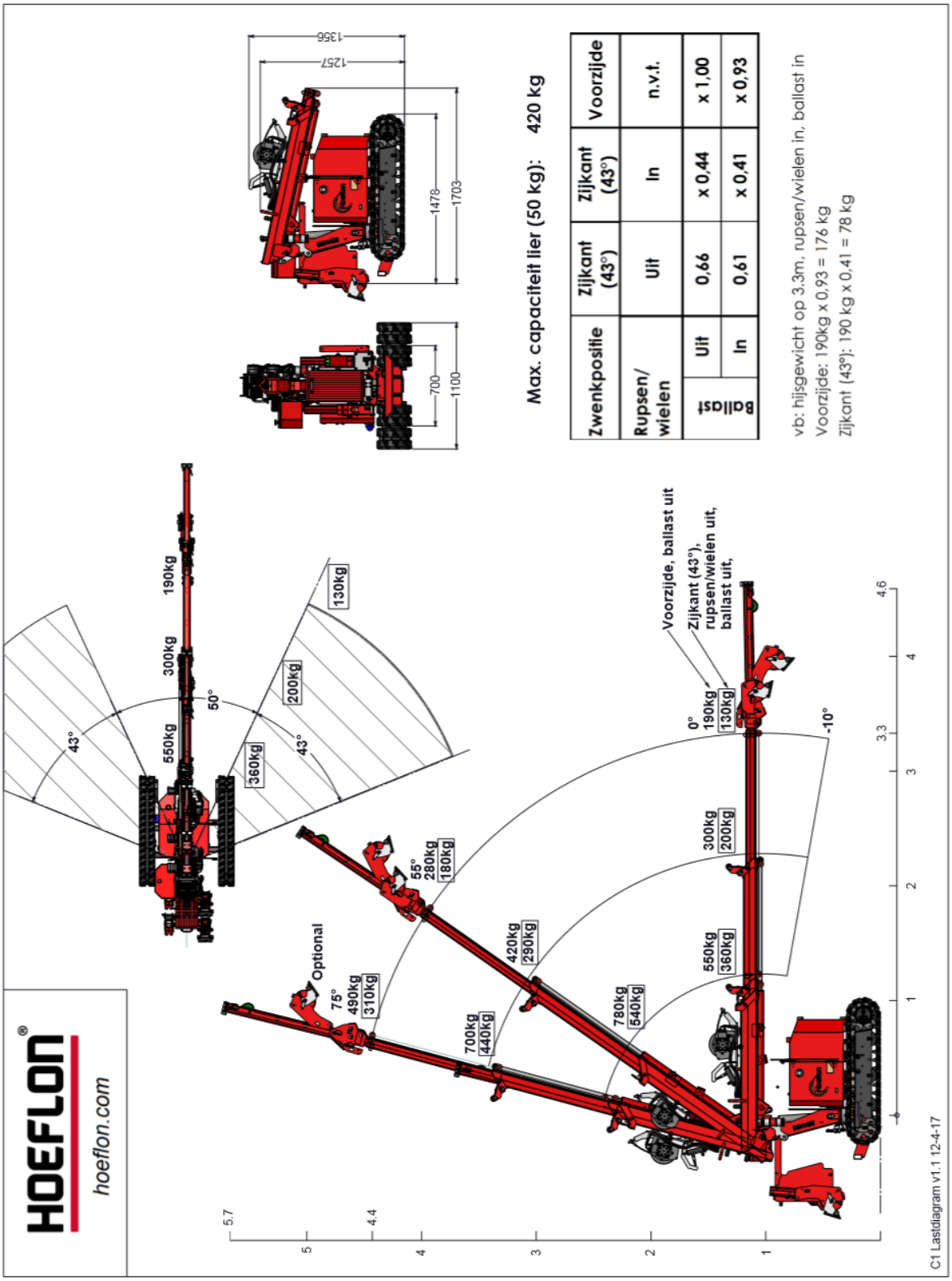
If the compact crane will be placed in storage for more than six months, contact Hoeflon International B.V. for the procedure to be followed.

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.

9. ANNEXES

9.1. Load table C1



9.2. EC Declaration