Valid for models:

PM 14021 E
PM 14022 E - PM 14022 E LC
PM 14023 E - PM 14023 E LC
PM 14024 E - PM 14024 E LC
PM 14025 E

Original instructions in English

SERIE 14 E

- GA88 -

INSTRUCTION AND WARNINGS

Valid with the serial number

G.A88.0001

Code number: **4.150.652**
Edition: **05/2010**

Realised by **Unistudio** - Modena

1 General information

1.1 - Purpose of the manual

The instructions manual contains information which is essential for the correct use of the crane (1) (hereinafter also referred to as the machine).

Its purpose is to inform the operator (2) of the instructions to follow and the fundamental criteria to apply in all machine use or maintenance operations.

Before starting up the machine for the first time, the operator must have read and understood the instructions contained in this manual, in particular those highlighted with the various symbols.

The manual is an integral part of the machine and must always be kept with it for future reference until it is scrapped.

If the machine is resold, the seller is bound to provide the new owner with the manual.

The information contained herein is arranged in chapters, in a sequential order according to subject matter.

The indexes, both alphabetic or analytic, allow the user to refer to the different subjects quickly and easily.

The original information is supplied by the manufacturer in English language.

In order to comply with legal and commercial requirements, original information can be translated into other languages.

It is strictly forbidden to use the manual for anything other than the machine's use and maintenance.

1.2 - Manufacturer's details and machine identification data

- Manufacturer's details

PM Group S.p.A.
Via Verdi, 22
41018 San Cesario sul Panaro - Modena (Italy)
tel. +39 059 936811
fax. + 39 059 936800
e-mail: info@pm-group.eu

(1) The term "crane" refers to the trade name given to the machine (from the crane series) stated on the title page.

(2) The term "operator(s)" refers to the person(s) possessing the necessary expertise to use, inspect and carry out routine maintenance on the machine.

01-GB-A1-192LF

- Machine identification data

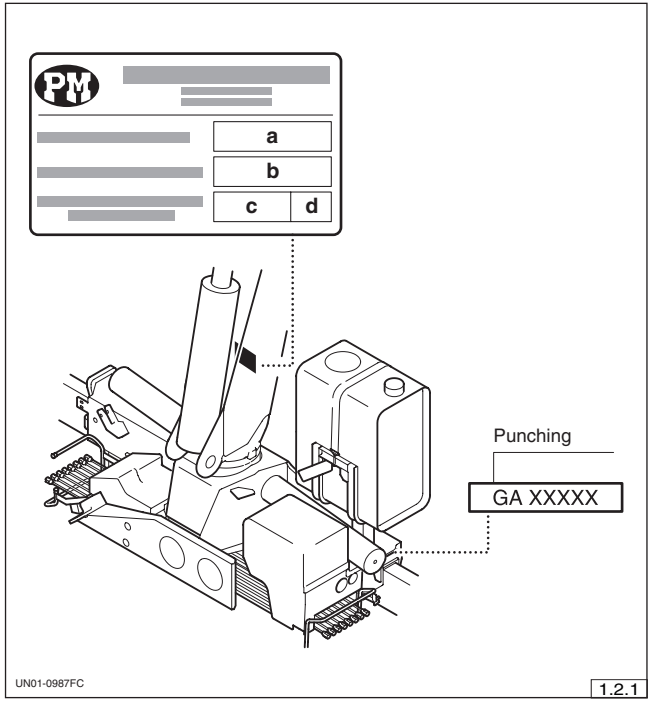


Plate details

a = Crane model
b = Serial number
c = Year of manufacture
d = “CE” stamp

1.3 - Symbology

HAZARD !

This indicates information or procedures which, if not complied with exactly, cause death or serious injuries.

WARNING

This indicates information or procedures which, if not complied with exactly, could cause death or serious injuries.

CAUTION !

This indicates information or procedures which, if not complied with exactly, could cause slight injuries or damage to the machine.

Information

This indicates useful and important information or procedures.

WARNING !

For the sake of clarity when outlining procedures to carry out, some illustrations show the machine with the guards, casings or panels removed.
Never use the machine without all the casings and guards in place.

1.4 - Technical service

Technical service requests must be addressed to the manufacturer's Technical Assistance Service (T.A.S.) or to the nearest Authorised Workshop.

1.5 - Enclosed documentation

- "EC" conformity declaration
- Crane guarantee booklet and maintenance programme
- Wireless control instruction manual
- Supplementary crossbeam instruction manual
- Winch instruction manual (if featured)
- Instruction manual for vehicle
- Vehicle guarantee booklet

1.6 - Disclaimer

The manufacturer is relieved of all responsibility in the event of:
- failure to follow the instructions either partly or in full;
- misuse of the machine;
- unauthorised alterations or work carried out on the machine;
- failure to comply with the highway code and regulations concerning transportation when moving the machine from one site to another;
- lack of maintenance;
- use of non-original spare parts or those which are not designed specifically for the model;
- exceptional weather conditions.

2.1 - Description of the crane

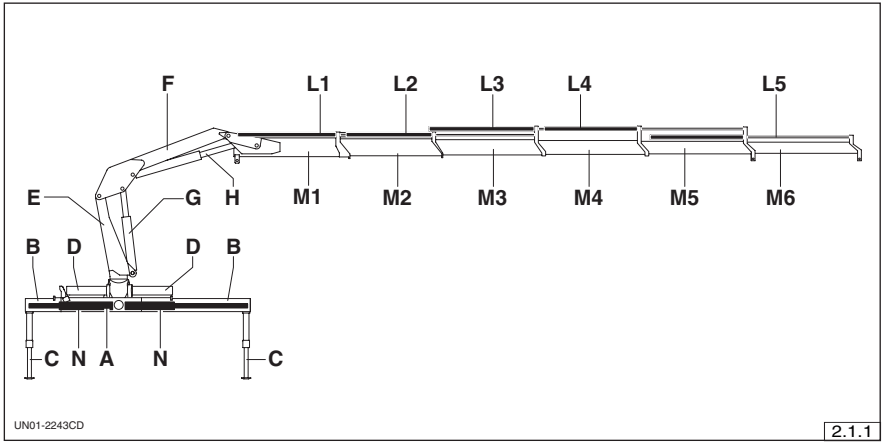
The crane is composed of a base inside which there is a rotating column with a system of articulated arms at its end.

The crane is driven by hydraulic energy generated by a motor and a pump.

This crane series is available in various models, which differ mostly in the number of extendable arms.

There is also the LC version, which has a shorter secondary arm.

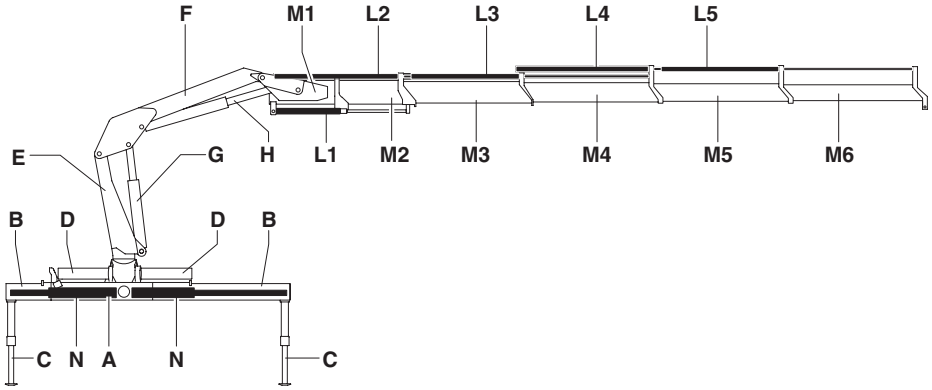
2.1.1 - Basic crane main parts



Key to the main parts

Ref.	Part	14021 E	14022 E	14023 E	14024 E	14025 E
A	Base	•	•	•	•	•
B	Stabiliser arm	•	•	•	•	•
C	Stabiliser jack	•	•	•	•	•
D	Rotation jack	•	•	•	•	•
E	Column	•	•	•	•	•
F	Main arm	•	•	•	•	•
G	Main jack	•	•	•	•	•
H	Secondary jack	•	•	•	•	•
L1	1st arm extension jack	•	•	•	•	•
L2	2nd arm extension jack		•	•	•	•
L3	3rd arm extension jack			•	•	•
L4	4th arm extension jack				•	•
L5	5th arm extension jack					•
M1	Secondary arm	•	•	•	•	•
M2	1st hydraulic extension arm	•	•	•	•	•
M3	2nd hydraulic extension arm		•	•	•	•
M4	3rd hydraulic extension arm			•	•	•
M5	4th hydraulic extension arm				•	•
M6	5th hydraulic extension arm					•
N	Stabiliser arm extension jack	•	•	•	•	•

2.1.2 - Basic crane LC main parts



UN01-2244CD

2.1.2

Key to the basic crane LC main parts

Ref.	Part	14022 E LC	14023 E LC	14024 E LC
A	Base	•	•	•
B	Stabiliser arm	•	•	•
C	Stabiliser jack	•	•	•
D	Rotation jack	•	•	•
E	Column	•	•	•
F	Main arm	•	•	•
G	Main jack	•	•	•
H	Secondary jack	•	•	•
L1	Secondary arm extension jack	•	•	•

Ref.	Part	14022 E LC	14023 E LC	14024 E LC
L2	1st arm extension jack	•	•	•
L3	2nd arm extension jack	•	•	•
L4	3rd arm extension jack		•	•
L5	4th arm extension jack			•
M1	Cover	•	•	•
M2	Secondary arm	•	•	•
M3	1st hydraulic extension arm	•	•	•
M4	2nd hydraulic extension arm	•	•	•
M5	3rd hydraulic extension arm		•	•
M6	4th hydraulic extension arm			•
N	Stabiliser arm extension jack	•	•	•

2.2 - Conditions of use

2.2.1 - Designated use

The crane is designed for the vertical lifting, handling and positioning of free loads (3), in compliance with the values given in the capacities diagram and handling speeds not exceeding the maximum prescribed limits (see specifications).
The cranes are designed in compliance with harmonised standard EN 12999, class H1-B3, which provides for non-continuous use, with a hook, for a maximum of 400 lifting cycles per week and a load equalling 3/4 of the load indicated in the relative diagram.
To use the machine with loads other than those for which it is designed, it is the user's responsibility to first contact an authorised workshop to check whether a downgrade is necessary.

2.2.2 - Inadmissible uses

It is forbidden to use the machine in areas where there is a risk of fires or explosions.
It is forbidden to use the crane to pull out poles, uproot trees and lift fixed loads.
It is forbidden to use the machine to lift people, with the exception of cases in which the crane is fitted with a specially designed operator's platform approved by the manufacturer.
It is forbidden to use the crane with fixed load-hoisting accessories such as hooks, bucket, grabs etc unless the accessories are authorised by the manufacturer.
It is forbidden to use the machine as a recovery means for towing broken-down vehicles.
It is forbidden to drag or push loads.
Before performing a rotation manoeuvre, the load must be lifted off the ground.
It is forbidden to lift the base truck with the stabilisers to change the tyres.
It is forbidden to lift the base truck with the stabilisers in order to move the vehicle if stuck in areas of loose ground.
It is forbidden to fit removable clamping accessories such as jibs, manual extensions etc if:

- they are not approved by the manufacturer;
- they are not designed specifically for the model in question.

(3) The term "free load" means loads whose movement is not limited.

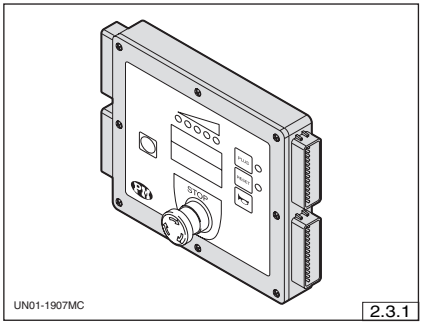
HAZARD !

Never tamper the safety devices.
All seals on safety devices and valves must only be removed in cases of failure foreseen by the manufacturer and must be replaced at an authorised service centre.
The use of the machine without seals and with by-passed safety devices is forbidden.

Information

The safety devices on the accessories are outlined in the paragraph describing each accessory.

2.3.1 - Functional control unit



UN01-1907MC 2.3.1

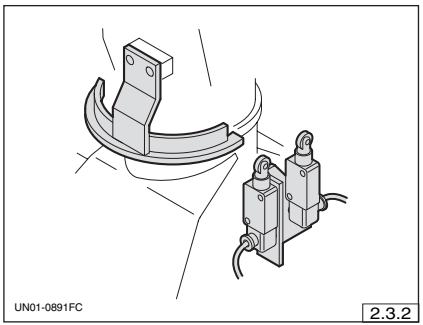
This includes:
- the crane's load limiting device;
- the rotation limiting device.

It controls:
- the thrusting pressure of the main and secondary jack;
- the safety devices' operation;
- it advises the operator of the machine's operation status and any malfunctions.

Information

The presence of the load limiting device does not relieve the operator of the responsibility for ensuring the maximum loads are not intentionally exceeded.

2.3.2 - Rotation locking and limiting device

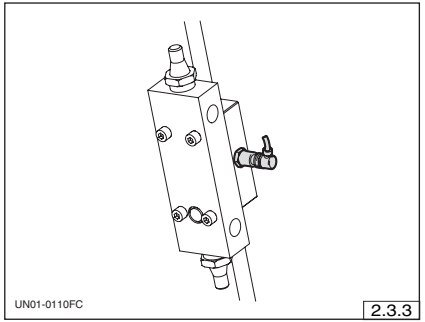


UN01-0891FC 2.3.2

- Rotation limiting device
This device stops the crane rotating when it reaches the area in which the stability, with that particular load, is at risk.
Work may only be carried out in that area if the load is reduced (in relation to the nominal capacity).

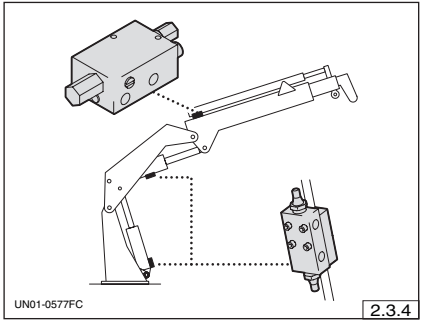
- Rotation lock device
This device prevents the crane being operated in the area where the stability of the outfitting is at risk.

2.3.3 - Pressure sensors



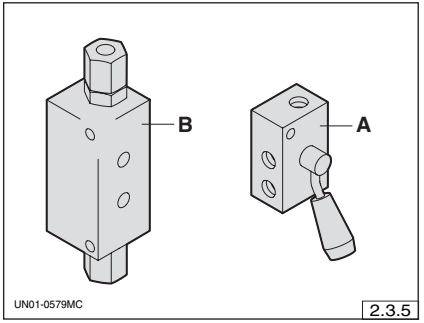
These are located on the load support valves on the secondary jack and the main jack. They signal to the functional control unit to inhibit the handling of loads exceeding the nominal loads to safeguard the machine and maintain the stability of the crane/base truck unit.

2.3.4 - Load support valves



These prevent the loads dropping unexpectedly to the ground as a result of a broken line or a sudden pump failure.

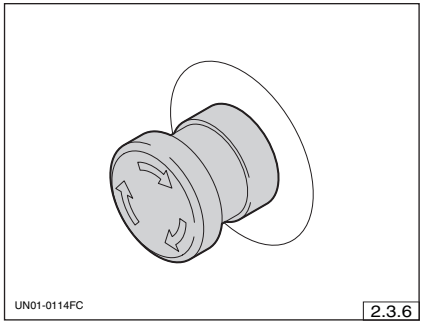
2.3.5 - Stabiliser valve



A - Lock-out valve with cock
B - Lock-out valve

This is fitted on each of the crane's stabiliser jacks.
It locks the stabiliser jack (in the position it is in at that precise moment) in the event of a broken line or that the oil delivered to the jack is suddenly cut off.

2.3.6 - Emergency stop device

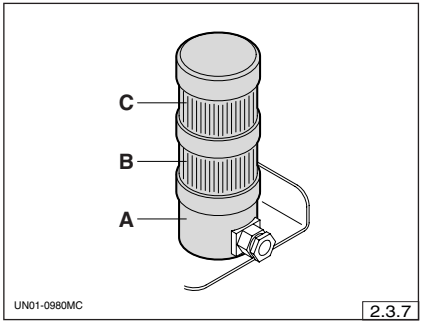


Use the device to stop all the crane's movements in the event of an emergency.
Release the button to activate the crane.

WARNING !

Ensure the hazardous conditions cannot persist before releasing the button.

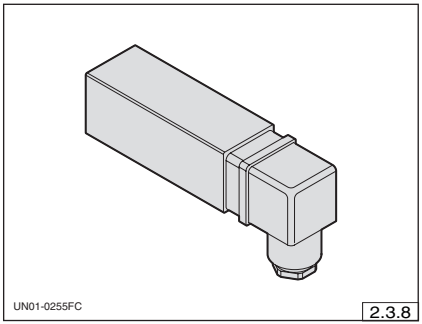
2.3.7 - Signal lamp and buzzer



A - buzzer
B - white light
C - orange light

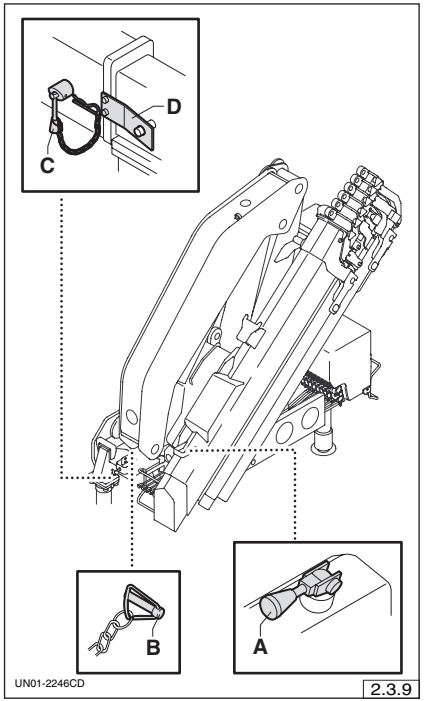
This signals:
- with the buzzer: the lock state as a result of an overload;
- with white light: remote control activation;
- with orange light: 90% of the admissible load limit has been reached.

2.3.8 - Tilt sensor



This signals to the function control unit the angle in relation to horizontal status, in order to enable the controls to move the crane in total safety.

2.3.9 - Safety devices for travelling on public roads



The devices keep the crane within the vehicle's profile when travelling on public roads.

A - anti-extension device for arm pack (LC version only);

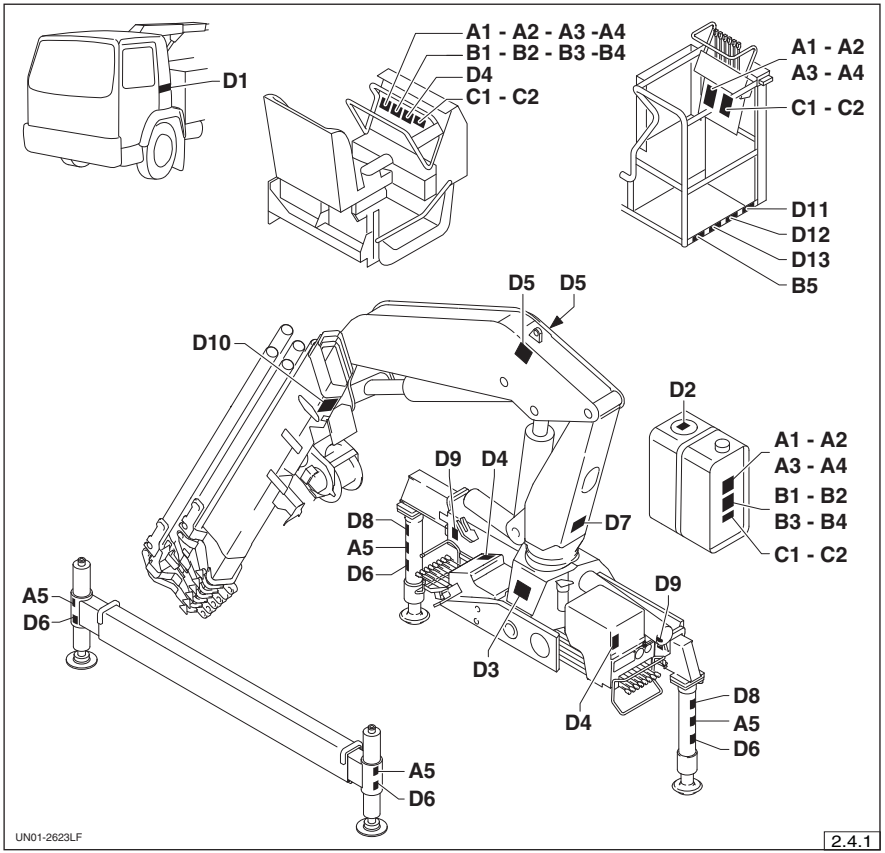
B - anti-rotation device for crane;

C - mechanical device to prevent the accidental extension of the outrigger arms;

D - automatic device to prevent extension of the outriggers (alternative to option "C").

WARNING !

Always comply with the safety recommendations on the plates.
Check that the plates are always present and legible; if not replace them with new ones in the same position.



- Hazards signs

A1 = Risk of electric shocks (*).
Always keep a safe distance from electricity lines.

A2 = Risk from overhanging loads (*).
Take care not to walk or stand under overhanging loads.

A3 = Dangerous manoeuvre signal (*).
Operate the crane so that it opens and closes on the opposite side to the trajectory travelled by the main arm.

A4 = Obstacle risk signal (*).
Watch out for max. admitted heights when travelling on public roads.

(*) Signals grouped together on one plate.

A5 = Risk of crushing.
Lower limbs could be crushed by stabiliser jacks when in use, take care.

- Prohibition signs

B1 = No entry (**).
It is forbidden to both move around and stop in the crane's operating range.

B2 = Prohibited use (**).
It is forbidden for unauthorised persons to use the machine.

B3 = No water jets (**).
It is forbidden to use pressurised water on the electrical components.

B4 = Prohibited use (**).
Use of the machine is prohibited if the stabilisers have not been positioned correctly.

(**) Signals grouped together on one plate.

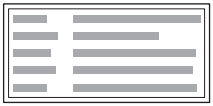
- Obligation signs

C1 = Instruction Manual plate (***).
This indicates that the operator must read the instruction manual carefully before using the machine.

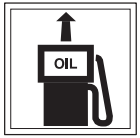
C2 = Individual safety gear plate (***).
This indicates that the user is under obligation to wear the safety helmet when operating the machine.

(***) Signals grouped together on one plate.

- Information signs

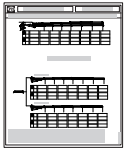


D1 = Power takeoff plate.
Reminds the operator to switch off the power takeoff during transfers.



D2 = Oil tank plate.
Indicates the hydraulic oil tank.

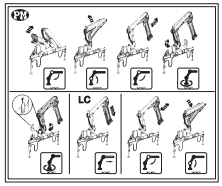
D3 = Dead centre indication plate.
Shows the side at which the crane rotation, both clockwise and anti-clockwise, ends.



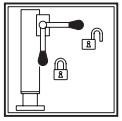
D4 = Capacities diagram plate.
This shows the performance of the machine and accessory when present.

D5 = Hoisting points plate.
Indicates the hoisting hooks attachment points.

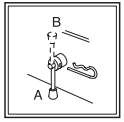
D6 = Max. stabiliser pressure signal.
Make sure the pressure on the ground does not exceed the max. limit stipulated.



D7 = Crane opening/closing plate.
Indicates the order of the actions to set the crane in the working or resting positions.



D8 = Lever position on stabiliser valve plate.
This shows the operator how to position the lever to obtain movement with the jack free or locked.



D9 = Stabiliser mobility plate.
This reminds the operator to lock the stabiliser arm in position with the relative pin.

D10 = Arm mobility signal plate.
Pay attention to locking the arm during transfers (for LC version only).

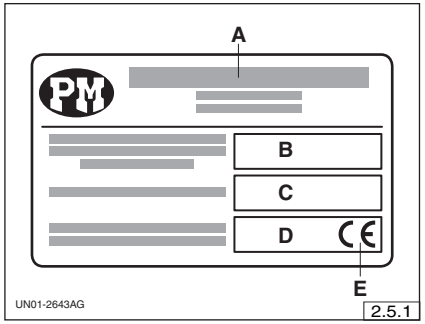
D11 = Max. capacity plate.
This shows the maximum admissible load on the raised control post.

D12 = Manoeuvre signal plate.
Lower the protection before operating the machine.

D13 = Manoeuvre signal plate.
Lower the protection before closing the machine.

2.5.1 - Additional crossmember

- Identification detail



A) Manufacturer code
B) Supplementary crossbeam model
C) Serial number
D) Year of manufacture
E) “CE” conformity marking

- General description

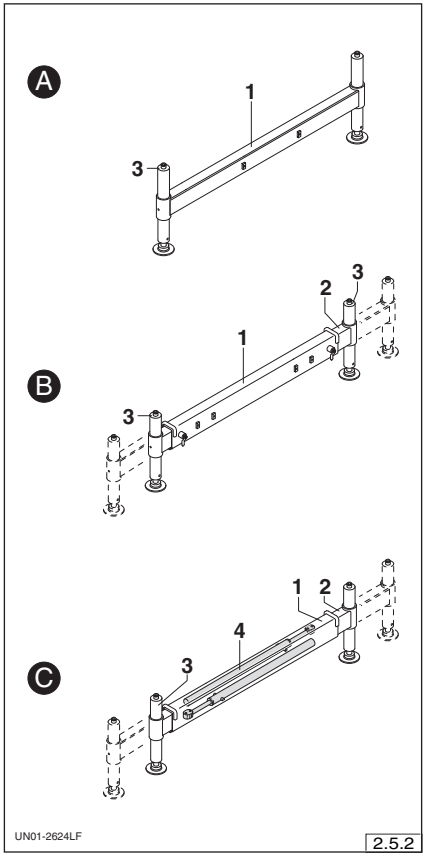
The additional crossmember is only fitted when the crane’s stabiliser jacks alone cannot guarantee the crane/truck unit’s stability.

- Main parts

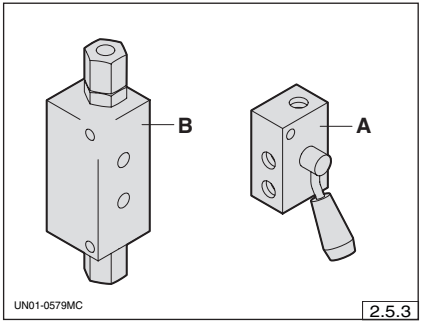
1 - Crossbeam
2 - Extendable stabiliser arm
3 - Stabiliser jack
4 - Stabiliser arms extension jack

- Installable crossbeams

A - Fixed crossbeam
B - Crossbeam with manually extended outriggers
C - Crossbeam with hydraulically extended outriggers



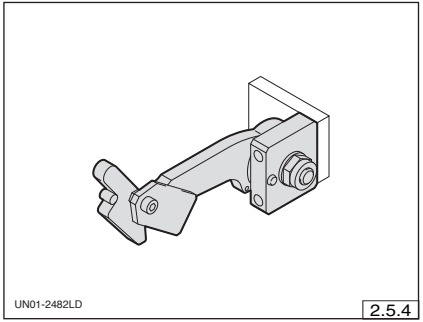
Stabiliser valve



A - Lock-out valve with cock
B - Lock-out valve

This is fitted on each of the stabiliser jacks.
It locks the stabiliser jack (in the position it is in at that precise moment) in the event of a broken line or that the oil delivered to the jack is suddenly cut off.

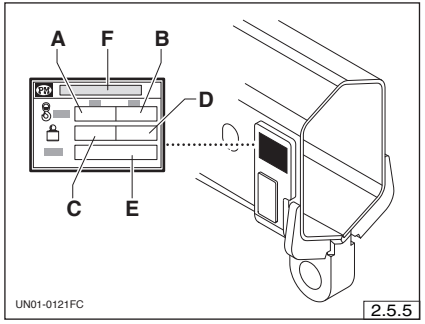
Safety devices for travelling on public roads



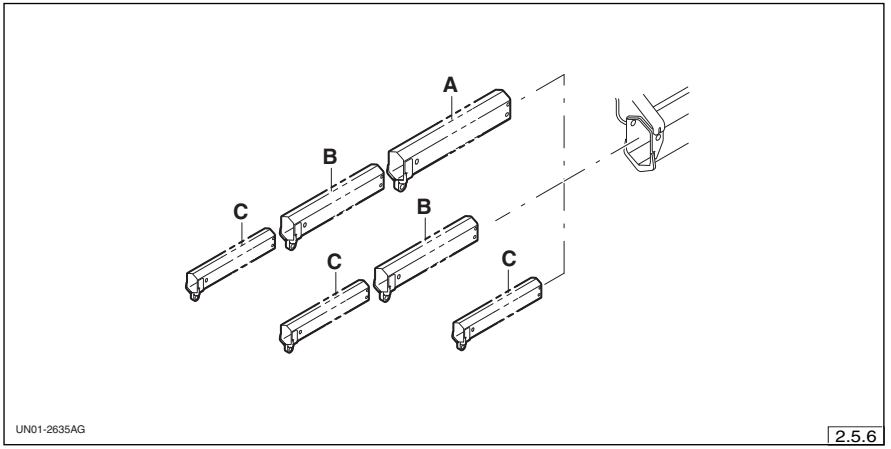
These prevent the supplementary arms extending accidentally when the vehicle is in transit.
They must be manually disconnected before extending the outrigger arms; closure is automatic once the arms are retracted.

2.5.2 - Manual extensions

- Identification details



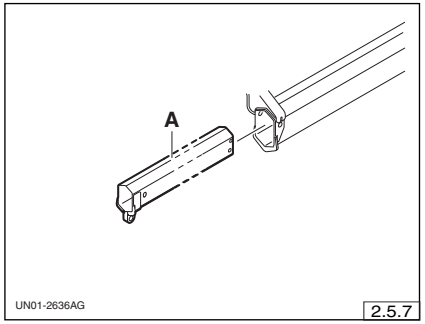
A) Max. admissible design capacity (kg)
B) Max. admissible design capacity (lbs)
C) Extension weight (kg)
D) Extension weight (lbs)
E) Identification code
F) Manufacturer



Manual extensions on basic machine

Pos.			Basic machine model			Weight kg (lbs)
	14021 E	14022 E	14023 E	14024 E	14025 E	
A	/	/	•			65 (143)
B	/	/	•	•		40 (88)
C	/	/	•	•	•	35 (77)

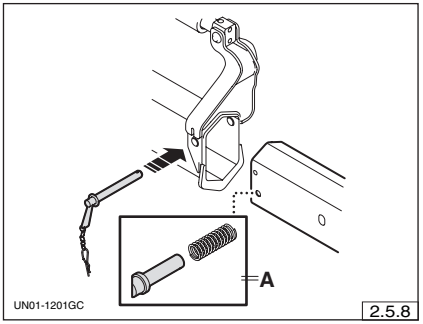
Manual extensions on jib



Pos.	Weight kg (lbs)	Model of the jib
		J 12
A	20 (44)	•

- Safety devices

Safety pin

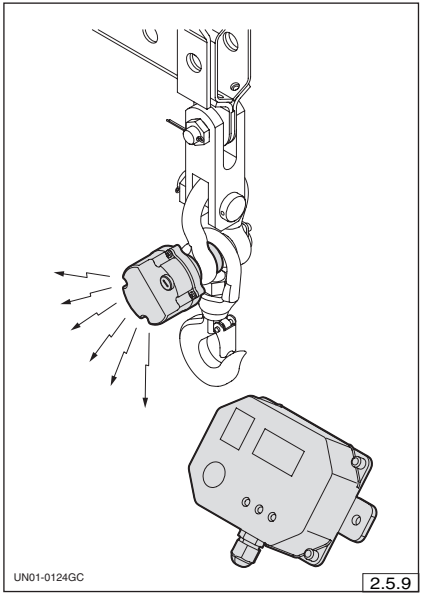


Device “A” prevents the extension dropping to the ground accidentally during its extension.

WARNING !

The device is not scaled to withstand hoisting loads, therefore each extension must be locked in position (extended or retracted) with the relative safety pin.

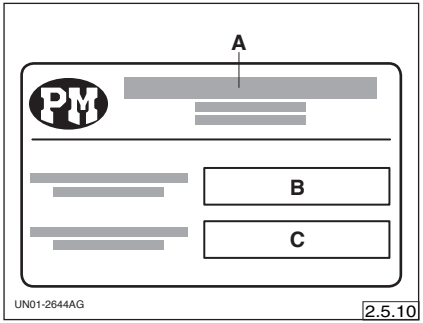
Manual extension load limiting device (available on request)



This prevents manual extension overloading (see “Use of the load limiter for manual extensions”).

2.5.3 - Jibs

- Identification details



A) Manufacturer code
B) Jib model
C) Serial number

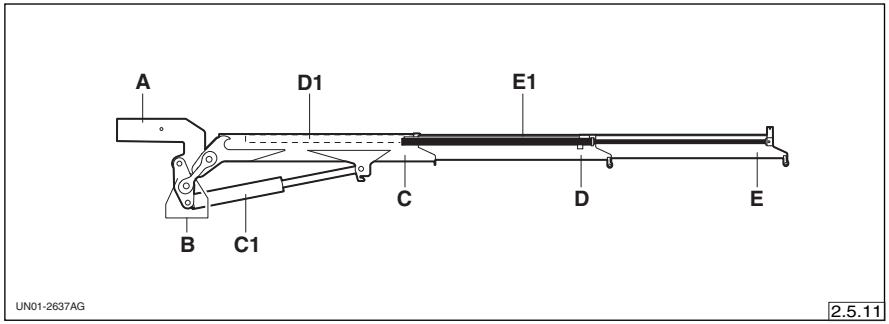
- General description

The jib is fitted on the crane's last hydraulic extension arm for the purposes of placing loads whose positioning requires both depth and height.

- Jibs that can be fitted

Crane model	J 12
14023 E	•

- Main parts



Pesi

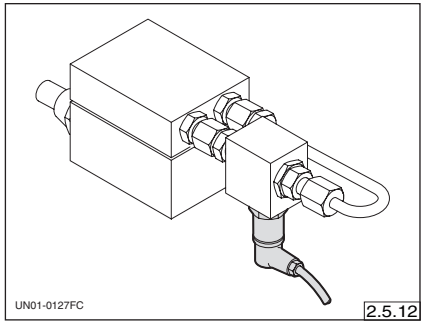
Model of the jib	Weight kg (lbs)
J 12	300 (661)

Key to main parts

Pos.	Part	J 12
A	Tooth	•
B	Connecting rods	•
C	Articulated arm	•
C1	Articulation jack	•
D	First arm hydraulic extension	•
D1	First arm extension jack	•
E	Second arm hydraulic extension	•
E1	Second arm extension jack	•

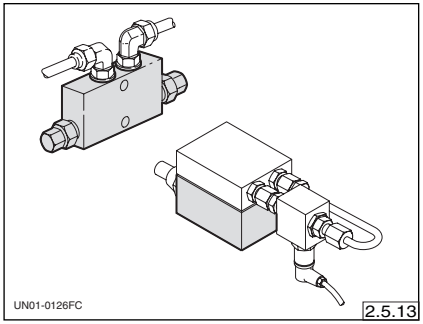
- Safety devices

Pressure sensor



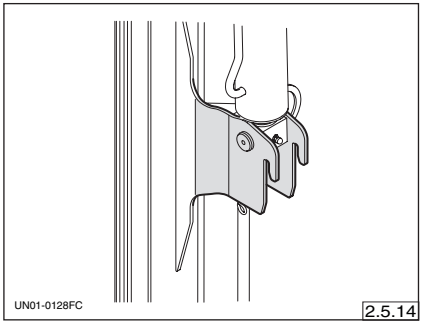
These signal to the functional control unit to inhibit the handling of loads exceeding the nominal loads.

Load support valves



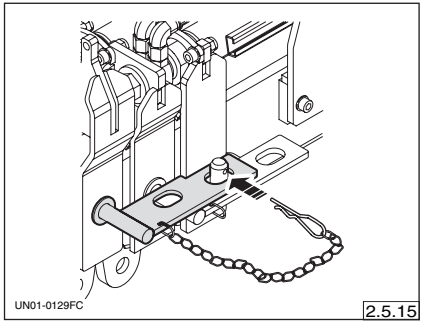
They stop the load from falling to the ground due to the rupture of a pipe or if there is sudden failure in the flow of oil to the jack.

Clamping device for jib in the resting position



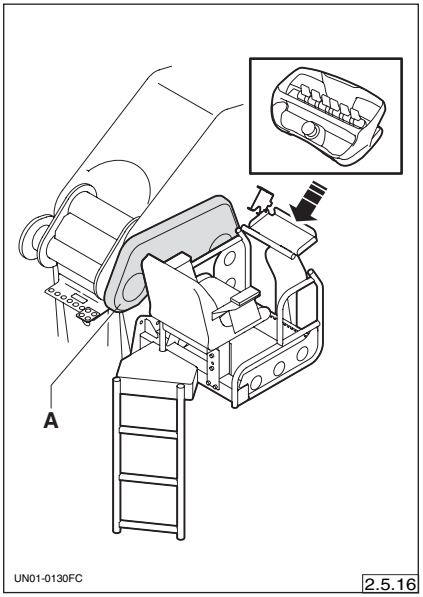
This prevents the jib arm pack swinging dangerously when the vehicle is moving.

Anti-extension device for jib arms



This prevents the jib arms extending accidentally when the vehicle is in transit.

2.5.4 - Overhead manoeuvring post



- Guards

A - Anti-cutting guard

- Safety regulations

Access to the seat in the overhead manoeuvring post is only permitted via the ladder provided for the purpose.
Place the radio control on its stand.

- Access to the top control position

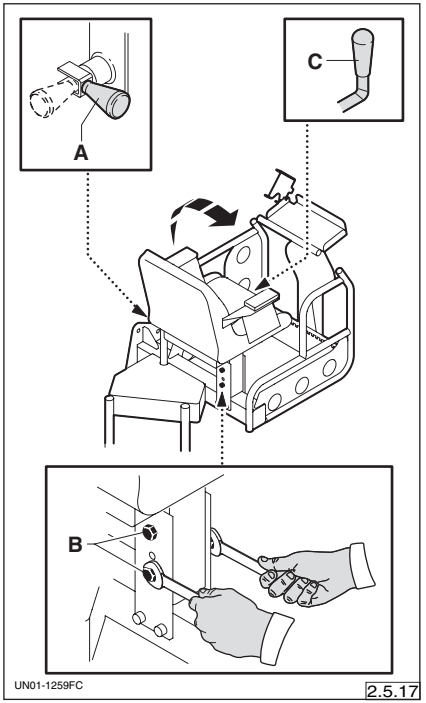
WARNING !

Use the special ladder to reach the control positions.
Do not hold onto controls or flexible piping but use the special handles and handrails foreseen for this purpose.
Always keep the control position and access ladders free from oil, mud, grease, snow and ice.

1 - The control position must be accessed from behind seat.
Release lever “A” and turn the seat.
2 - Turn the seat into working position and lock it with lever “A”.

Before operating the machine adjust the seat for maximum personal comfort and better control of the crane.

- Adjust seat height by moving screws “B” into the holes positioned at different heights and at the same time move the seat.
- Adjust the seat horizontally using lever “C” and check that it remains locked in the selected position.

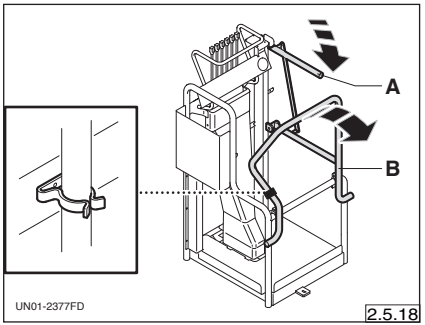


UN01-1259FC 2.5.17

2.5.5 - Raised control station

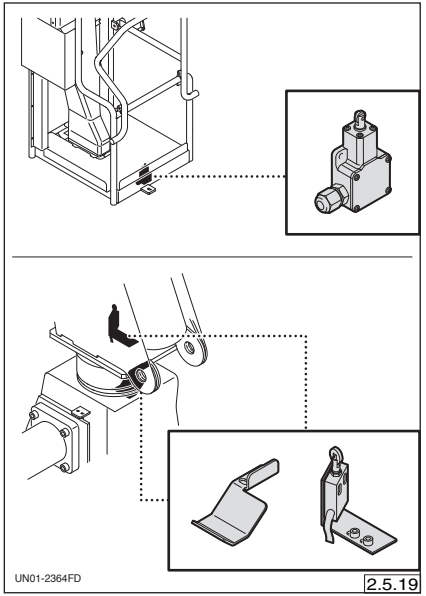
WARNING !

Always respect the maximum load capacity of the raised control station (see "Specifications").
Always keep the floor and handles of the raised control station clean and free from obstacles to avoid slipping or tripping over.



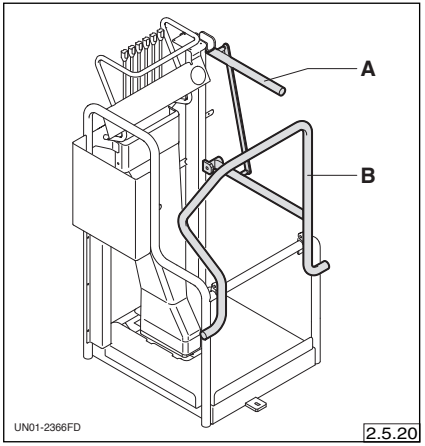
To control the machine from the raised control station:
1 - lift protection "A" and get on the station;
2 - lower protection "A" and lock protection "B".

- Rotation locking device



This device prevents the use of the machine in the work area above the raised control station when the operator is present.

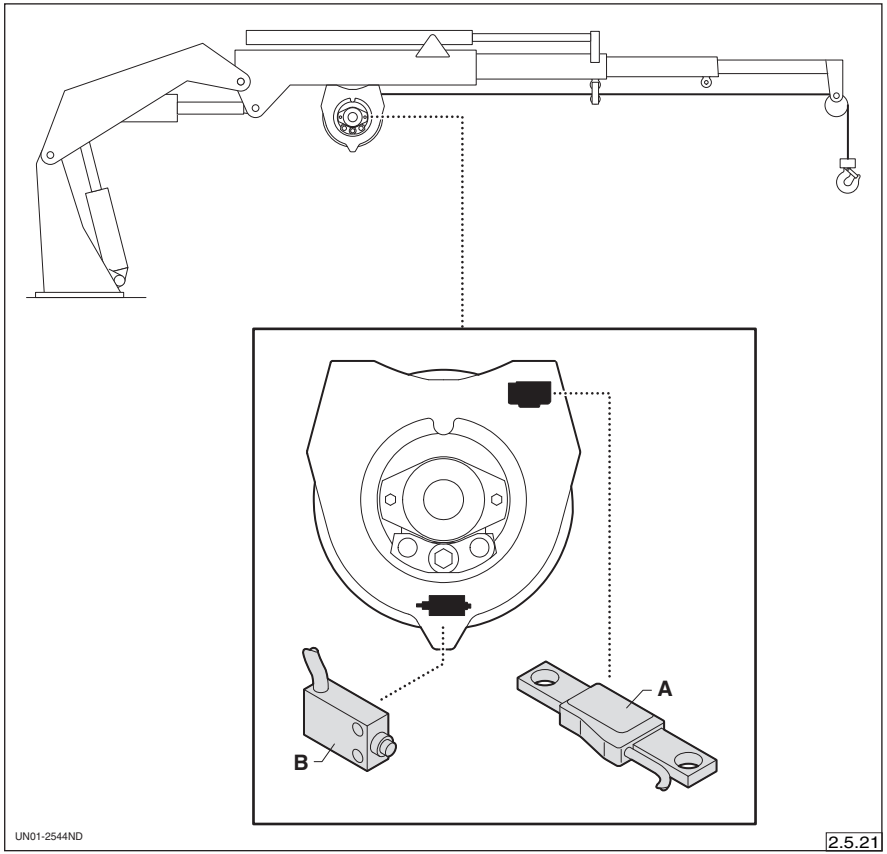
- Raised control station fall protection barriers



A - side fall protection device
B - rear fall protection device

They prevent the operator from falling from the raised control station.

2.5.6 - Winch (optional)



The winch is composed of a drum, driven by a hydraulic motor, around which the load lifting cable is wound.
At the end of the last extendable arm there is a lifting tackle fitted.

- Safety devices

A - Overload sensor
It stops the machine when:
a) the load exceeds the permitted maximum;
b) the lower block reaches the upper stroke limit.

B - Downwards stroke limit
This stops the load's downwards stroke to prevent the cable around the drum being completely unwound.

Information

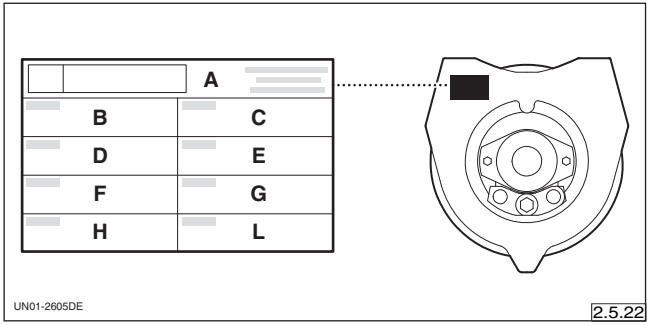
The operator shall be responsible for intentionally exceeding the maximum load permitted (see section on "Load diagram") even if the winch load limiter is installed.

- Specifications

Winch model ..... Dinamic Oil P15/E

Cable diameter ..... ø mm 10 ....in. 0,39”
Minimum cable breaking load ..... kN 95,4 .....lbs 21447
Maximum cable length..... m 50.....ft 164
Maximum cable pull
load (last layer) ..... kN 19,5 .....lbs 4384
Maximum cable pull
load (first layer)..... kN 24 .....lbs 5395
Maximum cable speed ..... m/min 30....ft/min. 170
Mass without cable ..... kg 79.....lbs 174
Mass with cable ..... kg 102.....lbs 225
Mechanism class according to
UNI ISO 4301/1 .....M3

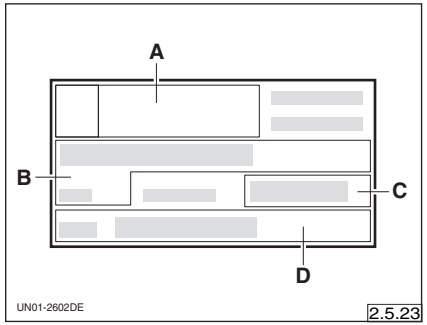
- Identification details



A) Manufacturer
B) Model
C) Code
D) Serial number
E) Year of manufacture
F) Maximum oil flow
G) Maximum speed
H) Maximum pull
L) Maximum pressure

- Lifting tackle

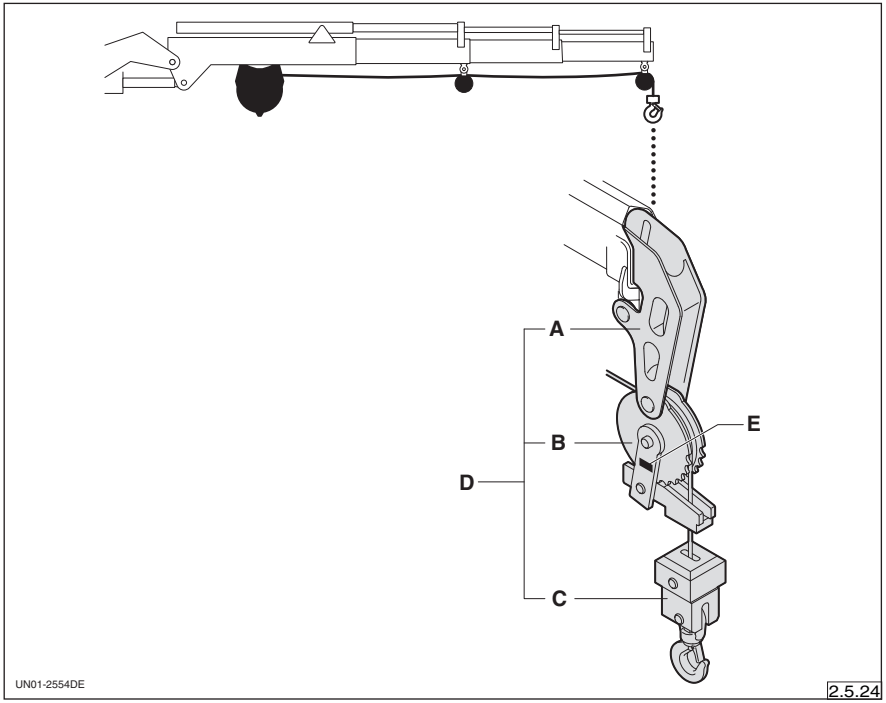
- Identification details



The tackle is composed of a system of pulleys located at the end of the last arm.

A - Builder
B - Tackle type
C - Serial number
D - Code

- Tackle types for each crane



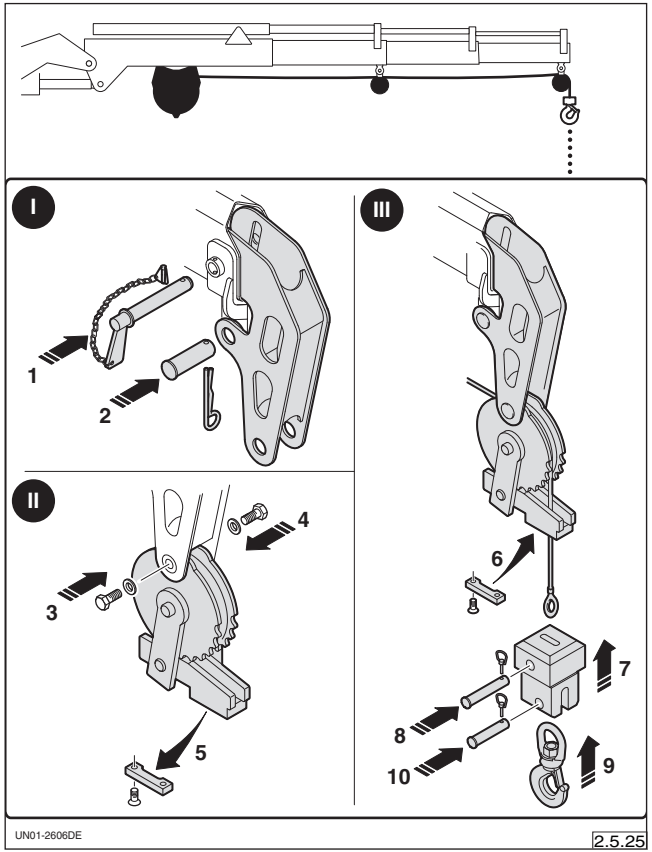
A - Arm
B - Upper block
C - Counterweight
D - Complete tackle for direct pull
E - Identification plate

Weights

Part - kg (lbs)			
A	**B**	**C**	**D**
20 (44)	28 (62)	18 (40)	66 (145)

- Tackle installation and removal

To install the tackle follow the number sequence showed in the figure.

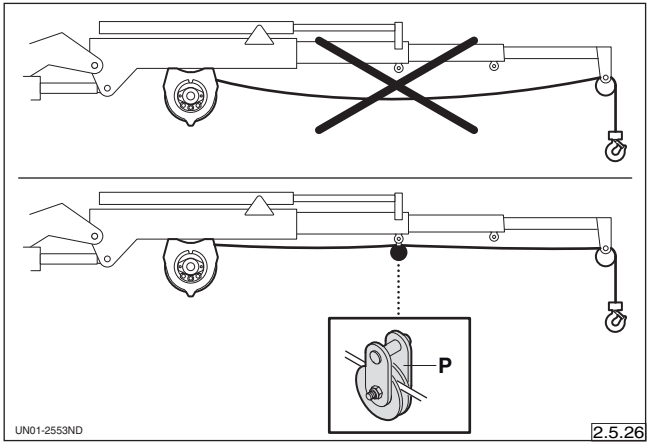


To remove the tackle follow the sequence in reverse order.

- Use of the winch

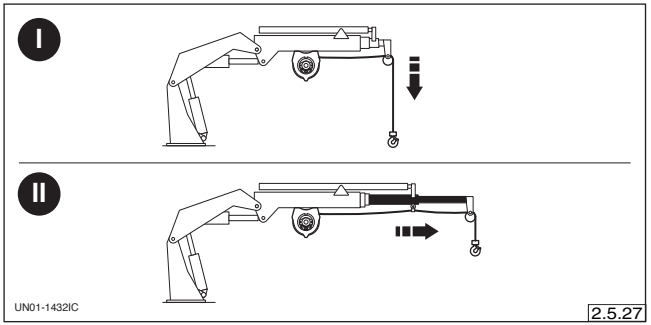
CAUTION !

The section of cable between the winch and the block must remain in contact with the arms. Always fit the intermediate guide pulley "P" on the special coupling on the end of the 1st hydraulic extension arm.



HAZARD !

It is forbidden to lift objects at an angle.



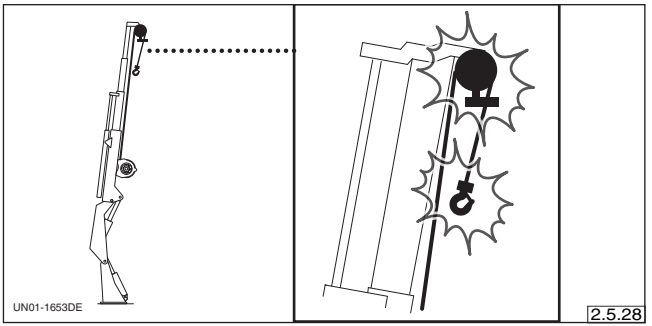
To prevent further damage to the cable, the hook must be lowered before the arm is extended.

CAUTION !

Do not use the winch when the secondary arm is retracted inside the LC sheath because the cable may not wind itself correctly round the winch drum.

CAUTION !

Remove the lifting tackle (fig. 2.5.25) before closing the crane in resting position (folded behind the cab or lying down on the pile holder). Do not operate the vehicle when tackle is installed.



When the arms are vertically tilted contact must be avoided between the arms and the upper block and counterweight to avoid damaging the machine.

2.6 - Noise level

Tests carried out have measured a sound pressure level below 70 Db(A).
The tests have been carried out without considering the power source (vehicle's engine) as it is not part of the supply.
The installer should ask the truck's manufacturer for information about the noise level and transfer the said information to the operator.

2.7 - Vibrations

Vibration effects on the operator are considered not significant as the machine is used for short periods of time.

2.8 - Gas emissions

- Gases produced by the combustion of the fuel used by the truck endothermic engine.
- Fuel vapours emitted during refuelling.

2.9 - Electromagnetic compatibility

All the machine's components which are subject to the Directive on electromagnetic compatibility comply with the said directive.

2.10 - Residual dangers

Dangers of a mechanical nature.
Contact with the articulated parts of the machine could result in limbs being crushed or lacerated.

Dangers of thermal nature.
Contact with the machine's hot parts could result in burns.

Fire hazard.
Fuel leaking from the tank, during use or when refilling, can create a fire hazard.

Risk of fluid ejection at high pressure.
The breakage of a pipe or blow-by under oil pressure could create risk of lesions and skin infections.

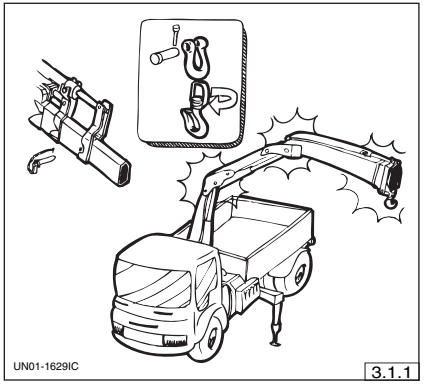
Risk of slipping and falling.
Oil, grease, snow and ice on the entrance steps of the maneuvering stations and on the work platform floor can cause the operator to slip and fall.

3 Safety

3.1 - Safety regulations

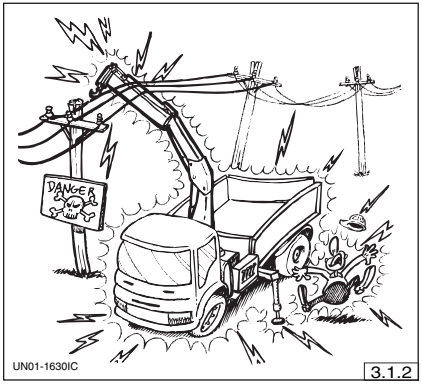
WARNING !

Read the instructions contained in this manual carefully, in particular those concerning safety and the signs affixed to the machine.



Before operating the crane

- Check the degree of wear of the accessories' lock pins;
- make sure the hook is fitted with a nut and that it rotates freely without excess play;
- make sure the hook is fitted with the safety device to prevent cables being released accidentally and that the said safety device is intact;
- carefully check the load harnesses and the chains, cables and straps are in good condition and that they are suitable for the load to be lifted;
- make sure the hoses are in good condition and that no oil leaks are present.



HAZARD !

Do not operate the machine in the vicinity of power lines.

To operate the crane in the vicinity of power lines, always refer to your superiors or the competent authority for special instructions.
Obtain clear instructions regarding the way in which the work must be carried out. Said procedures must be studied for each particular situation and complied with exactly.
When carrying out maintenance work on power lines, you are advised to connect the metal parts on the vehicle to the earth, observing the relative regulations in force.

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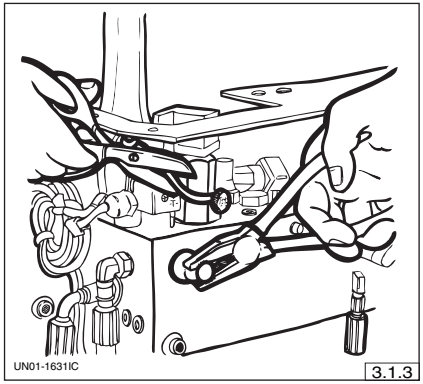
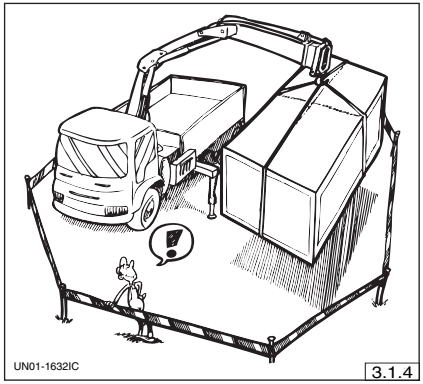


WARNING !

Do not remove the lead seals on the valves.

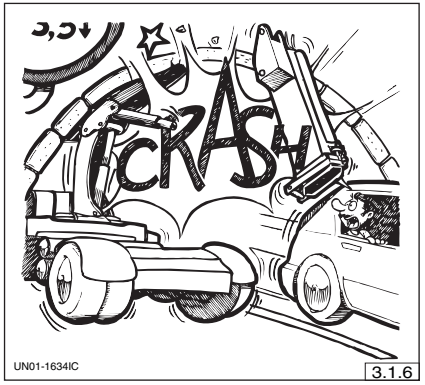


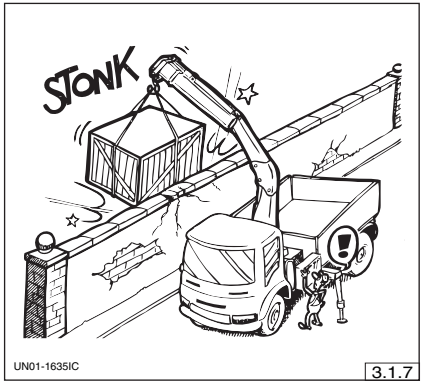
Cordon off the work area to prevent access by unauthorised persons.
The operator must ensure no-one stops or moves around in the work area.

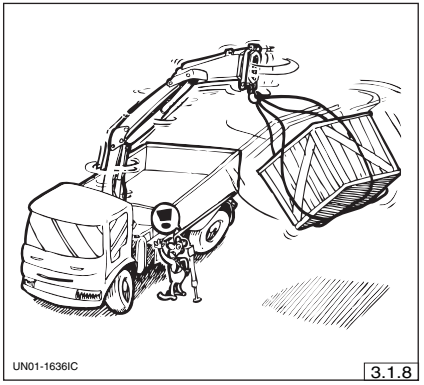
HAZARD !

It is strictly forbidden to move the load over the vehicle's manoeuvring area.

When this is unavoidable, operate the machine using the controls on the opposite side, assisted by other personnel on the ground to perform the necessary manoeuvres, or use suitable accessories provided for this purpose, such as:
- remote controls
- raised seat
- raised control station.





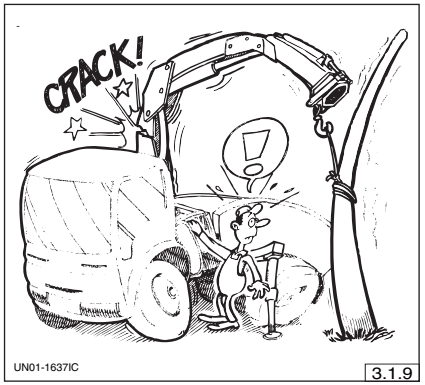


WARNING !

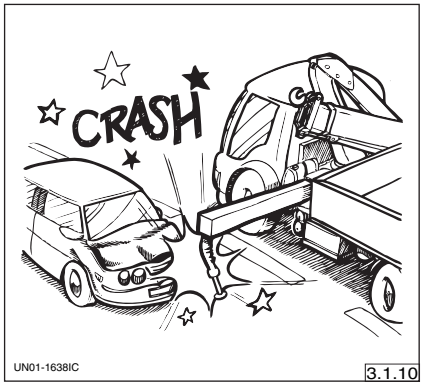
Always follow the Highway Code, in particular with regards to height limit signs.

Do not operate the crane in poor visibility conditions; the operator must always have a perfect view of the work area.

Use short harnesses and operate the levers smoothly and gently to prevent the load swinging dangerously.

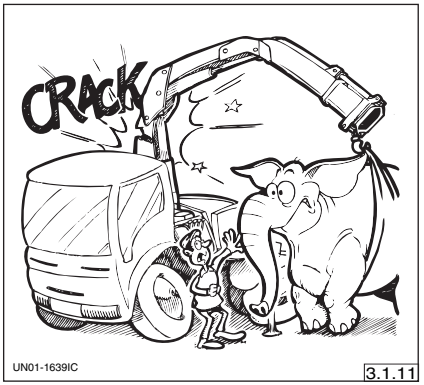


Do not use the crane to remove poles, uproot trees or lift fixed loads.



WARNING !

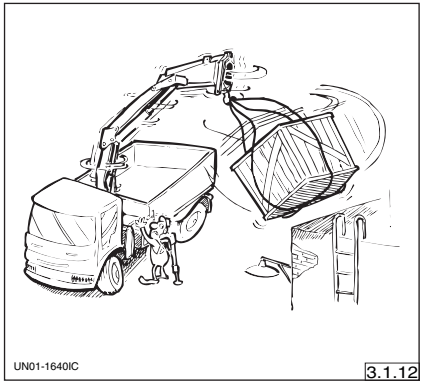
Before driving the vehicle, ensure all the lock devices are engaged.



WARNING !

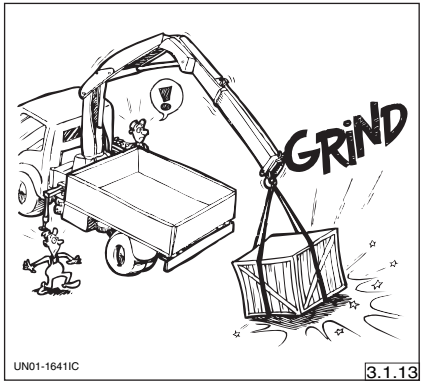
Never lift loads exceeding the limits stipulated in the loads diagrams.

Make sure the loads are less than those indicated on the diagrams in relation to the outreach.



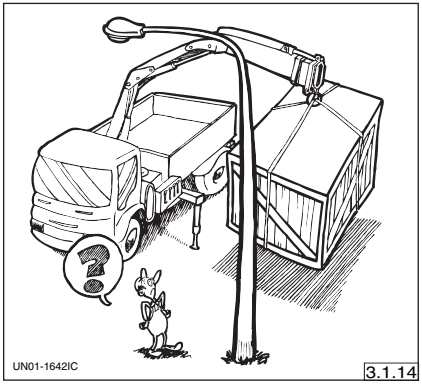
HAZARD !

Never swing the load to place it beyond the permitted outreach indicated in the load diagram.



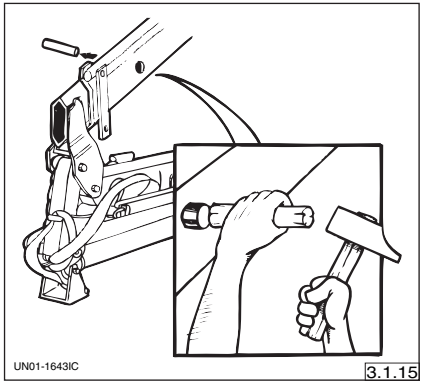
WARNING !

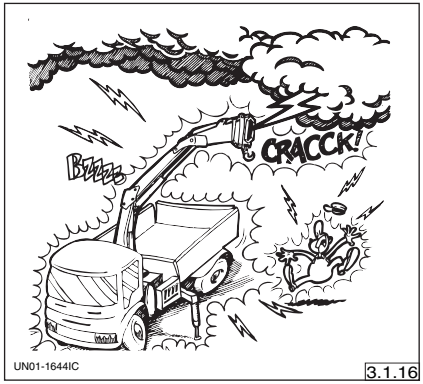
Never drag loads, lift them upwards.

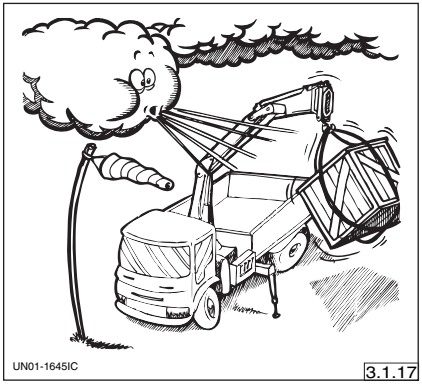


WARNING !

In the presence of objects obstructing the crane's range of action, take precautions to prevent collisions.







WARNING !

When fitting and removing the accessories' lock pins, use equipment made of soft materials to prevent the risk of being hit by flying splinters caused by the striking of the tool.

WARNING !

Never use the crane during a storm.

HAZARD !

It is forbidden to operate the crane when the wind reaches a speed of 10.8 m/s (grade 6 on the Beaufort scale).

To calculate the wind speed, please refer to the table below.

- Beaufort scale -

Wind force		Wind speed		Effect of the wind on land
Beaufort number	Description of the wind	m/s	Km/h (Mp/h)	
0	Calm	from 0 to 0,2	1 (0)	Calm, smoke rises straight up
1	Light air	from 0,3 to 1,5	from 1 to 5 (from 1 to 3)	Wind direction indicated by the movement of smoke only, not by the weathervane
2	Light breeze	from 1,6 to 3,3	from 6 to 11 (from 4 to 7)	Wind can be felt on the face, leaves rustle, weathervane moves
3	Gentle breeze	from 3,4 to 5,4	from 12 to 19 (from 8 to 12)	Leaves and small branches move, pennants unfold
4	Moderate breeze	from 5,5 to 7,9	from 20 to 28 (from 13 to 18)	Wind lifts dust and loose paper, moves branches and thin poles
5	Fresh breeze	from 8,0 to 10,7	from 29 to 38 (from 19 to 25)	Small broadleaves begin to wave, slight foam appears on lakes
6	Strong breeze	from 10,8 to 13,8	from 39 to 49 (from 25 to 31)	Poles move greatly, whistling along telephone lines, use of umbrellas is difficult
7	Near gale	from 13,9 to 17,1	from 50 to 61 (from 32 to 38)	All the trees move, it is very difficult to move against the wind
8	Gale	from 17,2 to 20,7	from 62 to 74 (from 39 to 46)	Tree branches are broken, walking in the open air is particularly difficult
9	Strong gale	from 20,8 to 24,4	from 75 to 88 (from 47 to 55)	Slight damage to houses (chimney pots and roof tiles are blown off)
10	Storm	from 24,5 to 28,4	from 89 to 102 (from 56 to 64)	Trees are uprooted, considerable damage to houses

DANGER !

3.2 - Operator's qualifications and behaviour

The use of the crane is restricted solely to personnel meeting the following minimum requirements:

- specifically employed personnel;
- apprentices under direct supervision of the specifically employed personnel;
- staff members employed for the machine's maintenance and testing (when their skills are required);
- crane inspectors.

Only the persons listed above may access the crane's work area, and only for the purpose of fulfilling their functions. In any case, they must always advise the operator or person in charge of their presence.

- Operator's qualifications

To operate the crane, the following requirements must be met:

- possession of the necessary psychophysical qualities to ensure the operator is neither a risk to himself or to others;
- ability to understand the descriptions and illustrations in the instructions manual (including the figures and diagrams contained therein) and the symbols and instructions on the plates affixed to the machine;
- familiarity with and ability to implement the emergency procedures;
- ability to operate the machine as a whole, together with any accessories applied;
- experience of the applicable safety regulations.

- Operator's behaviour

The operator must not:

- engage in any other activity which may distract him while operating the crane;
- operate the machine in a state of drunkenness or when under the influence of drugs which may reduce either physical or mental abilities;
- leave the crane unattended with the load hanging;
- use the machine in the event of malfunctions.

4 Handling, lifting and fitting

4.1 - Handling and lifting

WARNING !

Always use lifting means which are suitable for the load to be lifted and handled.
Chains and cables must always be in good condition, never worn or frayed as this would seriously prejudice the operators' safety.
Always keep the load as low as possible when moving to guarantee better stability and visibility.
Always work with great care and carry out very slow manoeuvres for the safety of the operators present and to safeguard the good working condition of the crane.

WARNING !

If the crane is used without the locking devices (e.g. wooden beams, threaded bars, tie rods, screws, pins, etc.) the machine may overturn.

They type of packing must be chosen according to the means of transport and the destination of the goods.

The crane is normally dispatched placed on two wooden beams with the stabilisers facing upwards or disassembled and placed in a box with the equipment used to fit the crane on the base truck.

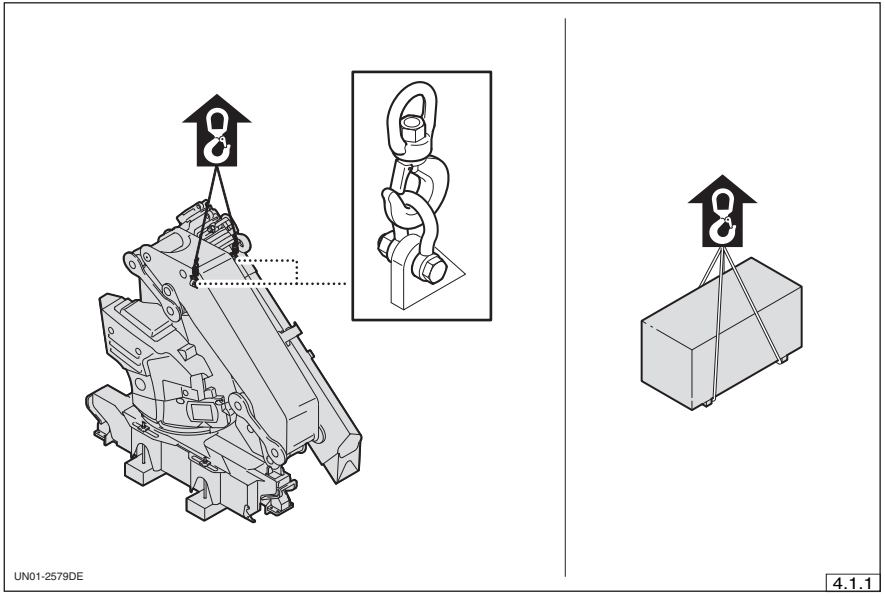
The wooden beams must be removed during the installation of the crane on a truck.

For packaging which differs from that shown in the manual, follow the instructions and the symbols applied to the packing itself.

Before lifting the crane always check the weight on the technical information sheets.

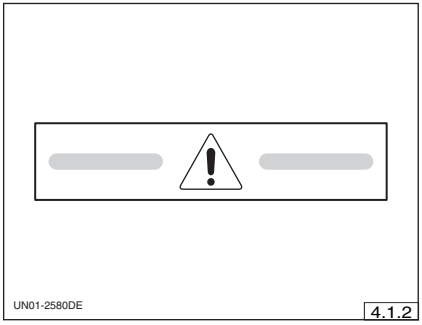
- Lifting the crane with a hook

Lift the crane using the special lifting points positioned on the main arm of the crane.
If the crane is fitted with accessories such as antenna, winch, manual extensions, etc., the barycentre of the machine will be different each time.
When lifting from above pay attention to the crane swinging movement as the lifting point is never perfectly barycentric.



- Safety devices

PM cranes are fitted with locking devices to avoid hazardous situations during handling of the machine (e.g.: arm pack or swinging support lock) highlighted with the following sticker (fig. 4.1.2).



4.2 - Storage

Normally, the crane accessories and other equipment supplied are dispatched wrapped in a protective sheet which must be removed before they are fitted.
However, in the event of long periods during which the unit will be not be used, provide a suitable cover and store it indoors to protect it from the weather.
The storage area must not be excessively damp or dusty. The room temperature must be between -20 °C (-4 °F) and +70 °C (+158 °F) with a maximum humidity level of 90%, with no condensation.

4.3 - Fitting

The installation of the crane on the vehicle and the inspections following installation required by the local regulations in force in each country must be carried out carefully following the information contained in the “Instruction and warnings manual for the installation of the crane on a truck” written by the company PM Group S.p.A.
All necessary information, including the “Instruction and warnings manual for the installation of the crane on a truck” is supplied to the crane owner only upon request sent by email to:

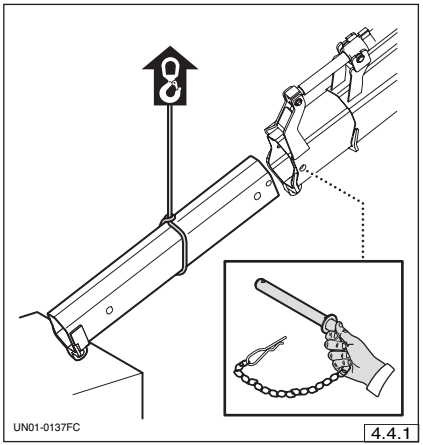
info@pm-group.eu

The fitting and any alterations to the vehicle required must comply with the regulations issued by the vehicle’s manufacturer.

4.4 - Fitting the manual extension

WARNING !

The manual extensions must be fitted and removed one at a time in a sequential order.
After fitting, ensure the safety devices prevent the extension sliding out uncontrolled.



1 - According to its weight, harness the extension with suitable lifting means and rest it on a stable surface.

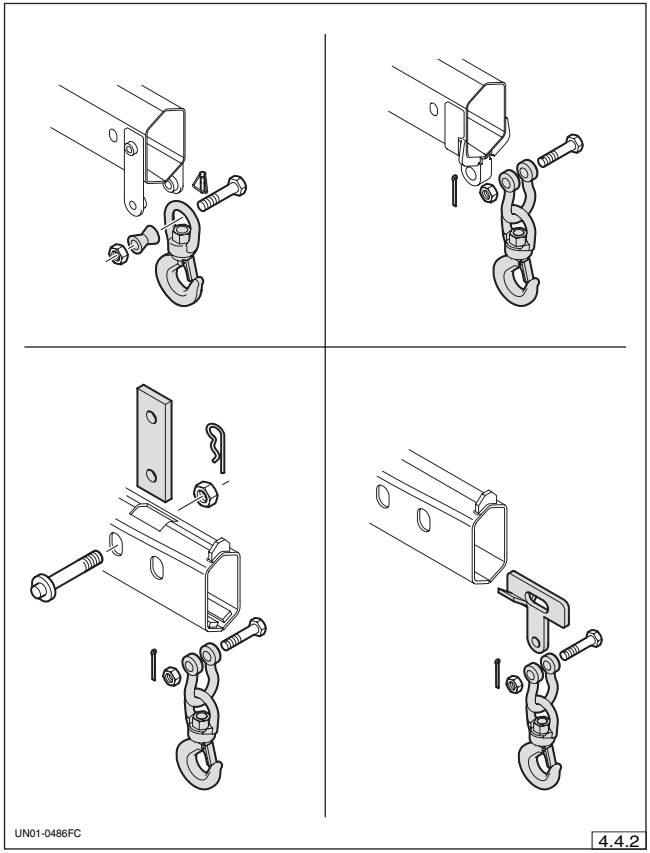
2 - Slide out the arms and insert the extension and so the pin holes are aligned.

3 - Lock the extension into position (open or closed) using the special pin and safety lock pin.

To disassemble the extension, proceed as described for the assembly but in the reverse order.
Whenever possible, keep the arm pack angled towards the ground.

4.4.1 - Fitting the hook

Assembly type



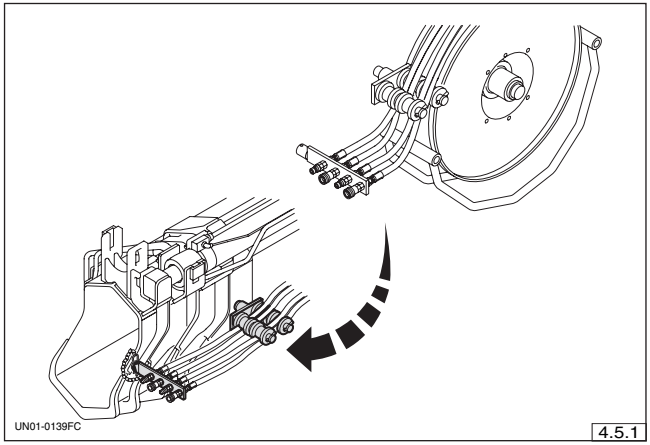
WARNING !

The hook can only be fitted on the last extension extended.

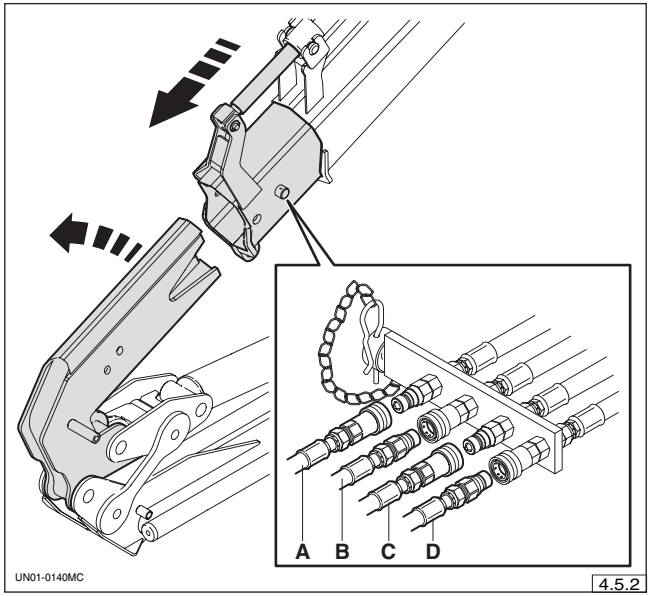
4.5 - Fitting the jib

WARNING !

To prevent the risk of the unit overturning, ensure the extension is always stable, resting on the ground or on suitable supports.



For the cranes equipped with a hose reel, fit the quick coupling mount at the end of the last arm and the pipe track on the main arm.



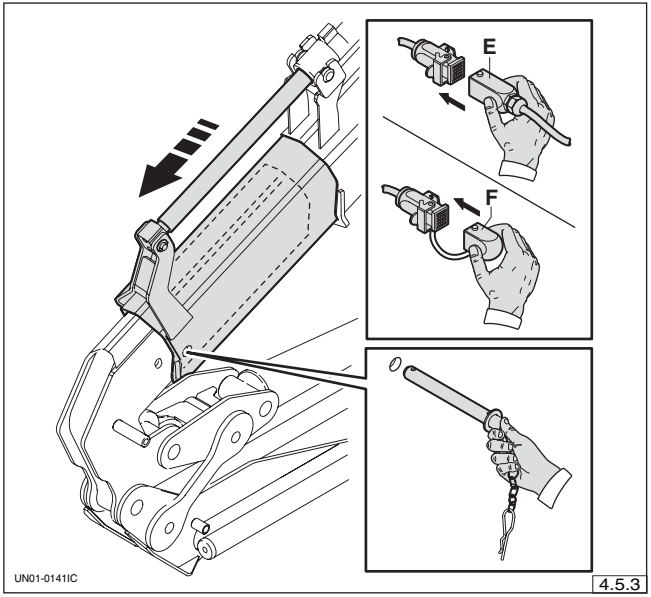
1 - Place the jib on the ground; if the crane is equipped with a winch, place it safely on suitable supports.
2 - Extend the arms until they are near the tooth.
3 - Connect the hoses to the unions in the following order:
   A - jib opening
   B - jib closing
   C - arm jack extension
   D - arm jack retraction

4 - Open the articulated joint jack to align the tooth with the crane.
5 - Extend the crane arms to introduce the nosepiece and lock it with the special pin and safety lock pin.

Information

In the crane with the pipe track, connect the hoses from the jib in the same order as the crane with the hose reel.

If the extension is fitted with a load limiting device, connect the electrical pin “E”.



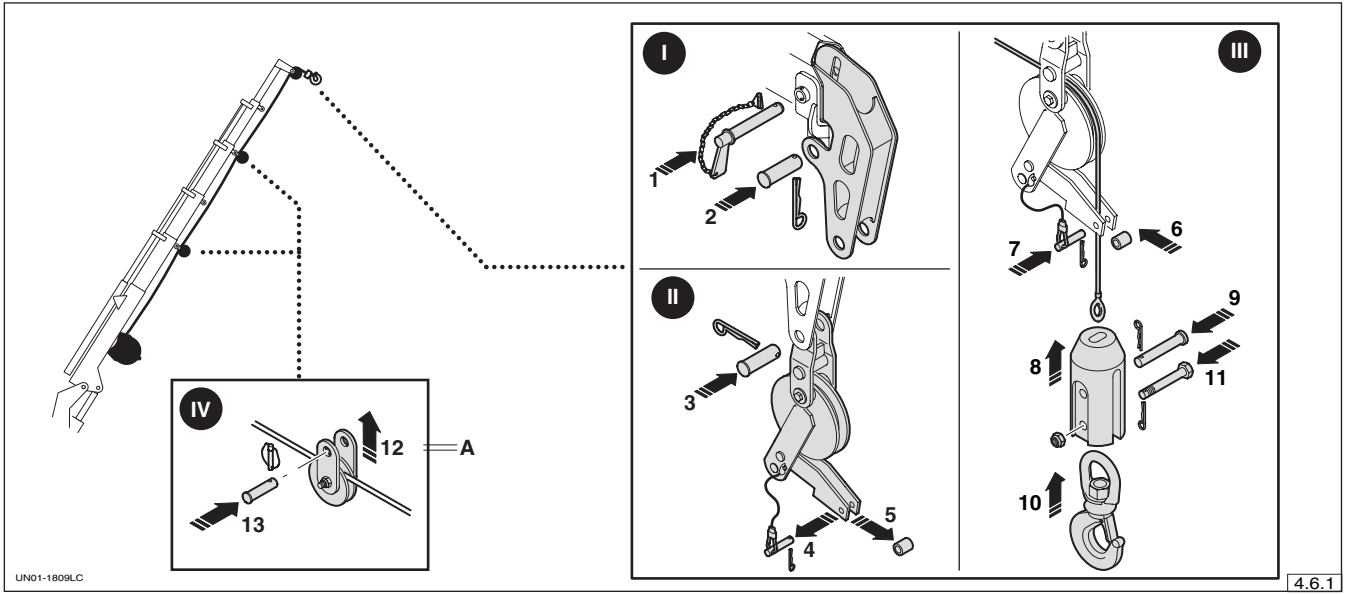
- Jib removal

For the disassembly, proceed as for the assembly but in the reverse order.
Connect the pin to terminal “F” to be able to use the crane without the jib.

4.6 - Tackle installation

4.6.1 - Fitting the tackle on the crane

Fit the pulley “A” to support the cable if there are long sections between the winch and the block.



A = driving pulley

5 Information about adjustments

All adjustments must be performed by an authorised workshop.

6.1 - Controls

6.1.1 - Symbols

Crane stabilisers		Stabiliser activation
		Crane activation
Stabilisers		Stabiliser jack extension
		Stabiliser jack retraction
Column		Clockwise rotation
		Anti-clockwise rotation

Main arm		Lowering
		Lifting
Secondary arm		Lowering
		Lifting
Arms		Extension
		Retraction

Jib		Lowering
		Lifting
		Extension
		Retraction
Rotator		Clockwise rotation
		Anti-clockwise rotation
Grab		Grab opening
		Grab closing
Jib arms/winch (with multiple activate device)		- Jib lifting - Winch lowering
		- Jib lowering - Winch lifting

6.2 - Radio control

The radio control is composed of a portable transmitter unit for the operator and a receiver unit installed on-board the machine.

- Safety precautions

Do not operate the radio control if it is damaged or malfunctioning.
Before using the radio control, check that the batteries are charged.
Do not position the load manually.
Do not leave the remote control unattended; otherwise the crane may be used by unauthorised persons.
Keep under constant control:
- work area;
- load trajectory;
- indicator light on-board the machine or the incremental bar on the radio control, which show the lifting of 90% or 100% of the load.

Do not clean the remote control with a pressurised water jet or immerse it in water or any other type of liquid.

6.2.1 - "SCANRECO" radio control

- Technical data

- Power voltage: 7,2 Volts
- Battery:
  - Rechargeable "Scanreco".
- Working range including obstacles: 100 m (ft 328).
- Protection grade: IP65.

Battery

The effective duration of a battery is approx. 8 hours.
The intermittent switching on three times of a buzzer and the intermittent switching on of the indicator light “M”, indicate that the battery is nearly flat.

Information

Only replace the battery when the flashing “M” indicator light switches off.

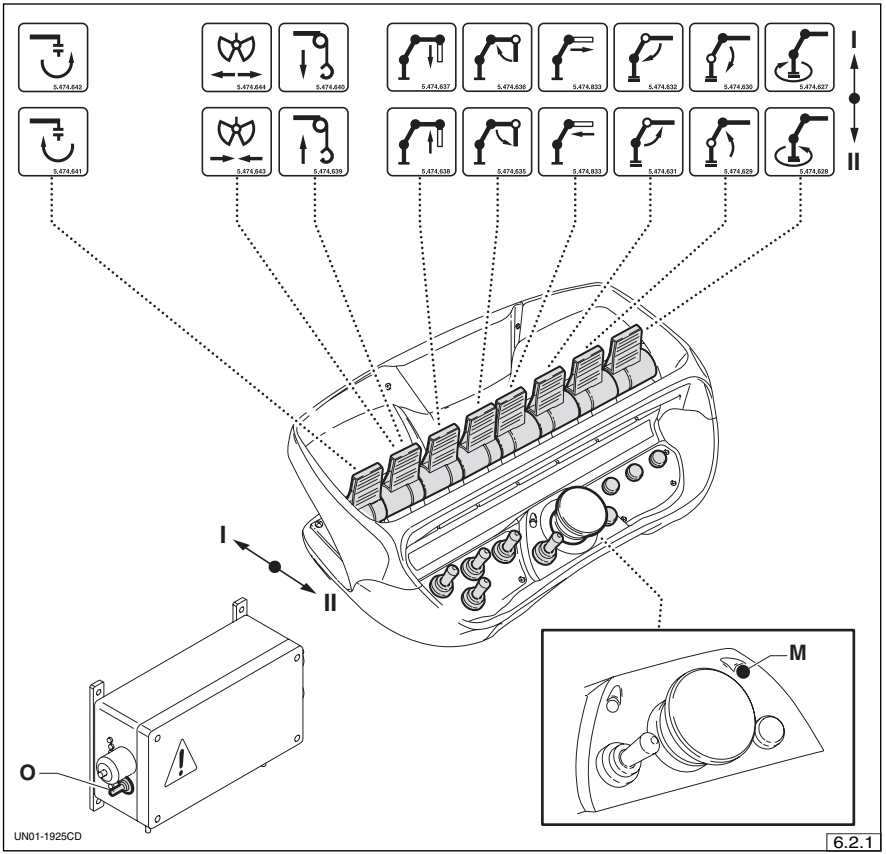
Battery charger

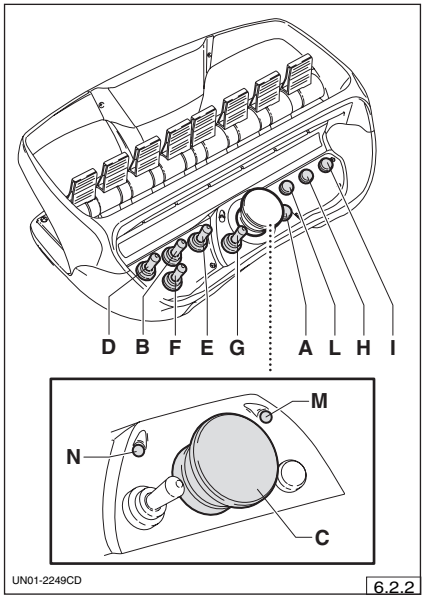
Charge voltage of the battery charger supplied: 11 Vcc - 30 Vcc.
The recharging time of a completely flat battery varies from 12 to 14 hours.

Battery charger indicator lights

- The red indicator light signals the presence of electricity supply to the charger.
- When the green indicator light is on, the battery is being recharged.

- Controls





A - Switching on the transmitter unit
The button has two functions:
I) radio control ON;
II) buzzer.

B - Start-up/stop
Flick the switch to start up or stop the vehicle engine.

C - Emergency stop button
See “Safety devices”.

D - “RPM” activation
Flick the switch to place the engine rpm in automatic or manual mode.

E - Accelerator
Flick the switch to vary the engine rpm of the vehicle. It only works with switch “D” in manual.

F - Switch
Not active.

G - Speed switch
The switch activates and deactivates the functioning speed of the crane.
Press repeatedly.
Each time it is pressed corresponds to a different crane speed.
Up to five different speeds are possible.
The speed chosen is indicated by the number of flashes of the indicator light “N”.
Flick the switch once only (in the “off” direction) to reset the normal functioning speed.

H - “Reset” button
The button, used in combination with each single load lowering control command, moves the crane from a blocked situation in which all the controls are inhibited (see function reset with “3-30”).

I - “Plus” reset button
Not active.

L - Function button (F1)
Not active.

M - Indicator light
Red.
When on, it indicates that the transmitter unit is switched on.

N - Indicator light
Green.
When on, it indicates the different functioning speeds of the crane (see speed switch).

O - Three-setting switch (fig. 6.2.1)
Remote: the ECU is activated.
Off: the ECU is switched off.
Manual: the ECU is activated, the receiving unit is switched off.

- Switching on the radio control

- Press button “A”, fig. 6.2.2.

- Switching off the radio control

- Press button “A”, fig. 6.2.2.

6.2.2 - “HETRONIC” radio control

- Technical data

- Power voltage: 3 Volts
- Batteries:
  - Rechargeable with Ni-Mh or Ni-Cd accumulators, 3,9 Volts;
  - Stylus/miniature type alkaline 2x1,5 Volts or 3x1,5 Volts.
- Working range including obstacles: 100 m (ft 328).
- Protection grade: IP65.

The radio control is equipped with two safety devices which are automatically triggered in the following cases:

a) if the work area is disturbed by a signal which effects the radio control’s frequency range;
b) the radio control is out of the transmitting unit’s range.
   In this case, the radio control switches to emergency mode and stops the crane operating.

Battery

Information

Use alkaline batteries only.
The power supplied by zinc-carbon batteries is insufficient.

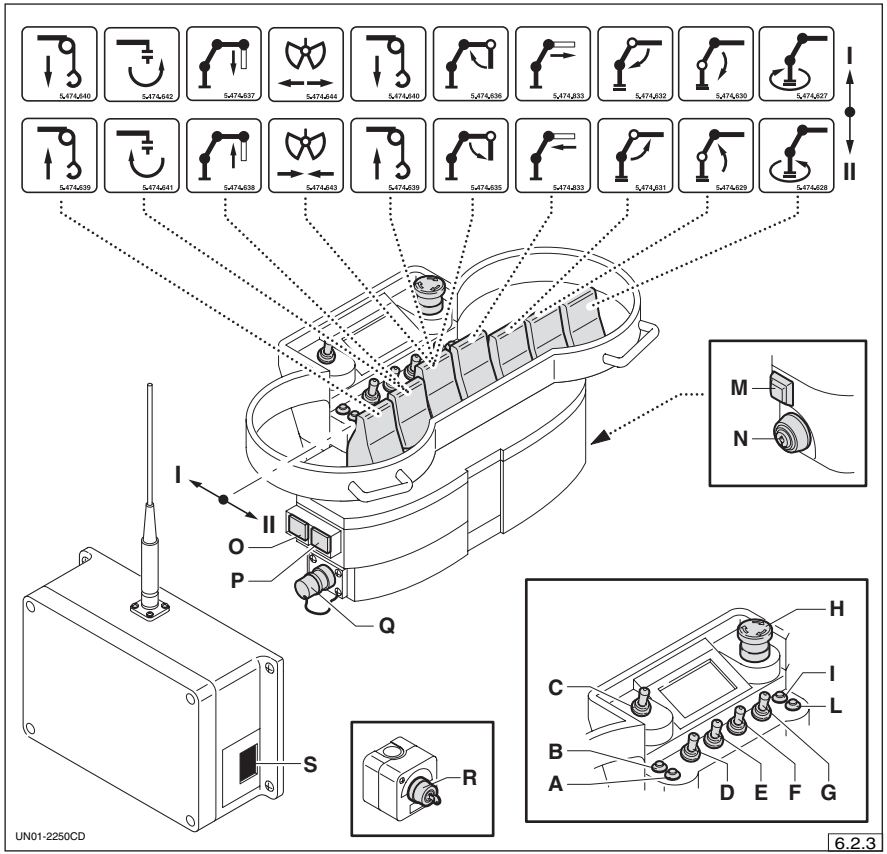
Battery charger

Charge voltage of the battery charger supplied: 12 V / 24 V.

Battery charger indicator lights

- When the signal light is switched on, this means the battery charger is live.
- When charging, the signal light should always remain on.
- As soon as the battery charging is complete, the signal light will flash.

- Controls



i **Information**

The fig. 6.2.3 simbology illustrated controls order can be on request inverted.

A - Signal light (fitting only)
Not active.

B - Signal light (fitting only)
Not active.

C - Control commutation switch
Not active.

D - Switch (“RPM + / RPM -”)
Flick the switch to vary the engine rpm of the vehicle.

E - Speed/F3 function key switch
Activate to enable or disable the crane operating speed or the optional F3 function key.

F - Start/stop switch
Flick the switch to start up or stop the vehicle engine.

G - F1 and F2 functions switch
Activate to enable or disable the optional F1 or F2 functions.

H - Emergency stop button
See “Safety devices”.

I - Indicator light
Not active.

L - Indicator light
When on:
- with a green light, this shows the radio-control is operating normally;
- with a red light, this shows the transmitter unit batteries are flat.

M - Remote control enable
The button has two functions:
1) enables the radio control operation;
2) sounds to alert the operator that the radio control is switched on.

N - On switch
O = Transmitter unit is switched off
I = Transmitter unit is live
P = Programming accessible by specialised technical staff only

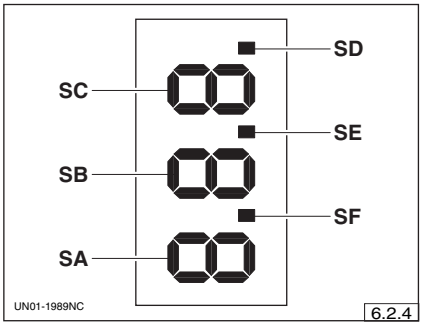
O - Button
Not active.

P - “Reset” button
The button, used in combination with each single load lowering control command, moves the crane from a blocked situation in which all the controls are inhibited (see function reset with “3-30”).

Q - Cable connector
Connection for use of the transmitter as a cable control.

R - Receiver unit ON switch
Hand/Manual position = manual control function activated;
Radio position = radio-control function activated.

S - Display



The display shows all the radio-control operation information.

- Alphanumeric fields
SA: shows which lever on the transmitter unit has been operated;
SB: only active during system programming carried out by specialised personnel;
SC: displays the radio-control operating status (see chart below).

- Key

Pos.	Code	Description	
SA	E	Transmitter unit lever operating error. Switch the transmitter unit off then on again; if the code is still displayed, operation is inhibited	
	1	Joystick 1 operation	Joysticks = control levers, labelled in ascending order from left to right (see fig. 6.2.3). For example: Joystick 3 = third lever from the left
	2	Joystick 2 operation	
	3	Joystick 3 operation	
	4	Joystick 4 operation	
	5	Joystick 5 operation	
	6	Joystick 6 operation	
	7	Joystick 7 operation	
	8	Joystick 8 operation	
SB		System codes: these are only displayed during system programming. For use by specialised personnel only	
SC	0	Radio-control activated: all manoeuvres are enabled.	
	1	Receiver unit powered correctly. Radio signal present but radio-control not yet active.	
	2	Emergency stop button pressed on transmitter unit.	
	3	Warning message: insufficient radio signal reception.	
	4	Receiver unit powered correctly but no radio signal: - transmitter unit switched off; - programming error (wrong radio channel or serial number).	

- Points:
SD - flashing: correct radio signal reception.
SE - not active.
SF - flashing in conjunction with SD: during programming stage only.

- Switching on the radio control

- Turn the key on the receiver unit ON switch “R” (fig. 6.2.3) to the “RADIO” position.
- Turn the key on the transmitter unit ON switch “N” (fig. 6.2.3) to the “I” position.
- Press button “B” to activate the transmitter/receiver unit functions.

- Switching off the radio control

- Turn the key on the ON switch “N” on the transmitting unit (fig. 6.2.3) to position “0”.
- Turn the key on the receiver unit switch “R” to the “HAND / MANUAL” position.

6.2.3 - Radio control operation check

Before starting to work:
- check the batteries are charged;
- check the radio control is in good condition;
- check the rubber guards around the levers are in good condition;
- check the receiving unit connections are in good condition;
- check the connection pins on the receiving unit are tightened properly.
- Checking emergency stop device operation.
  Press the button “H”, move the radio control levers in both directions and make sure that the crane movement is disabled.
  Rotate the button to restore normal crane operation.

6.2.4 - Radio control stop due to power failure

In the event that the crane locks due to a flat battery, proceed as follows:

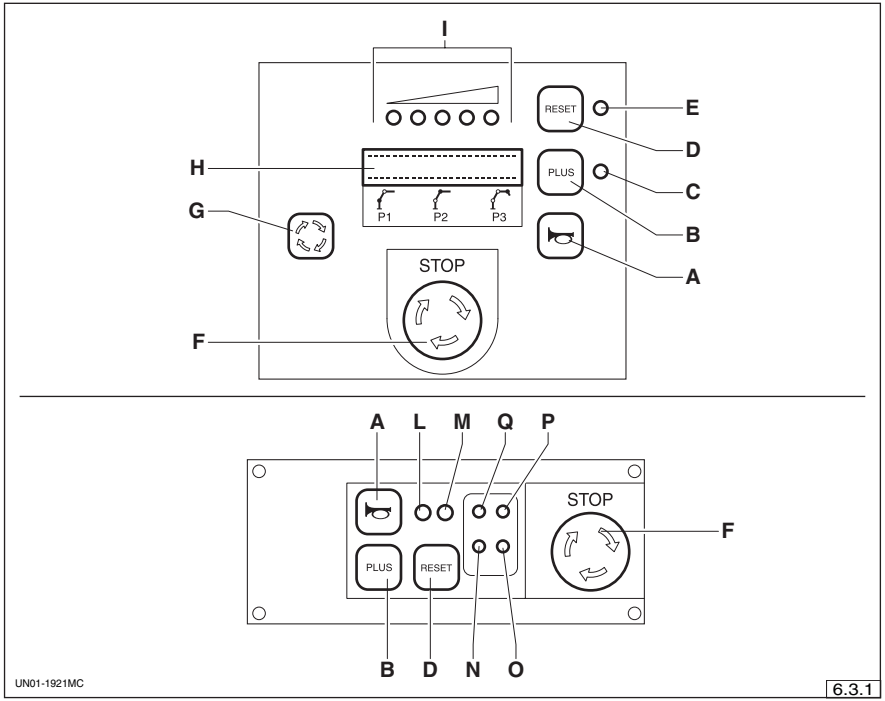
I) switch off the transmitting unit
II) replace the battery
III) carry out the receiving unit start-up procedure.

6.2.5 - Radio control maintenance

For radio control maintenance, please refer to the instructions contained in the instruction manual provided by the radio control’s manufacturer.

6.3 - Functioning control unit

6.3.1 - Functioning control unit controls and indicators



A - Buzzer

B - "PLUS" button
Not active.

C - Indicator light
Not active.

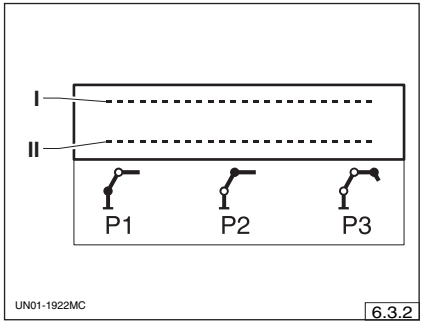
D - Reset" button
The button, used in combination with each single load lowering control command, moves the crane from a blocked situation in which all the controls are inhibited (see function reset with "3-30").

E - Indicator light
When on, it indicates that the movement of the load in the "3-30" mode is in progress (see function reset with "3-30").

F - Emergency stop button
See "Safety devices".

G - Scroll button
Press to display the pressure readings at jacks (see "Display") and switch between percentages and absolute values.

H - Display



The following information is shown on the display.

- During use

- Field "I"

Status message (see "Status messages" chart).

- Field "II"

Operating pressure readings for the following jacks:

P1- main jack
P2- secondary jack
P3- jib joint jack.

The pressure readings are displayed (prioritised by percentage) above the corresponding symbol.

- Alarm active

- Field "I"

Alarm message (see "Alarm messages").

- Field "II"

Operating pressures as specified in "During use - Field II".

- Status messages

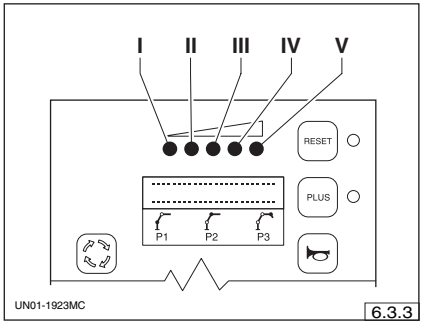
Message type	Message	Description
SYSTEM START		SELF-DIAGNOSTICS AT START
	SYSTEM TEST WAIT TEST SUCCESFUL SYSTEM ACTIVE	OPERATION CHECK AT START TEST IN PROGRESS TEST SUCCESSFUL OPERATIVE SYSTEM
ALARM CONDITION		ERROR DETECTED
	ERROR xxx SYSTEM LOCKED SYSTEM TEST OK ¡REACTIVATE WITH R	SENSOR FAILURE (SEE “ALARM MESSAGES” CHART) SYSTEM ERROR DETECTED ERROR REMOVED PRESS “R” TO REACTIVATE THE SYSTEM (R = Reset)
STANDARD LOCK		PRESSURE LOCK (enables manoeuvres to bring load towards column)
	P1 LOCK P2 LOCK P3 LOCK	PRIMARY JACK LOCK SECONDARY JACK LOCK ANTENNA JOINT JACK LOCK
UPPER LOCK		OVERPRESSURE LOCK (enables lowering manoeuvres only)
	P1 OVERLOAD P2 OVERLOAD P3 OVERLOAD	PRIMARY JACK OVERLOAD SECONDARY JACK LOCK ANTENNA JOINT JACK LOCK
RESET FUNCTION		TEMPORARY LOAD LIMITER BYPASS
	RESET ON RESET OFF	RESET FUNCTION ACTIVE (3 SEC.) RESET FUNCTION PAUSED (30 SEC.)
LIMITED AREA		OPERATION IN LIMITED AREA
	LIMITED AREA LOCK	LIMITED AREA LOCK
LMU		MANUAL EXTENSION LMU DEVICE
	LMU LOCK	MANUAL EXTENSION OVERLOAD

- Alarm messages

Message	*Description*
Error 27A Error 27B	Main jack pressure sensor *27A - sensor disconnected* *27B - sensor short circuited*
Error 28A Error 28B	Secondary jack pressure sensor *28A - sensor disconnected* *28B - sensor short circuited*
Error 29A Error 29B	Jib joint jack pressure sensor *29A - sensor disconnected* *29B - sensor short circuited*
Message	Sensor disconnected
Error 7	Rotation control
Error 8	Main jack control
Error 9	Secondary jack control
Error 10	Arm jack control
Error 11	Jib joint jack control
Error 12	Jib extension jack control

Message	*Description*	
	Distributor lever active position	
Error 14 A	Rotation control lever (anti-clockwise)	1st component
Error 14 B	Rotation control lever (clockwise)	
Error 15 A	Main jack control lever (lifting)	2nd component
Error 15 B	Main jack control lever (lowering)	
Error 16 A	Secondary jack control lever (lifting)	3rd component
Error 16 B	Secondary jack control lever (lowering)	
Error 17 A	Arm jack control lever (retraction)	4th component
Error 17 B	Arm jack control lever (extension)	
Error 18 A	Jib joint jack control lever (lifting)	5th component
Error 18 B	Jib joint jack control lever (lowering)	
Error 19 A	Jib extension jack control lever (retraction)	6th component
Error 19 B	Jib extension jack control lever (extension)	

I - Indicators light
These show the lifting capacity when the unit is in operation.



- LEDs I - II - III (green).
When lit up, they signal, respectively, that the following levels have been reached:
- 50% (led “I”)
- 70% (led “II”)
- 80% (led “III”)

of the max. lifting capacity.

- LED “IV” (orange).
When lit up, this shows that 90% of the max. lifting capacity has been reached.

- LED “V” (red).
When lit up, this shows that 100% of the max. lifting capacity has been reached: lock conditions.

L - Indicator light
Yellow.
This shows the control unit is powered.

M - Power take-off indicator light
Yellow.
When lit up, this shows the power take-off is engaged.

N - Indicator light
When lit up, this shows the machine is nearing the overload limit.

O - Indicator light
When lit up, this shows the jib is nearing the overload limit.

P - Indicator light
Red.
- If signal lights “P” and “N” both light up at once, this means the machine has reached the limit representing 100% of the allowable load.
- If signal lights “P” and “O” both light up at once, this means the machine has reached the limit representing 100% of the allowable load using the jib.

Q - Indicator light
Yellow.
- If signal lights “Q” and “N” both light up at once, this means the machine has reached the limit representing 90% of the allowable load.
- If signal lights “Q” and “O” both light up at once, this means the machine has reached the limit representing 90% of the allowable load using the jib.

6.4 - Work sectors

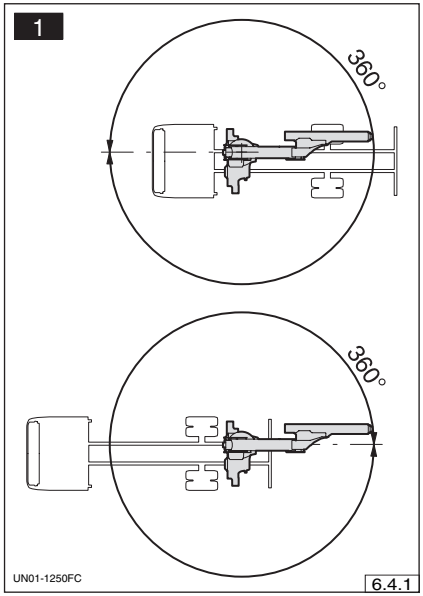
6.4.1 - When the operator is on the ground

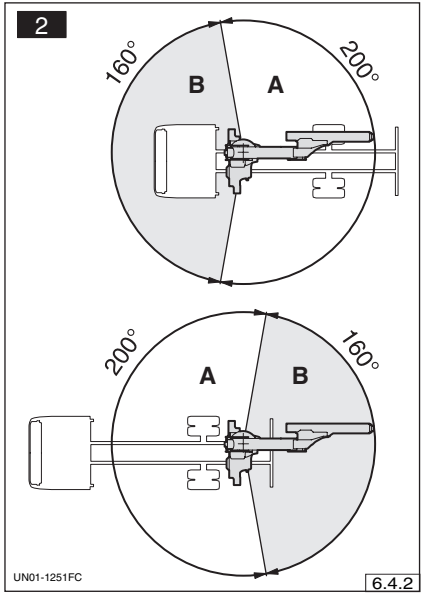
To ensure the stability of the assembly, the work sectors can be:

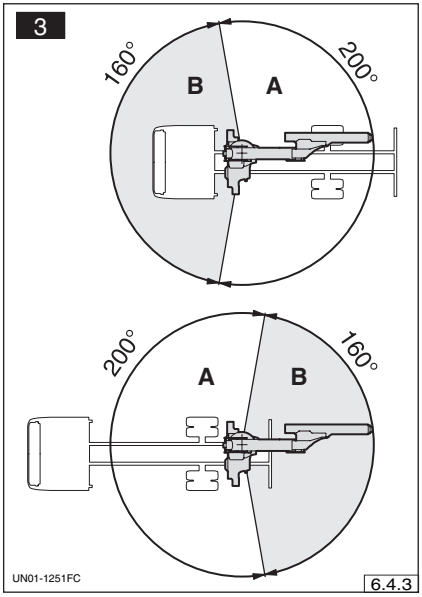
1) at 360° with a nominal capacity **(4)** (fig. 6.4.1).

2) With a nominal capacity in sector "A" (200°) and a reduction in capacity in sector "B" (160°) (fig. 6.4.2).

3) With a nominal capacity in sector "A" (200°) but without the possibility of rotation in sector "B" (160°) (fig. 6.4.3).





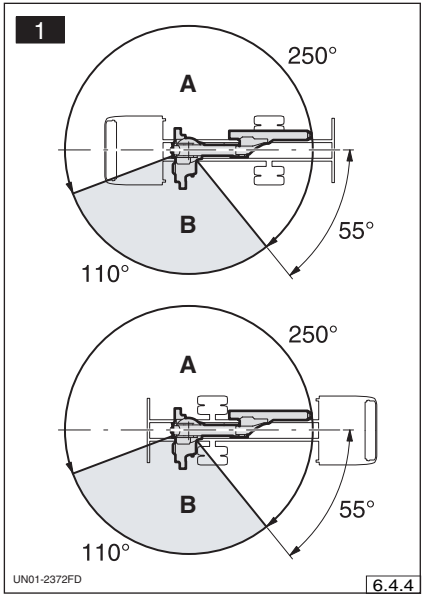


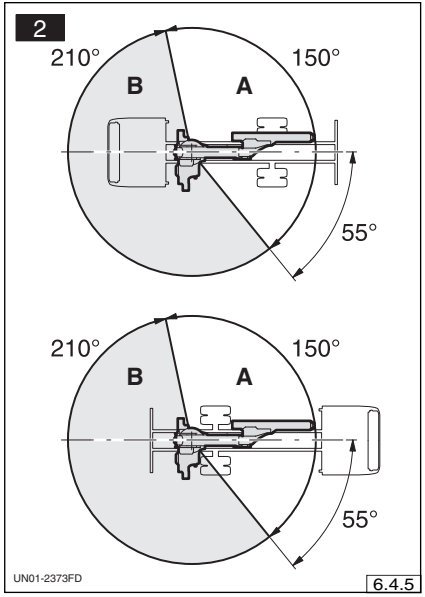
(4) Nominal capacity = load permitted in relation to a certain configuration (see capacity diagram).

6.4.2 - When the operator is on the raised control station

1) With a nominal capacity in sector “A” (250°) but without the possibility of rotation in sector “B” (110°) (fig. 6.4.4).

2) With nominal capacity in sector “A” (150°) (if the 200° rotation locking device is installed) with the impossibility of rotating in sector “B” (210°) (fig. 6.4.5).



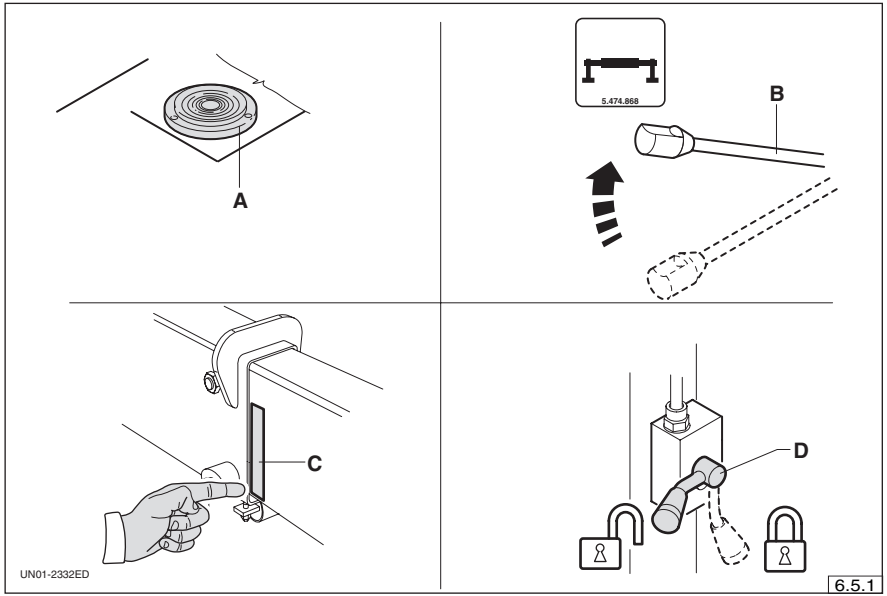


6.5 - Crane stabilisation

6.5.1 - Warnings

HAZARD !

The operator must know the maximum load that the stabiliser will apply to the ground (see enclosed documents) and must ensure that the ground consistency can guarantee the stability of the vehicle.
On ground that is not very solid, place the raised support plates or a hard wooden board of a suitable size between the stabiliser and the ground.
Stabilise the machine by unloading the weight of the vehicle from the suspension without lifting the wheels off the ground, as this would cancel out the elastic effect of the suspension, causing it to tip over.
Check the correct levelling using the spirit level (fig. 6.5.1), which must be flat (0°) with a maximum tolerance of +/-1°.



CAUTION !

Before using the controls for the stabilisation, deactivate all the locking devices.

1 - Block the vehicle with the parking brake and place the chocks behind the wheels.

2 - Start the motor at minimum rpm and engage the power takeoff.

3 - Make sure the distributor lever “B” is in the “stabiliser enabling” position (fig. 6.5.1).

4 - Extend the stabiliser arms to the maximum open position signalled by the yellow indicator light “C” (fig. 6.5.1).

5 - Open the cock “D”.

6 - Use the lever on the distributor to place the outrigger on the ground.

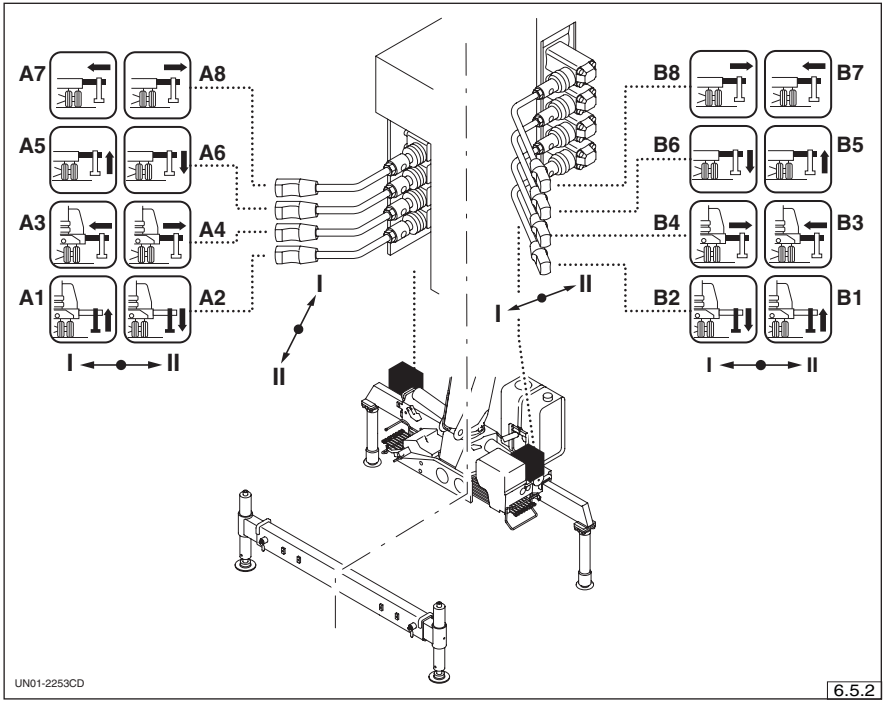
7 - Close the cock “D”.

8 - Repeat the operations for each stabiliser.

Information

In cold climates, allow the pump to run for a few minutes before manoeuvring the crane to ensure the hydraulic oil reaches the operating temperature.

6.5.2 - Stabilisation controls



A1 - retraction of the crane left stabiliser jack

A2 - extension of the crane left stabiliser jack

A3 - retraction of the crane left stabiliser arm

A4 - extension of the crane left stabiliser arm

A5 - retraction of the supplementary crossbeam left stabiliser jack

A6 - extension of the supplementary crossbeam left stabiliser jack

A7 - retraction of the supplementary crossbeam left stabiliser arm

A8 - extension of the supplementary crossbeam left stabiliser arm

B1 - retraction of the crane right stabiliser jack

B2 - extension of the crane right stabiliser jack

B3 - retraction of the crane right stabiliser arm

B4 - extension of the crane right stabiliser arm

B5 - retraction of the supplementary crossbeam right stabiliser jack

B6 - extension of the supplementary crossbeam right stabiliser jack

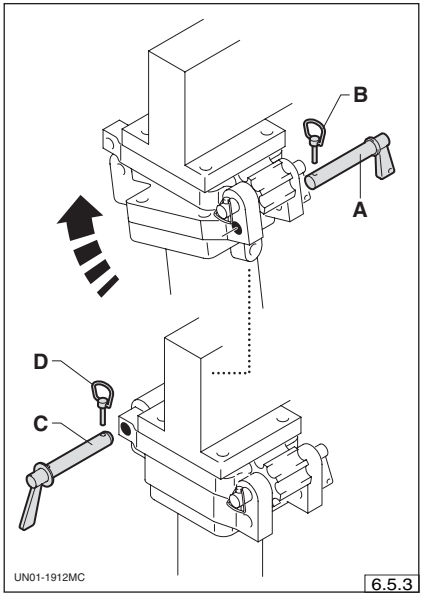
B7 - retraction of the supplementary crossbeam right stabiliser arm

B8 - extension of the supplementary crossbeam right stabiliser arm.

6.5.3 - Adjustable stabiliser

WARNING !

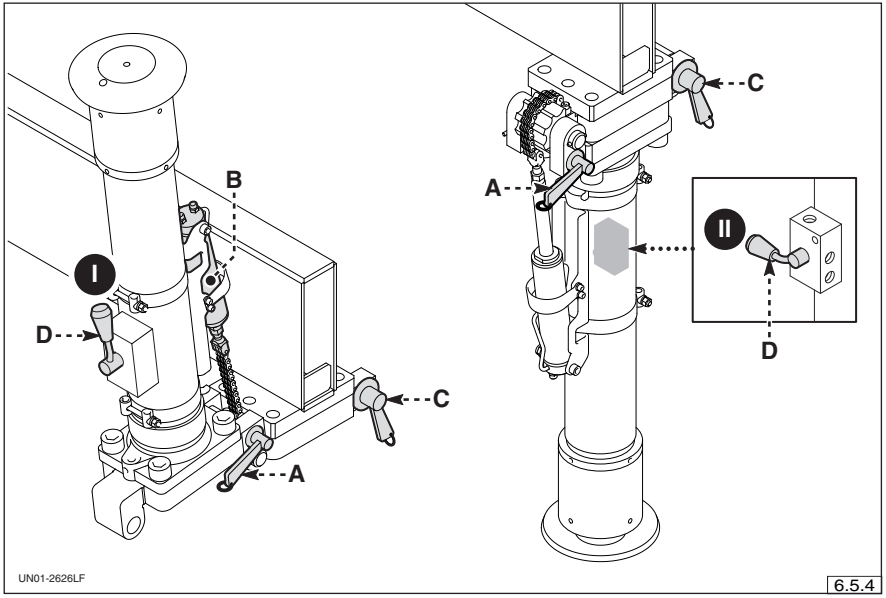
Before removing the lock pin, support the stabiliser jack (with the force required) and accompany it through the rotation movement until it reaches the upright position (work position).



1 - Remove the lock pin “A”.
2 - Rotate the jack into the upright position.
3 - Fit the pin “C” and secure it with the safety pin “D”.

Carry out the same operations but proceeding in reverse order to return the jack to the resting position.
Lock it in position with pin “A” and the relative safety pin “B”.

6.5.4 - Adjustable hydraulic outrigger



Use lever “D” of turn valve to enable the rotation controls of the outrigger jack.

To rotate the outrigger jack use the extension and retraction controls of the outrigger jacks (see “Stabilisation controls”).

- Stabilisation

1) Check that pin “A” is in its seat and locked with a safety lock pin.
2) Extend outrigger arm.
3) Check that lever “D” of the turn valve is in “I” position.
4) Use the outrigger jack retraction lever to pressurise jack “B”.

WARNING !

Always pressurise jack “B” before sliding out pin “A” to avoid the uncontrolled rotation of the outrigger jack.

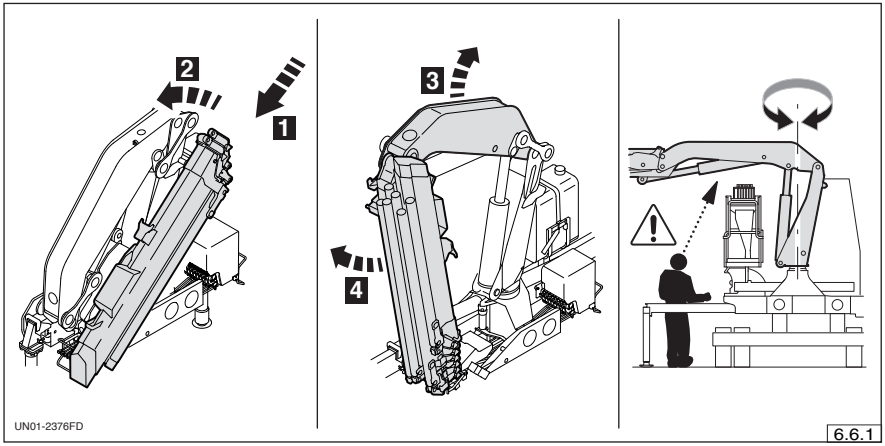
5) Slide out pin “A” and pin “C”.
6) Use the outrigger jack extension lever to rotate the outrigger jack downwards.
7) Complete the rotation of the outrigger jack manually and slide in pin “C” and lock it with the safety lock pin.
8) Slide in pin “A” and lock it with the safety lock pin.
9) Use lever “D” of the turn valve in position ”II” to enable the extension of the outrigger jack.
10) Use the stabilisation controls to stabilise the machine.
11) Use lever “D” of the turn valve in position ”I” to disable the extension and retraction controls of the outrigger jack.

- Destabilisation

1) Use lever “D” of the turn valve in position ”II” to enable the extension and retraction controls of the outrigger jack.
2) Use the stabilisation controls to destabilise the machine.
3) Use lever “D” of the turn valve in position ”I” to enable the lifting movement of the outrigger jack.
4) Slide out pins “C” and “A”.
5) Use the outrigger jack retraction control lever to completely rotate the outrigger jack.
6) Slide in pin “A” and lock it with the safety lock pin.
7) Slide in pin “C” and lock it with the safety lock pin.
8) Retract the outrigger arm fully.

6.6 - Working position of the crane

Before moving the crane, carefully read the section on “Safety” and the stabilisation instructions.
Check that the battery is charged and the radio control functions properly.



CAUTION !

Before starting the manoeuvres remove:

- ***the safety devices that hold the crane in position during road travel;***
- ***the safety devices which prevent the crane rotating.***

To place the crane into the working position, carry out the following manoeuvres:

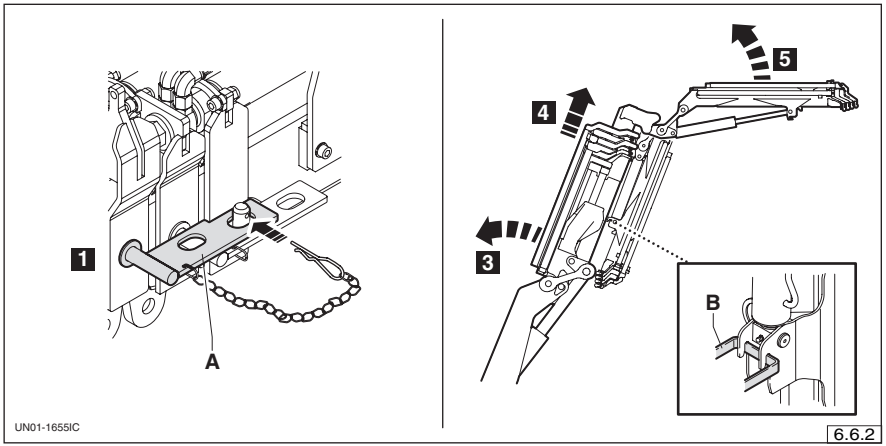
1 - close the jack or the arm extension jacks to the end strokes;
2 - close the secondary jack to the end stroke;
3 - open the main jack;
4 - open the secondary jack.

The main and secondary jacks must be open enough to allow the free rotation of the crane.

CAUTION !

When working from the ground control positions particular attention must be paid to the space occupied by the raised control station as in this operating mode the rotation locking device is not active.

6.6.1 - Working position of the jib



To place the jib into the working position, carry out the following manoeuvres:

1 - remove the arm anti-extension device “A”;

2 - carry out the crane opening manoeuvre described in para. “Working position of the crane”;

3 - open the secondary jack to allow the rotation of the jib;

4 - extend the crane arms enough to free the extension from the lock “B”;

5 - open the articulation jack.

On start-up, the function control device carries out a self-diagnosis (of the existing crane configuration) to check for any malfunctions.
The anomalies are shown on the wireless control display (if featured) and on the control unit display (see “Control unit controls and signals” - Alarm messages”).

6.7.1 - Checking the emergency stop button

WARNING !

Check all the emergency stop buttons individually.

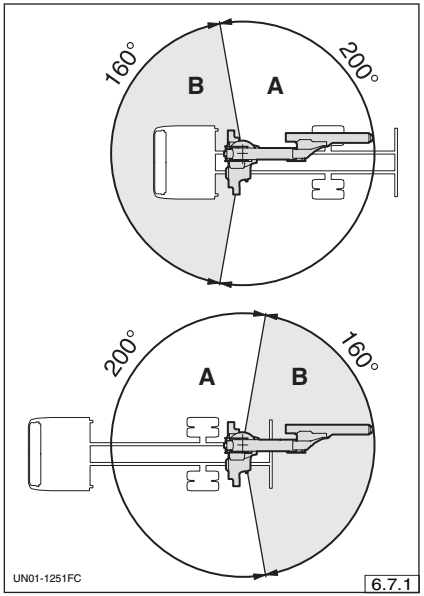
With the crane open and without a load:
1) press the button;
2) move the control levers in both directions and check that it is not possible to move the crane.
3) Turn the button to reset the crane functioning.

6.7.2 - Checking the rotation limiter (fig. 6.7.1)

Carry out the check with a load that is higher than what is permitted for that certain sector.
The permitted load value is provided by the authorised service centre that performed the installation and checked the stability of the assembly.
1) Turn the crane clockwise and anticlockwise to check that the device prevents the rotation of the crane into sector “B”.

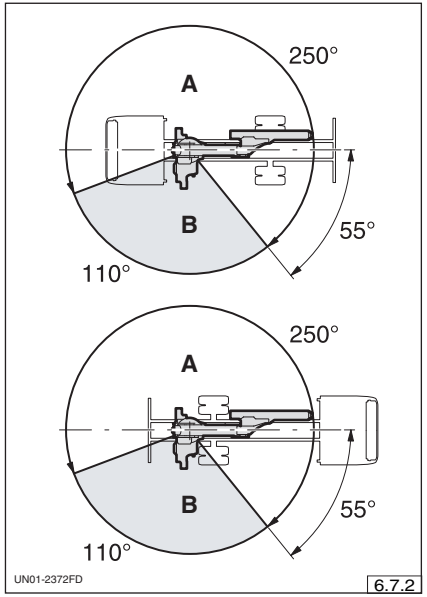
6.7.3 - Checking the rotation block (fig. 6.7.1)

Carry out the check with the crane open and without a load.
1) Turn the crane clockwise and anticlockwise to check that the device prevents the rotation of the crane into sector “B”.

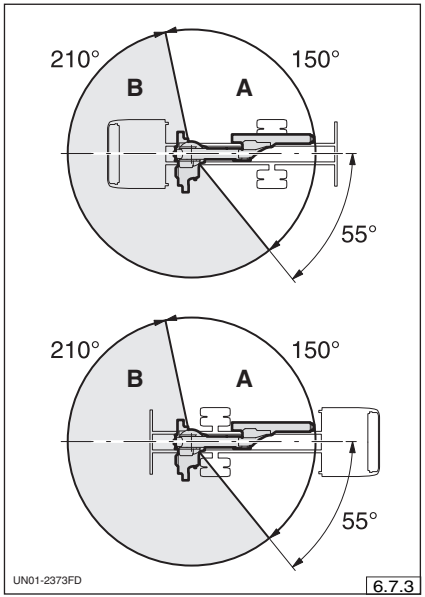


6.7.4 - Rotation lock control with raised control station

- Machine without 200° rotation locking device (fig. 6.7.2)



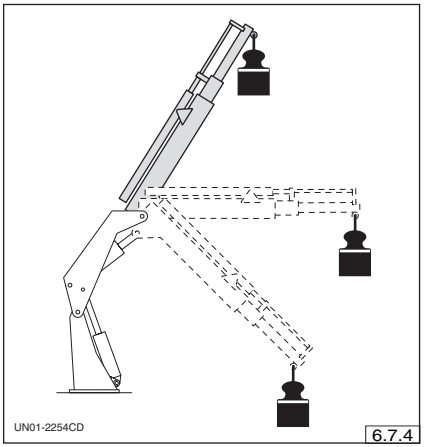
- Machine equipped with 200° rotation locking device (fig. 6.7.3))



Carry out a test from the raised control station with the crane open and unloaded.

1) Rotate the crane clockwise and anticlockwise to check that the device stops it from rotating in sector “B”.

6.7.5 - Checking the load maintenance valves

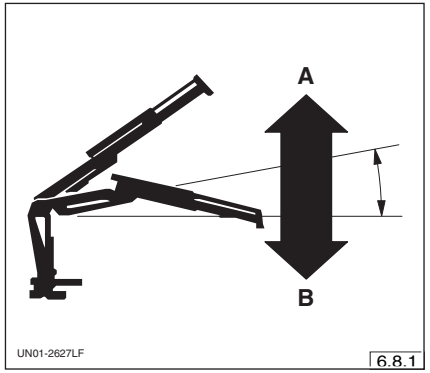


Carry out the check with a medium load.

1) Position the crane as shown in fig. 6.7.4;
2) deactivate the power takeoff;
3) remove the pressure from the system by moving the distributor lever a few times;
4) wait for a short time to check that the load does not lower.

6.8 - Lifting and moving the load

- Lifting the load



To lift large loads that require the full power of the crane, work as follows.

Zone "A":
- move mainly the main jack.

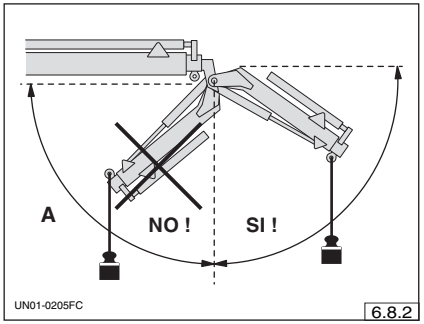
Zone "B":
- use mainly the secondary jack and the arm extension jacks.

To speed up the loading / unloading operations, it is preferable to use the main and secondary jack, rather than the arm extension jacks.

- Moving the load with the jib

WARNING !

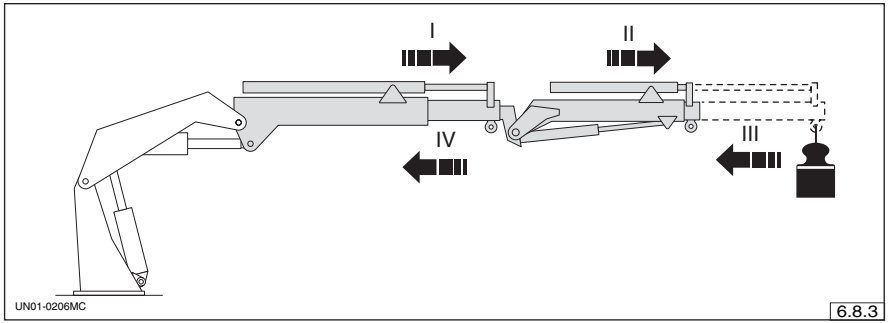
It is prohibited to move loads in the negative sector "A" (see fig. 6.8.2).



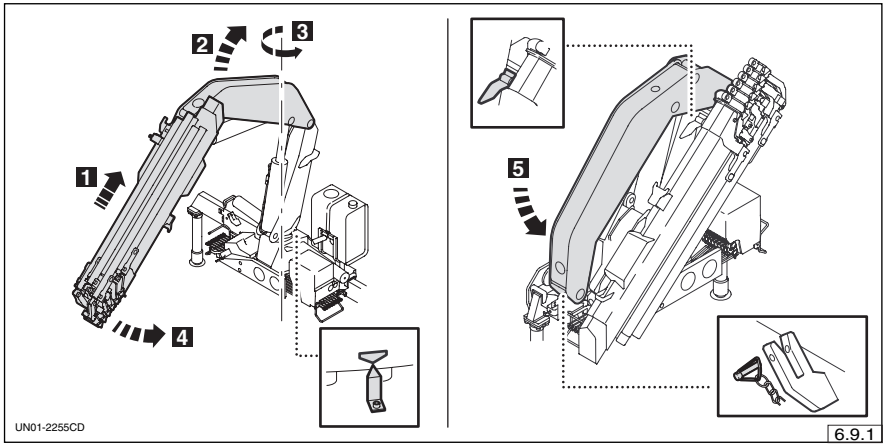
The appropriate manoeuvres to transfer the load (crane and jib arms horizontally), fig. 6.8.3, are:

1 - first extend the crane arms and then the jib arms;

2 - retract the jib arms and then the crane arms.



6.9 - Crane resting position



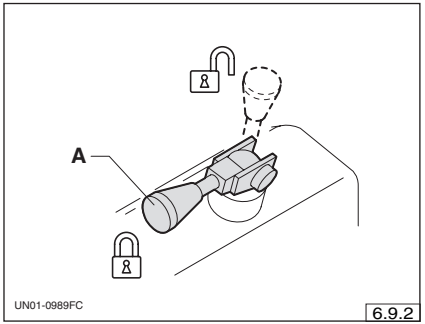
HAZARD !

To avoid the risk of accidents, manoeuvre the crane from the opposite side to the main arm closing.

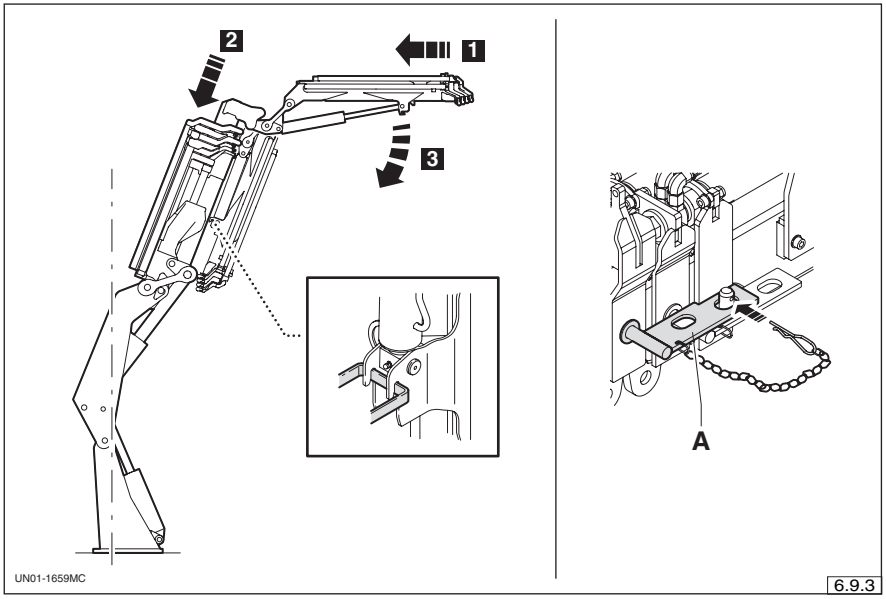
To place the crane in the resting position, carry out the following manoeuvres (fig. 6.9.1).

1 - Retract the crane arms;
2 - open the main jack;
3 - turn the crane until it fits the reference points located on the column and base;
4 - close the secondary jack;
5 - close the main jack making sure that the main arm of the crane fits into the special anti-rotation supports.

In the “LC” version check that the arms are correctly locked by the extension lock device “A”.



6.9.1 - Crane resting position with jib



To set the crane in the resting position, perform the following manoeuvres:

1 - retract the jib arms completely;

2 - retract the crane arms, leaving them slightly open to allow the jib to be locked;

3 - close up the articulation jack;

4 - retract the crane arms completely;

5 - perform the manoeuvres described in para. “Crane resting position”;

6 - switch on the safety device “A”.

6.10 - Crane destabilisation and circulation on the roads

- Crane destabilisation

Close up the machine into the resting position.

1 - Retract all the stabiliser jacks completely;
2 - retract all the stabiliser arms completely;
3 - check that the safety devices for road travel are activated;
4 - deactivate the power takeoff;
5 - check that the crane is within the maximum outreach limits foreseen by the Highway Code.

For machines fitted with adjustable hydraulic outriggers see “Adjustable hydraulic outrigger” - Destabilisation.

- Circulation on the roads

WARNING !

Before setting off, make sure the power takeoff is switched off to prevent serious damage to the vehicle.

Driving the vehicle and crane outfitting requires particular skill and training, in addition to a extreme awareness of the responsibility it entails, which is why only suitably trained and authorised persons may drive the machine.
Circulation on the road network is only permitted to approved machines and drivers meeting the requirements of the current highway code.
In any case, before setting off, ensure:
- the safety pins for circulation on the roads are fitted properly;
- any mobile parts which could move suddenly and unexpectedly are locked securely;
- all protruding parts are clearly marked with the relative warning plates.

6.11 - Locking the crane

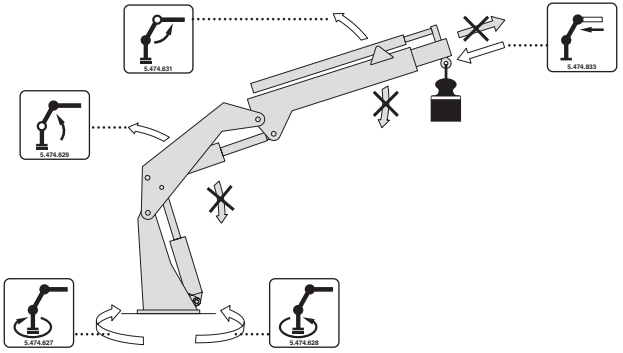
6.11.1- Lock situations and manoeuvres permitted

It is impossible to explain every lock situation; however, the following are illustrations of some situations in which they can occur.
As a general rule, manoeuvres that move the load towards the column are permitted.

Information

The retraction of the arms is always allowed, with the exception of the particular situations in which the manoeuvre overloads the column jack. In these cases, the arm retraction locks and it is possible to move the load with the remaining manoeuvres permitted.
If all the controls are inhibited, carry out the unlocking manoeuvres using the "3-30" system.

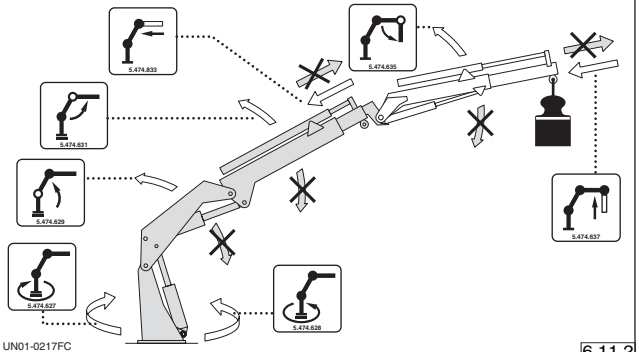
I Standard crane



UN01-0210FC

6.11.1

II **Standard crane and jib**
Intervention of the crane load limiter



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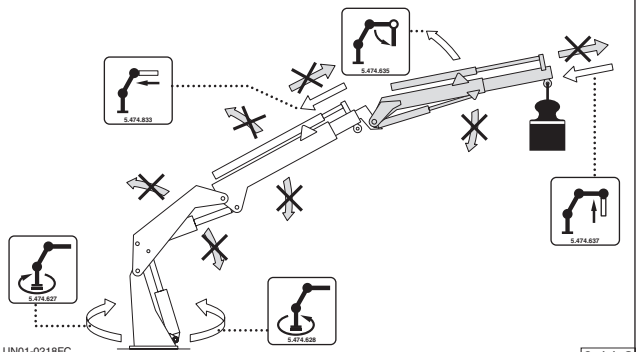
6.11.2

III **Standard crane and jib**
Intervention of the jib load limiter



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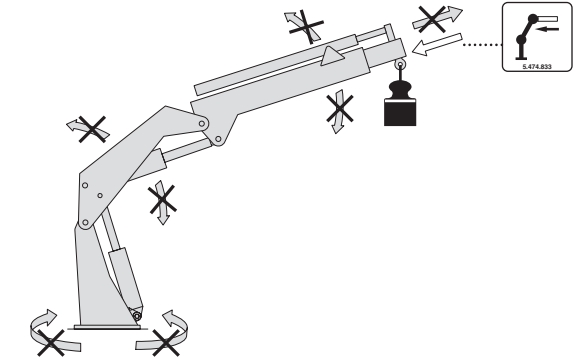
6.11.3

IV **Standard crane - limited area**



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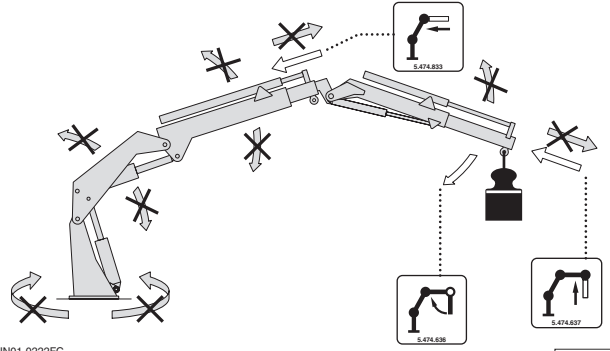
6.11.4

V **Standard crane and jib - limited area**



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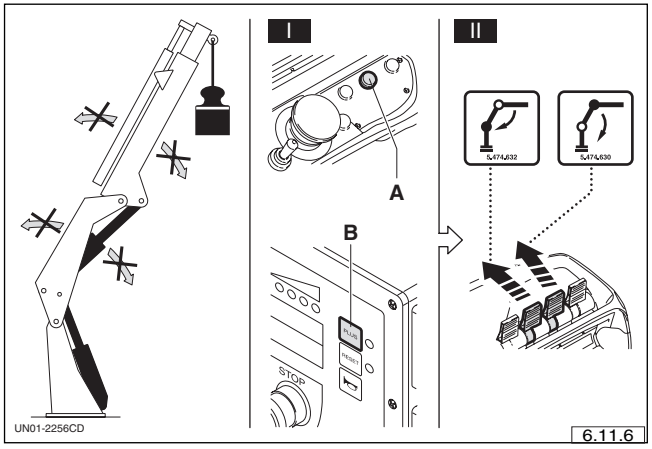
6.11.5

6.11.2- Resetting the functioning using the “3-30” system

Information

It is only possible to carry out the lowering of the load with the arms completely retracted.

Use the system when all the controls are inhibited and the machine is blocked.
”3-30” means that the system imposes 3 seconds of manoeuvre for lowering the load and 30 seconds for stopping the machine. Carry the operations out repeatedly until the load is placed onto the ground.



- Press reset button “A” (or button “B”) and use the controls of the locked jack to lower the load.

6.11.3- Winch lock

Handling loads which exceed the winch’s maximum limit will cause the winch to lock, therefore stopping mid-manoeuvre.
Invert the manoeuvre to unlock the winch, then replace the load in its initial position.
In the event that that reversal of the manoeuvre is not enough to unlock the winch, retract the crane’s arms while carrying out the reversed manoeuvre with the winch at the same time.

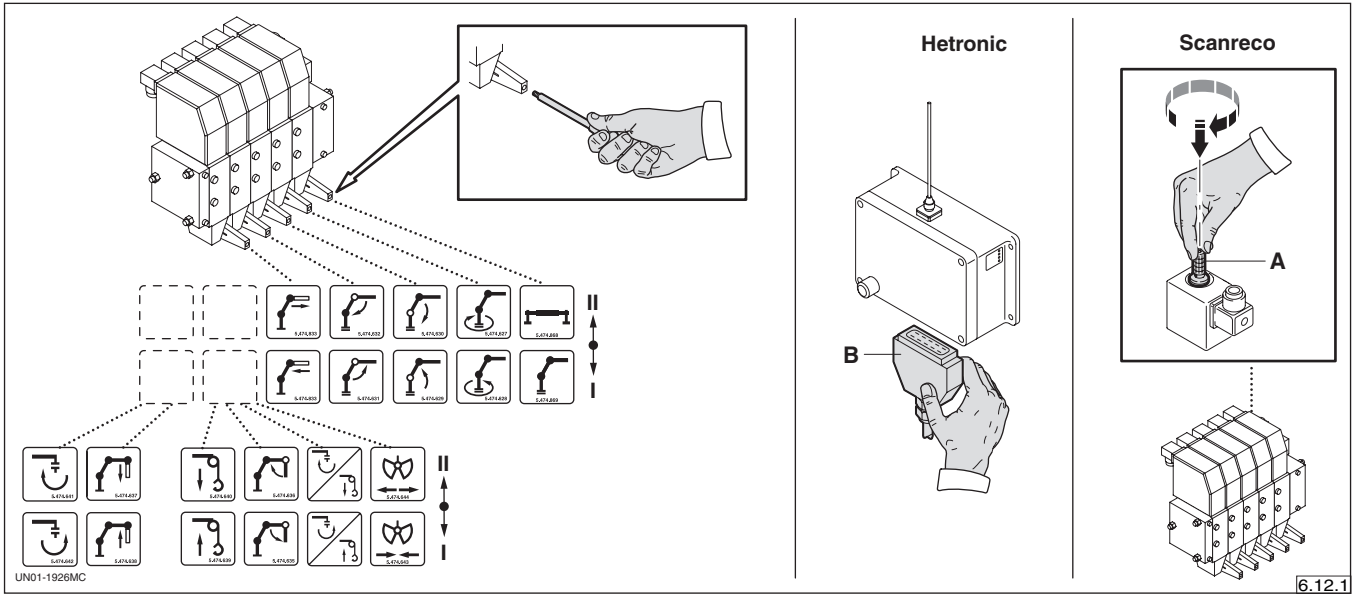
6.12 - Emergency situation

6.12.1- Crane resting position

As result, the electric/electronic or radio control malfunction causes the exclusion of the function control unit and it is possible to move the crane from the distributor.

HAZARD !

The exclusion of the function control unit makes it possible to tip the machine over, therefore operate with maximum care.
Only carry out the manoeuvres that move the load towards the column, in order to place the load on the ground.



Information

Distributor manoeuvres are only permitted in an emergency.
Moving the crane from the distributor with the functioning radio control causes the crane to lock.
To restart the machine restart the vehicle engine and reengage the power takeoff.

In the event of a radio control failure, proceed as follows to set the load down on the ground.

1 - "Scanreco" radio control
remove the seal and unscrew pawl "A" fully, as shown in fig. 6.12.1
or
"Hetronic" radio control
remove the seal and detach pin "B" from the receiver unit - fig. 6.12.1.

2 - Tighten the emergency lever fitted on every single part of the distributor to carry out the manoeuvres required to set the load down on the ground.

Information

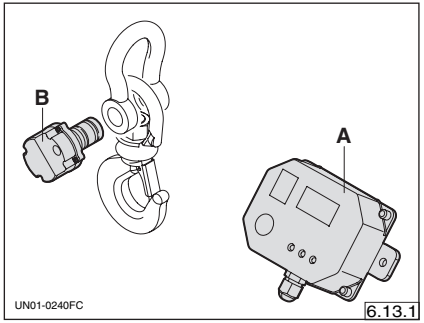
The seals on the load limiter's cut-off device must be replaced by an authorised workshop.

6.13 - Use of the load limiter for manual extensions

WARNING !

Before moving the load with the extensions, check that the transmitter pin is working and that it is mounted onto the extension that you wish to use.
Always select the number relating to the extension in use.
During movement of the load, do not for any reason change the number of the extension in use.
It is prohibited to lift loads larger than those indicated on the capacity diagrams (whatever the geometric configuration of the crane is).
In any case, never exceed the load value indicated on the plate attached to the extension.

The limiter informs the operator of the weight lifted by the extension in use.
On reaching the preset value (depending on the extension in use), all the load lifting manoeuvres stop immediately and so the overloading of the extension is avoided.



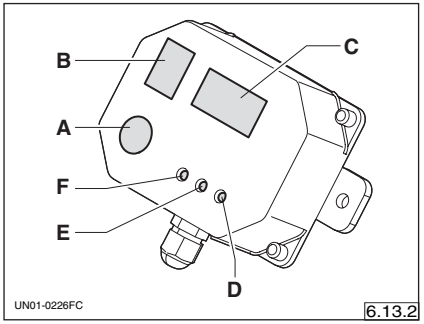
- Main parts

A - Receiver unit
B - Transmitter pin

- Technical data

Power voltage	from 12 to 24 V dc
Absorption	100 mA max.
Protection	IP 67
Emission frequency	FM 868,3 Mhz (CEPT SRD 1FI)
Battery	Ni-Mh 3,6V
Indicative battery duration	30 hours

- Controls and indicators



A - selection key for the extension in use;
B - display for the extension selected;
C - display for the weight in kg lifted by the extension in use;

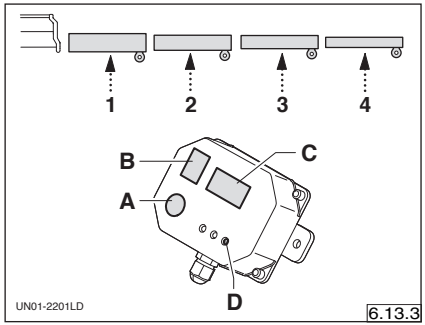
D - indicator light:
when on, it indicates that
- the preset weight for the extension in use has been exceeded;
- there is no transmitter unit radio signal (in this case the message “ERR” appears on the display “C”).

E - Indicator light.
When on, it indicates that the limiter is switched on.

F - Indicator light.
When on it indicates that the transmitter unit battery is nearly flat.
When the battery is totally flat, the “ERR” message appears on the display “C”.

- Functioning

1 - Using button “A”, select the manual extension that you wish to use, in accordance with the diagram in fig. 6.13.3 (max. 4 extensions). The number of the extension appears on the display “B”.
2 - Install the hook/transmitter onto the selected extension.
3 - Lift the load.
On reaching the maximum load that can be lifted by the extension in use, the crane buzzer is activated, the indicator light “D” switches on. The corresponding icon appears on the remote control and the control unit displays.
All the lifting manoeuvres by the crane are blocked and only lowering movements to place the load on the ground are permitted.
With the load on the ground, the alarm stops and it is possible to start work again.



WARNING !

If all the controls are inhibited, press the button “A” until a flashing cursor that indicates the deactivation of the load limiter appears on the display “B”. The operator has to manoeuvre with maximum care and place the load on the ground in order to avoid any accidents.

- Displaying the maximum preset values(fig. 6.13.3)

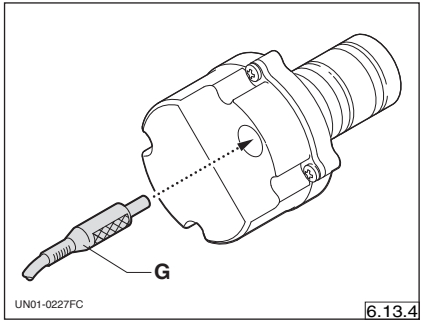
1 - Using button “A”, select the number of the extension for which you wish to know the maximum preset load; the number of the extension appears on the display “B”;
2 - keep button “A” pressed for at least 5 seconds; the load value flashes on the display “C”;
3 - release the button to return to normal functioning.

WARNING !

The values for the maximum loads of the manual extensions were originally preset by PM Autogru or at an authorised service centre. Any re-calibrations may only be carried out at an authorised service centre.
The maximum preset values are slightly higher than those indicated in the load diagrams, due to the tolerance of the device.

- Charging the battery

Connect the cable “G” of the battery charger to the transmitter unit and the 12 - 24 V dc vehicle socket.

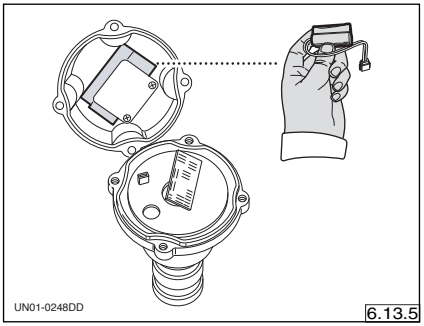


- Replacing the battery

1 - Unscrew the four screws and open the case;

2 - tip the case up and unscrew the two battery fixing screws;

3 - extend the connector to the card and replace the batteries.



Information

Do not use lithium batteries, as they are not suitable.
Only use batteries of the type indicated by the manufacturer.

7 Maintenance

7.1 - Regular checks

All the maintenance operations that are not provided for in this chapter must be carried out at an authorised PM service centre.

CAUTION !

Before carrying out any maintenance operation check that the oil has completely cooled down.

Regular checks Checks to be carried out by the operator						
Component	**Operation**	**Every 10 hours**	**Every 100 hours**	**Every 500 hours**	**Every 1000 hours**	**Manual reference number - para. -**
Pipes and hoses	Check	•				7.2
Hosing guard	Check integrity	•				7.3
Connections	Check for leaks	•				7.4
Plates	Check integrity	•				2.4
Hook	Check	•				3.1
Hydraulic oil	Check	•				7.5
Safety devices	Check	•				2.3
Structure	Inspection	•				7.6
Winch cable	Check	•				7.8
	Lubrication		•			7.9
Pulleys	Check integrity	•				7.7
	Running check	•				7.7
	Lubrication		•			7.20
Pin lock	Check		•			7.10
Crane stay rod	Check		•			7.11
Crane	Cleaning		•			7.13
Pins	Lubrication		•			7.20
Arms	Lubrication		•			7.14
Sliding blocks	Lubrication		•			7.20
Rotation block	Lubrication		•			7.20
Control levers	Lubrication		•			7.20
Jack sliding blocks	Check		•			7.12

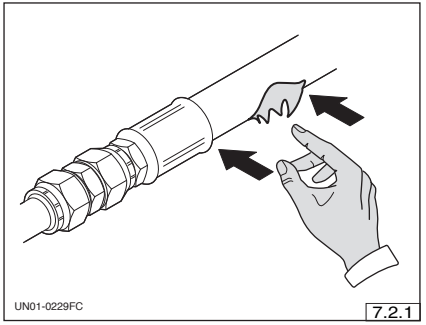
Regular checks Checks to be carried out by the operator						
Component	**Operation**	**Every 10 hours**	**Every 100 hours**	**Every 500 hours**	**Every 1000 hours**	**Manual reference number - para. -**
Filters	Check	•				7.15
	Replacement			•		7.15
Radio control batteries	Replacement				•	6.1
Manual extension limiter batteries	Replacement				•	6.12

Regular checks Checks that must be carried out at an authorised service centre						
Component	**Operation**	**Every 200 hours**	**Every 500 hours**	**Every 1000 hours**	**Every 2000 hours**	**Every 4000 hours**
Hydraulic oil	Check, replacement			•		
	Check contamination		•			
Safety devices	Check			•		
Structure	Inspection		•			
Sliding blocks	Replacement					•
Valves	Calibration		•			
Manual extensions	Adjustment		•			
Winch	Lubrication check	•				
	Lubrication replacement (*)		•			
	Check brake			•		
Hydraulic system	Washing					•

(*) For oil bath lubricated winches

7.2 - Checking the condition of the hoses

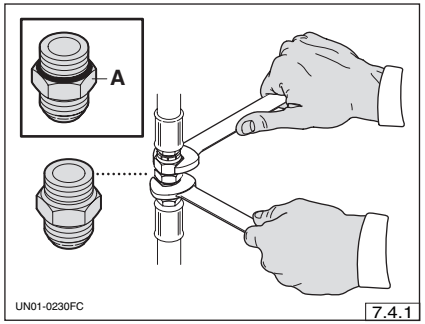
Check the fastening of the pipe connection and the condition of the hose. If the pipe shows any signs of ageing, breakage, bulging, abrasion, etc., it must be replaced.



7.3 - Checking the hosing guards

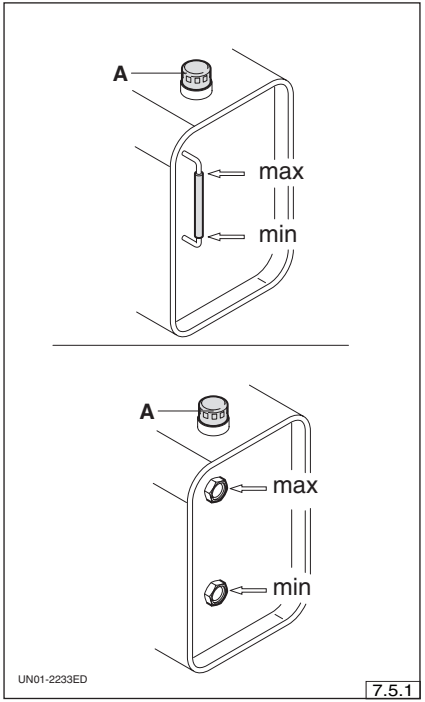
These guards protect the operator from oil spurts in the event of a breakage in the hosing.
If they are worn or broken, they must be replaced.

7.4 - Checking for oil leaks from the hydraulic system



Oil leaks from the connections can normally be eliminated by tightening the connections correctly.
Oil leaks from connection “A”, which is supplied with an airtight washer, can only eliminated by replacing the connection.

7.5 - Checking the hydraulic oil level



Check the oil level daily, which must be between the minimum and maximum marks.
If necessary, top up from mouth “A”.
For the oil characteristics see para “Oils and lubricants”.

i **Information**

Carry out the check with the crane in the resting position, with all the jacks retracted and the vehicle on a flat surface.

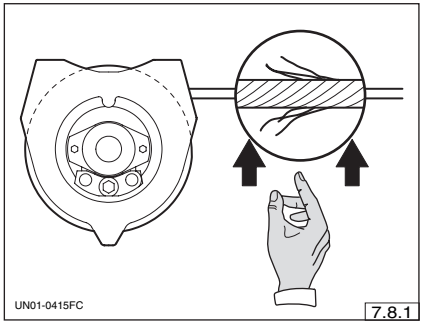
7.6 - Structure inspection

Wash the crane carefully before carrying out the checks.
Visually inspect the integrity of the structure in general and in particular the welding.
If any weakening or small cracks are noticed, immediately contact an authorised PM service centre.
As stated in the regular check schedule (para. “Regular checks”) have the structure checks carried out at an authorised PM service centre.

7.7 - Pulley check

- Check that the pulley races and flaps are in good condition; if they are worn or broken, they must be replaced.
- Check that they run smoothly when rotating and if they do not, contact an authorised PM workshop.

7.8 - Cable check

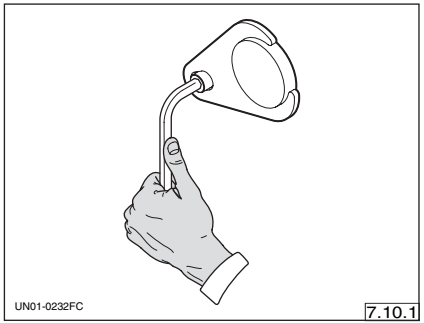


The cable must be carefully examined for any wear which could alter its technical features.
The cable must be replaced when:
- the quantity of the broken wires (in a section whose length is equal to four times the screw pitch of the elementary wire in the strand) is over 10% of the total wires making up the cable;
- the wire wear is extremely visible (10% reduction in the diameter of the elementary wire);
- the cable is permanently warped with slackening of the trefoils;
- the cable has considerable dents or permanent twisting, has been crushed, its core is coming out or has any other significant signs of wear;
- the sealing on the cable ends is damaged.

7.9 - Cable lubrication

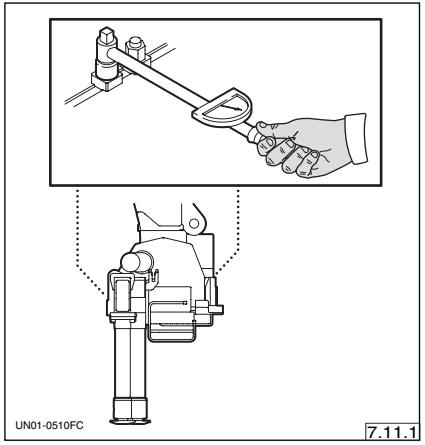
The lubrication must be carried out with particular care to protect the cable from corrosive external elements and to reduce the friction with the pulleys.
For lubricant specifications, see para. “Oils and lubricants”.

7.10 - Checking the pin locks



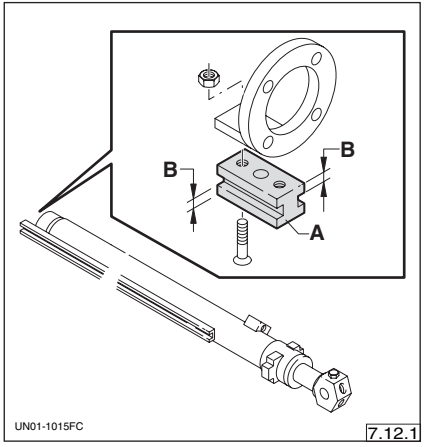
Check the fixing screws of the pin locks. If they have loosened, tighten the screws to the tightening torque of 4 daNm (30 lbf - ft).

7.11 - Checking the anchorage stay rods



Check that the anchorage stay rods are tightened; if not, tighten the nuts to the tightening torque of 95 daNm (701 lbf - ft).

7.12 - Checking the jack sliding blocks



Check the wear of sliding blocks “A”.
At an authorised service centre, have the sliding blocks replaced when the wings “B” are less than 4 mm (0.157”).

7.13 - Cleaning the machine

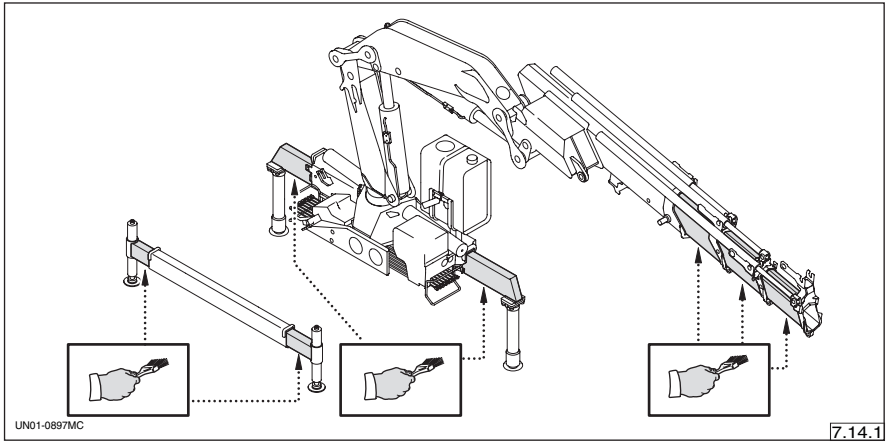
Clean the jack shafts to avoid dirt building up.
Clean the machine with a jet of pressurised water, using detergents that are authorised by the standards in force.
Do not orient a jet of pressurised water to electrical equipment to avoid damaging it.

7.14 - Lubrication of the crane arms and stabilisers

After having carried out the lubrication, carry out some arm extension manoeuvres without a load, in order to distribute the lubricant.
For the lubricant characteristics see para. “Oils and lubricants”.

- Crane arms
Extend the arms completely and grease the upper and lower surfaces.
Grease the sides of the arms when the lateral sliding blocks are assembled.

- Stabiliser arms
Extend the arms completely and grease the lateral surfaces.



7.15 - Filters

i **Information**

After the first 20 hours of work and in general after every maintenance operation on the hydraulic system, replace the filter cartridges to ensure the efficiency of the filtering system (see “Filters replacement”).
If there are any solid deposits inside the filtering unit, contact an authorised service centre.

7.16 - Long periods of machine inactivity

If the crane has to remain inactive for a long period of time, it is necessary to:

1) wash it and fold it back into the resting position with all the jacks closed. If this is not possible, clean and lubricate the part of the jackshafts that remains exposed to the atmospheric agents.
2) Park the machine in a sheltered area, which can only be accessed by authorised personnel;
3) check and replace the damaged and worn components;
4) check and remove any fluid leaks;
5) check and top up all the fluid levels if necessary.

7.17 - Starting the machine up again

Before starting the machine up again after a long period of inactivity, carry out the following checks and operations:

1) wash the machine completely;
2) grease all the components that are subject to lubrication;
3) check and top up all the fluid levels if necessary;
4) check and remove any fluid leaks;
5) check the integrity of the pipes and hoses;
6) check and replace any damaged components;
7) check the correct functioning of the controls and visual indicators;
8) check the correct functioning of all the safety devices;
9) carry out the maintenance operations in accordance with the planned maintenance schedule (see para. “Regular checks”).

7.18 - Scrapping

The scrapping of the machine must be entrusted to personnel that are specialised in such work and have the necessary hydraulic and mechanical skills.
The components must be separated, depending on the nature of the material they are composed of, and sent to authorised collection centres.

7.19 - Oils and lubricants

Never mix oils of different types together, in order to avoid machine malfunctions.
For top ups, only use preventively filtered oils (maximum filtration grade, class 9, in accordance with Nas 1638-18/14 ISO 4406).

Environmental temperature 0 ÷ 50 °C (32 ÷ 122 °F)

Lubricant	AGIP (1)	MOBIL	SHELL	TOTAL	ESSO	TAMOIL
Hydraulic oil	OSO 46	DTE OIL 25	TELLUS OIL 46	AZOLLA ZS 46	NUTO H46	HVI 46
Grease	GR CC2	MOBIL-FLEX 47	SUPER GREASE EP 2	MULTIS 2	GP grease	--

(1) Lubricant used by the manufacturer to fill the tank for the first time

Environmental temperature -15 ÷ 20 °C (-5 ÷ 68 °F)

Lubricant	AGIP	MOBIL	SHELL	TOTAL	ESSO
Hydraulic oil	OSO 32	DTE OIL 24	TELLUS OIL 32	AZOLLA ZS 32	NUTO H 32
Grease	GR CC2	MOBIL-FLEX 47	SUPER GREASE EP 2	MULTIS 2	GP grease

Information

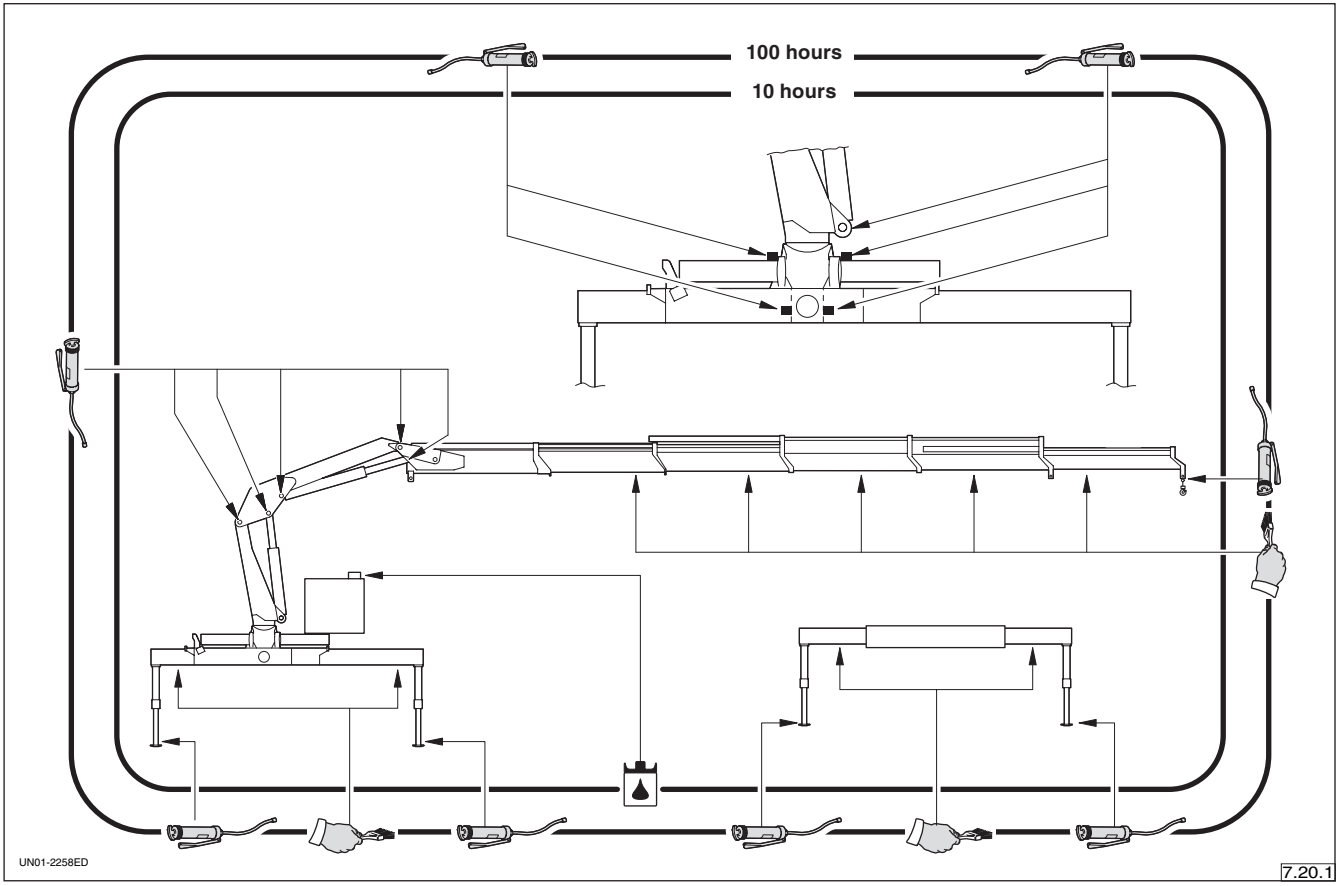
Do not dispose of the oil in the environment, as it causes pollution.

For lower temperatures

Lubricant	AGIP	MOBIL	SHELL	TOTAL	ESSO
Hydraulic oil	OSO 32	DTE OIL 22	TELLUS OIL 22	AZOLLA ZS 22	NUTO H 22
Grease	GR LP0	MOBIL-FLEX EP 0	SUPER GREASE EP 0	MULTIS EP0	BEACON EP 0

7.19.1- Lubricant comparison table

Lubricant		Environmental conditions		
		0÷40 °C	20÷50 °C	-10÷20 °C
Hydraulic oil	ISO 3348	ISO VG 32	ISO VG 46	ISO VG 22
 Grease		NLGI 2 calcium/ lithium	NLGI 2 calcium/ lithium	NLGI 0 calcium/ lithium



Symbols = Hydraulic oil Grease Grease

8 Fault, cause, remedy

Fault	Cause possible	Remedy
The crane is completely stopped	Emergency buttons pressed	Release the emergency stop buttons
	The moment control device has come into operation	See “Block situation and manoeuvres allowed”
	The P.T.O is not engaged correctly	Engage the P.T.O
	P.T.O. engagement malfunctioning	Repair the P.T.O. engagement
	Electrical system malfunctioning	Check signals on push-button panel or electronic control unit displays
	There may be a lever switch for a dump body located on the latter	Position the switch on crane
	Radio control malfunctioning	Check radio control devices

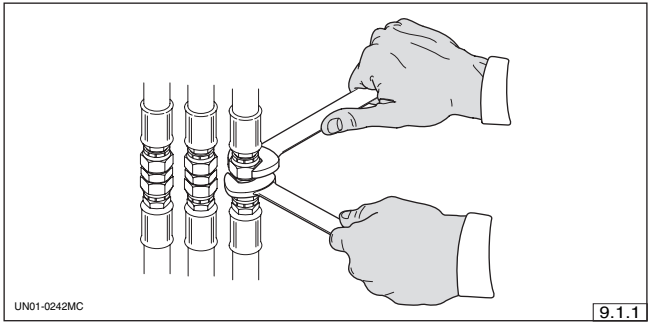
Fault	Cause possible	Remedy
The crane boom cannot hold the load and kreep down considerably	The pilot operated check valve fitted on the lift cylinder in question leaks	Have the valve checked and/or replaced by an authorized repair workshop
	Oil leakage inside the cylinder concerned	Have the seals inside the cylinder replaced by an authorised repair workshop
Permanent vibrations while operating on all the movements	Insufficient hydraulic oil	Add hydraulic oil to the tank (see “Checking the hydraulic oil level”)
	Clogging of hydraulic oil filter	Replace the filter cartridge (see “Filters replacement”)
	Suction hose obstructed	Locate the cause of the obstruction and remove it
	Inefficient pump	Check the pump flow; if it is not regular replace the pump
Considerable reduction in the speed of the movements	Low speed of the engine	Check the exact speed of the vehicle’s engine on the basis of the hydraulic boom extension time
	Radio and/or distributor system malfunctioning	Check signals on push-button panel or electronic control unit displays
	Inefficient pump	Check the pump flow; if it has decreased, replace the pump

Fault	Cause possible	Remedy
It is hard to engage the P.T.O.	If pneumatic: the air into the appropriate vehicle system is insufficient If mechanical: the control cable is obstructed	Check the pressure of the air in the vehicle's pneumatic system; stop any leaks Free the control cable
Vibrations in the arm unit during load translation	Sliding pads insufficiently lubricated Sliding pads too worn Insufficient hydraulic oil	Lubricate the sliding pads according to the relative instructions Consult an authorised workshop Check the level of the hydraulic oil
Lack of tension on the whole crane	Interrupted fuses P.T.O. relay malfunctioning	Replace the fuses Replace the relay
Electronic control unit off and crane not working	Control unit malfunctioning	Consult an authorised workshop

Fault	Cause possible	Remedy
Radio control off or not working	Interrupted radio fuse	Replace the fuse (see ”Fuse replacement”)
	Radio unit malfunctioning	Consult an authorised workshop
	Push-button panel battery exhausted	Recharge the battery
	Interferenced radio transmission	Connect via cable the push-button panel to the receiver on the crane
	Receiver antenna malfunctioning	Consult an authorised workshop
	Emergency stop push-button pressed	Release the emergency stop push-button
Heat exchanger not working	Exchanger activation device malfunctioning	Have the device replaced by an authorized repair workshop
	Exchanger electrical connections cut-off	Check all electrical contacts
	Fan motor not working	Have the device replaced by an authorized repair workshop
	Satellite electronic control unit malfunctioning	Have the device replaced by an authorized repair workshop

9 Spare part replacement

9.1 - Hose replacement



HAZARD !

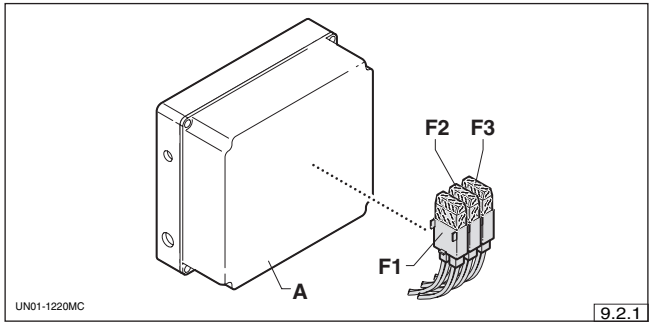
The hosing must be replaced with the hydraulic system depressurised and when the oil has completely cooled down.

To depressurise the system, disconnect the power take off, stop the truck engine and move the control levers back and forwards.
Unscrew the joints and collect oil into a suitable tank.
Replace the hose and tighten the joints.

9.2 - Fuse replacement

Before replacing the interrupted fuse, remove the cause of its blowing up.
Replace the blown fuse with a new one having the same characteristics.

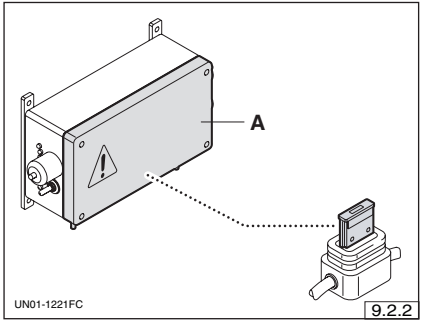
9.2.1 - Connector block fuse replacement



Remove the cap “A” and replace the interrupted fuse.

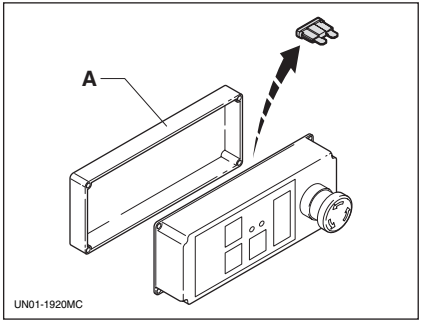
Pos.	Protected circuit	Ampére
F1	Main circuit (electronic control units, radio)	15
F2	Secondary circuit (operating control unit)	5
F3	Heat exchanger circuit	20

9.2.2 - Radio receiver fuse replacement



Remove the cap “A” and replace the interrupted fuse with a 10 A new one.

9.2.3 - Fuse replacement on the functional control unit



9.2.3

Remove the cap “A” and replace the interrupted fuse with a 10 A new one.

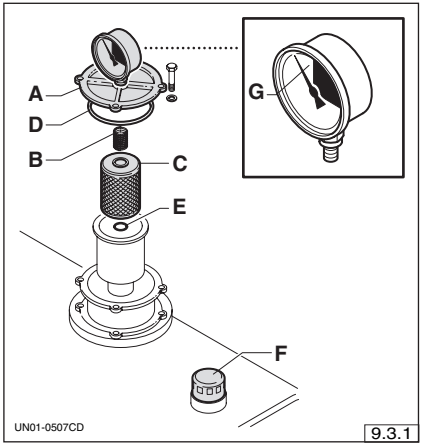
9.3 - Filters replacement

CAUTION !

The filters must be replaced when the oil has completely cooled down.

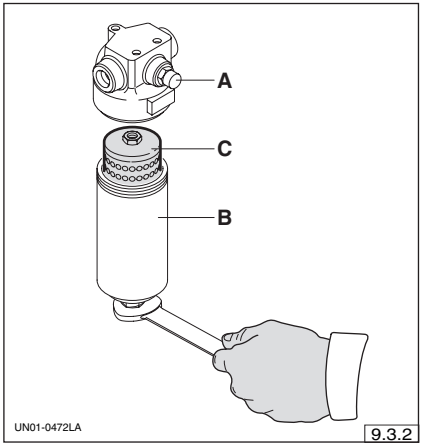
9.3.1 - Replacing the exhaust filter

When the filter cartridge is replaced, the exhaust plug “F”, equipped with a 3 micron filtering grade air filter, must also be replaced.
Replace the filter cartridge, as it is not washable, when the hand of the pressure gauge is in the red area “G” (clogged filter) - fig. 9.3.1.
In any case, replace the filter cartridge as specified on the maintenance schedule (see “Routine checks”).
To replace, proceed as follows.
1 - Carefully clean the external surfaces of the filter;
2 - unscrew the screws on cover “A”;
3 - remove the spring “B” and the filtering cartridge “C”;
4 - check the condition of the washers “D” and “E”; if they are damaged replace them.
To reassemble the filter, carry out the disassembly operations in reverse.

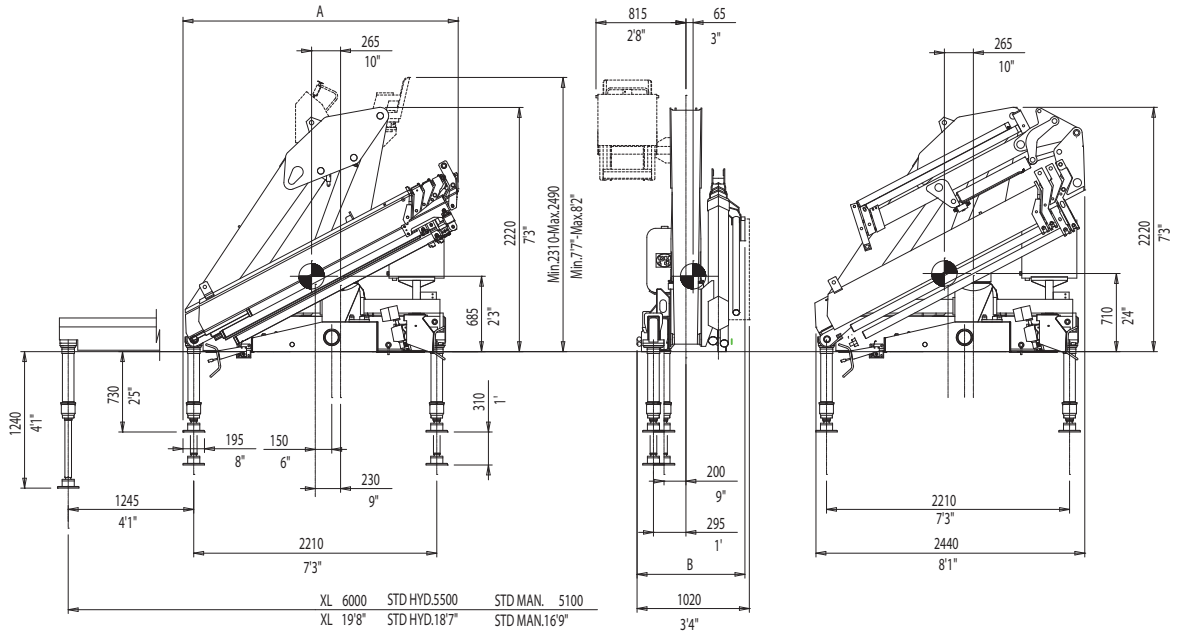


9.3.2 - Delivery filter replacement

Replace the filter cartridge when the clog signal light “A” goes red.
In any case, replace the filter cartridge as specified on the maintenance schedule (see “Routine checks”).
For the replacement proceed as follows:
1 - Carefully clean the external surfaces of the filter;
2 - turn off the tank tap;
3 - unscrew the filter unit “B” and drain the oil inside it;
4 - replace the filter cartridge “C”.
Tighten the filter unit to a tightening torque of 10 daNm (73,7 lbf - ft).
Turn on the tank tap.



- Overall dimensions



	14021	14022	14023	14024	14025
A (mm)	2410	2410	2410	2460	2500
A (Ft)	7'11"	7'11"	7'11"	8'1"	8'2"
B (mm)	860	860	860	860	980
B (Ft)	2'10"	2'10"	2'10"	2'10"	3'3"

PM-ingombri

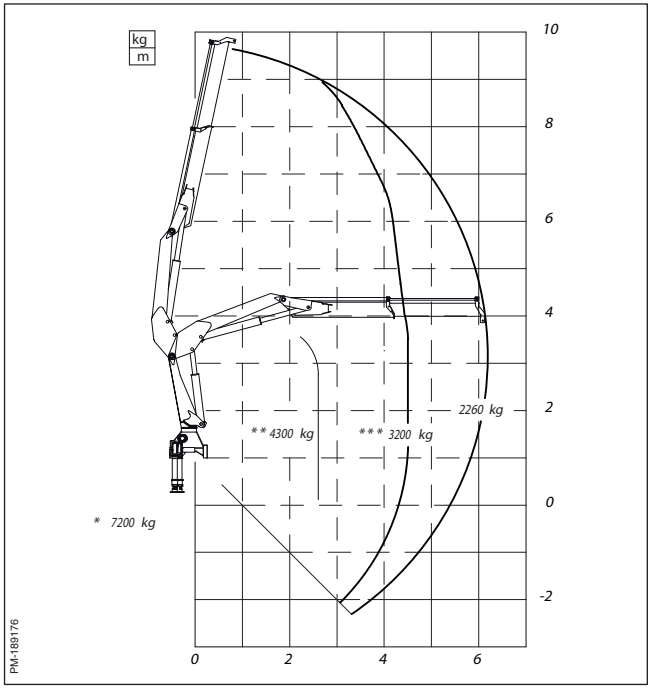
- Specifications and performances

14021 E

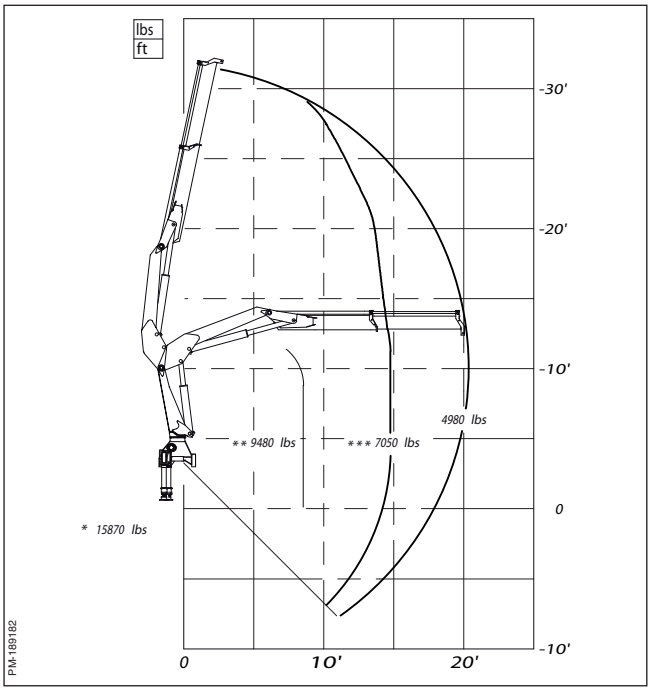
Max. lifting momentum	kNm	140	ft lbs	103258
	tm	14,2	/	/
Hydraulic outreach:				
Horizontal	m	6,50	ft	21’4”
Vertical	m	9,80	ft	32’2”
Outreach with manual extensions:				
Horizontal	m	/	ft	/
Vertical	m	/	ft	/
Hydraulic system:				
Recommended capacity	l/min	30	gals/min	7,9
Maximum pressure	Mpa	29,5	psi	4279
Oil tank capacity	l	88	gals	23
Rotation unit:				
Rotation angle	°	400	°	400
Rotation torque	kNm	16	ft lbs	11063
Weight of standard crane with tank empty	kg	1770	lbs	3902
Maximum power absorbed by the hydraulic pump	kW	21,9	HP	29,3
Maximum force exerted on ground by stabilisers	kN	75	lbs	16860
Specific operating pressure of each stabiliser with Ø 195 mm (7’6”) disk	Mpa	2,5	psi	362
Arm pack extension time for standard unit	sec.	11	sec.	11
“Fixed” hook (optional) - Capacity	kg	8500	lbs	18740
“Mobile” hook - Capacity	kg	7500	lbs	16535

- Capacities diagram

14021 E



* Maximum capacity at fixed hook
** Nominal capacity with mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°



* Maximum capacity at fixed hook
** Nominal capacity with mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

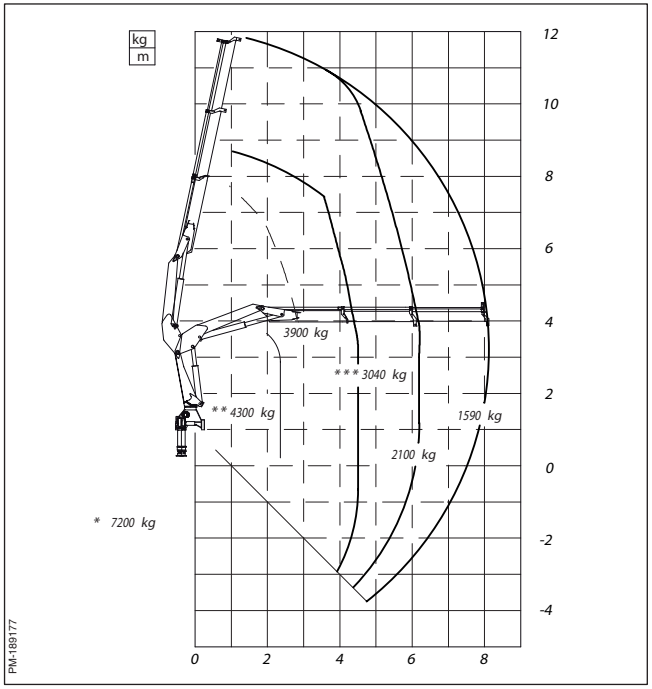
- Specifications and performances

14022 E - 14022 E LC

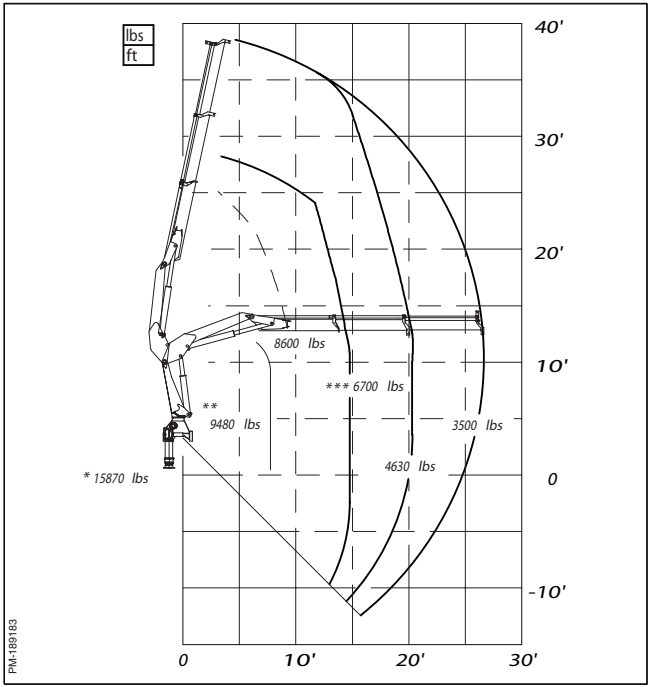
Max. lifting momentum	kNm	136	ft lbs	100308
	tm	13,8	/	/
Hydraulic outreach:				
Horizontal	m	8,45	ft	27’9”
Vertical	m	11,75	ft	38’7”
Outreach with manual extensions:				
Horizontal	m	/	ft	/
Vertical	m	/	ft	/
Hydraulic system:				
Recommended capacity	l/min	30	gals/min	7,9
Maximum pressure	Mpa	29,5	psi	4279
Oil tank capacity	l	88	gals	23
Rotation unit:				
Rotation angle	°	400	°	400
Rotation torque	kNm	16	ft lbs	11063
Weight of standard crane with tank empty	kg	1880	lbs	4145
Weight of LC crane with tank empty	kg	2030	lbs	4475
Maximum power absorbed by the hydraulic pump	kW	21,9	HP	29,3
Maximum force exerted on ground by stabilisers	kN	75	lbs	16860
Specific operating pressure of each stabiliser with Ø 195 mm (7’6”) disk	Mpa	2,5	psi	362
Arm pack extension time for standard unit	sec.	22	sec.	22
Arm pack extension time for LC unit	sec.	28	sec.	28
“Fixed” hook (optional) - Capacity	kg	8500	lbs	18740
“Mobile” hook - Capacity	kg	7500	lbs	16535

- Capacities diagram

14022 E - 14022 E LC



---- Capacity of LC version
* Maximum capacity at fixed hook
** Maximum capacity at mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°



---- Capacity of LC version
* Maximum capacity at fixed hook
** Maximum capacity at mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

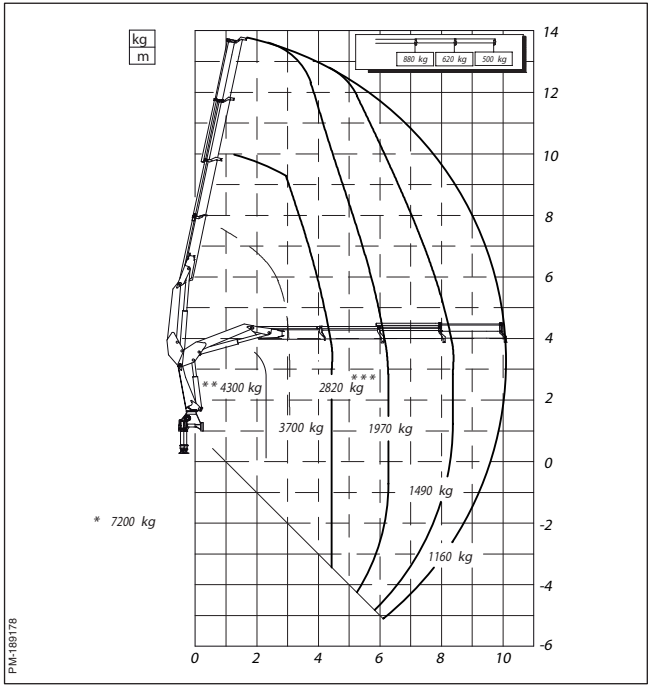
- Specifications and performances

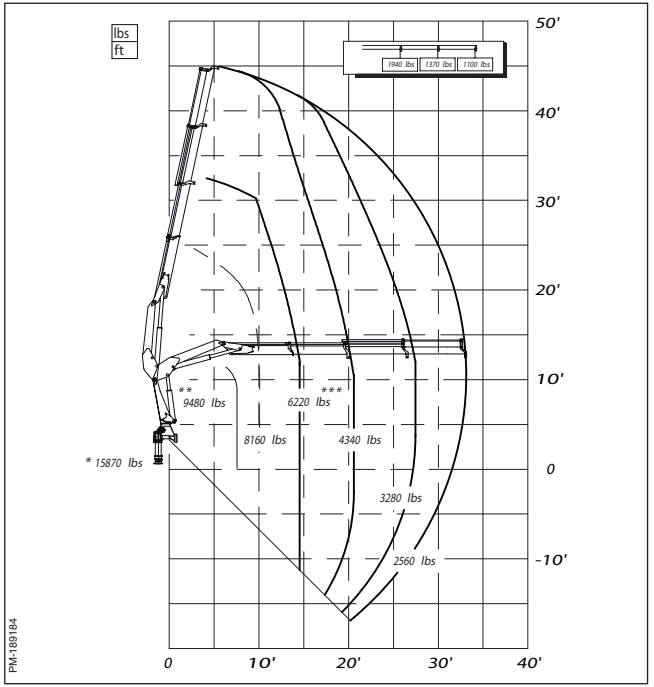
14023 E - 14023 E LC

Max. lifting momentum	kNm	127	ft lbs	93670
	tm	13,0	/	/
Hydraulic outreach:				
Horizontal	m	10,45	ft	34’3”
Vertical	m	13,70	ft	44’11”
Outreach with manual extensions:				
Horizontal	m	16,05	ft	52’8”
Vertical	m	19,25	ft	63’2”
Hydraulic system:				
Recommended capacity	l/min	30	gals/min	7,9
Maximum pressure	Mpa	29,5	psi	4279
Oil tank capacity	l	88	gals	23
Rotation unit:				
Rotation angle	°	400	°	400
Rotation torque	kNm	16	ft lbs	11063
Weight of standard crane with tank empty	kg	1990	lbs	4387
Weight of LC crane with tank empty	kg	2140	lbs	4717
Maximum power absorbed by the hydraulic pump	kW	21,9	HP	29,3
Maximum force exerted on ground by stabilisers	kN	75	lbs	16860
Specific operating pressure of each stabiliser with Ø 195 mm (7’6”) disk	Mpa	2,5	psi	362
Arm pack extension time for standard unit	sec.	46	sec.	46
Arm pack extension time for LC unit	sec.	50	sec.	50
“Fixed” hook (optional) - Capacity	kg	8500	lbs	18740
“Mobile” hook - Capacity	kg	7500	lbs	16535

- Capacities diagram

14023 E - 14023 E LC





---- Capacity of LC version
* Maximum capacity at fixed hook
** Maximum capacity at mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

---- Capacity of LC version
* Maximum capacity at fixed hook
** Maximum capacity at mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

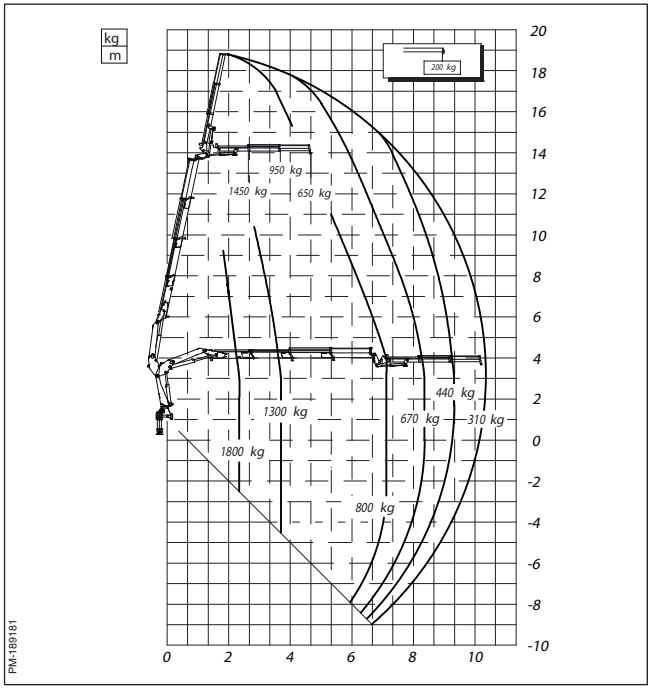
- Specifications and performances

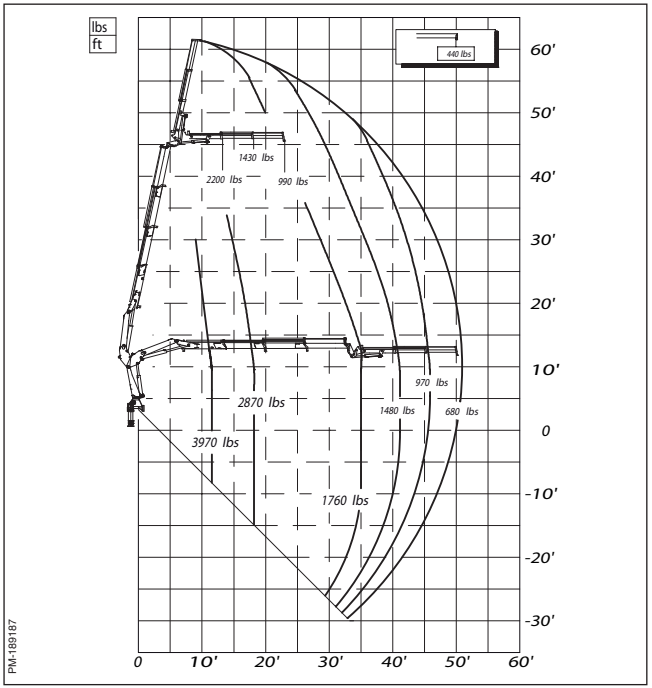
14023 E - with jib J 12

Max. lifting momentum	kNm	/	ft lbs	/
	tm	/	/	/
Hydraulic outreach:				
Horizontal	m	15,65	ft	51’4”
Vertical	m	18,75	ft	61’6”
Outreach with manual extensions:				
Horizontal	m	17,15	ft	56’3”
Vertical	m	20,20	ft	66’3”
Hydraulic system:				
Recommended capacity	l/min	30	gals/min	7,9
Maximum pressure	Mpa	29,5	psi	4279
Oil tank capacity	l	88	gals	23
Rotation unit:				
Rotation angle	°	400	°	400
Rotation torque	kNm	16	ft lbs	11063
Weight of standard crane with tank empty	kg	2280	lbs	5027
Maximum power absorbed by the hydraulic pump	kW	21,9	HP	29,3
Maximum force exerted on ground by stabilisers	kN	75	lbs	16860
Specific operating pressure of each stabiliser with Ø 195 mm (7’6”) disk	Mpa	2,5	psi	362
Arm pack extension time for standard unit	sec.	/	sec.	/
“Fixed” hook (optional) - Capacity	kg	8500	lbs	18740
“Mobile” hook - Capacity	kg	7500	lbs	16535
Jib hook - Capacity	kg	2000	lbs	4409

- Capacities diagram

14023 E - with jib J 12





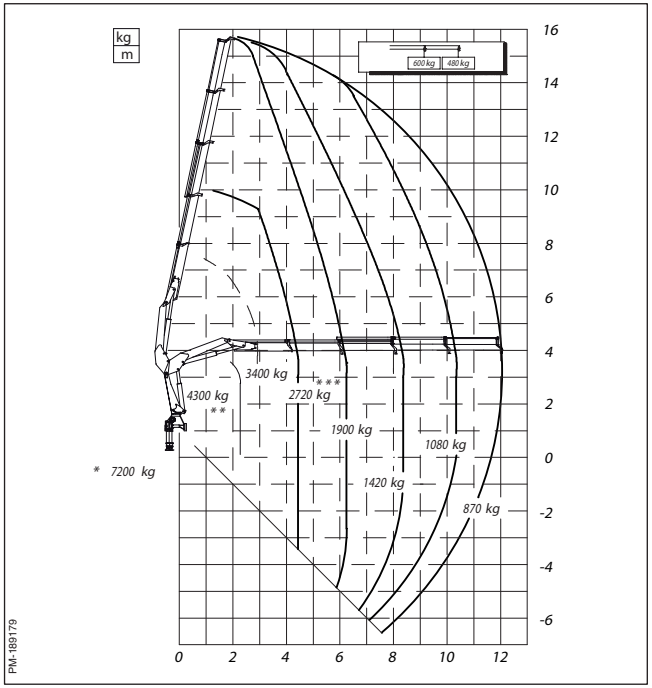
- Specifications and performances

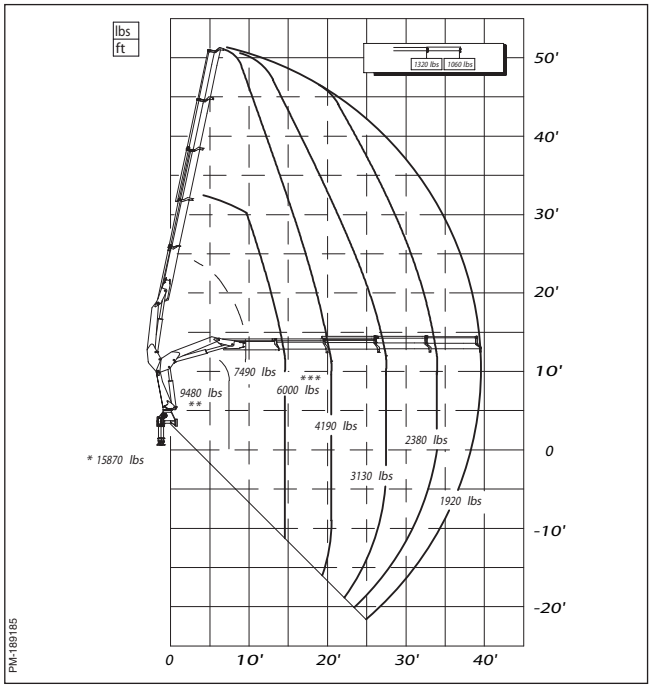
14024 E - 14024 E LC

Max. lifting momentum	kNm	125	ft lbs	92195
	tm	12,8	/	/
Hydraulic outreach:				
Horizontal	m	12,40	ft	40’8”
Vertical	m	15,60	ft	51’2”
Outreach with manual extensions:				
Horizontal	m	16,15	ft	52’11”
Vertical	m	19,35	ft	63’6”
Hydraulic system:				
Recommended capacity	l/min	30	gals/min	7,9
Maximum pressure	Mpa	29,5	psi	4279
Oil tank capacity	l	88	gals	23
Rotation unit:				
Rotation angle	°	400	°	400
Rotation torque	kNm	16	ft lbs	11063
Weight of standard crane with tank empty	kg	2080	lbs	4585
Weight of LC crane with tank empty	kg	2230	lbs	4916
Maximum power absorbed by the hydraulic pump	kW	21,9	HP	29’3”
Maximum force exerted on ground by stabilisers	kN	75	lbs	16860
Specific operating pressure of each stabiliser with Ø 195 mm (7’6”) disk	Mpa	2,5	psi	362
Arm pack extension time for standard unit	sec.	46	sec.	46
Arm pack extension time for LC unit	sec.	50	sec.	50
“Fixed” hook (optional) - Capacity	kg	8500	lbs	18740
“Mobile” hook - Capacity	kg	7500	lbs	16535

- Capacities diagram

14024 E - 14024 E LC





---- Capacity of LC version
* Maximum capacity at fixed hook
** Maximum capacity at mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

---- Capacity of LC version
* Maximum capacity at fixed hook
** Maximum capacity at mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

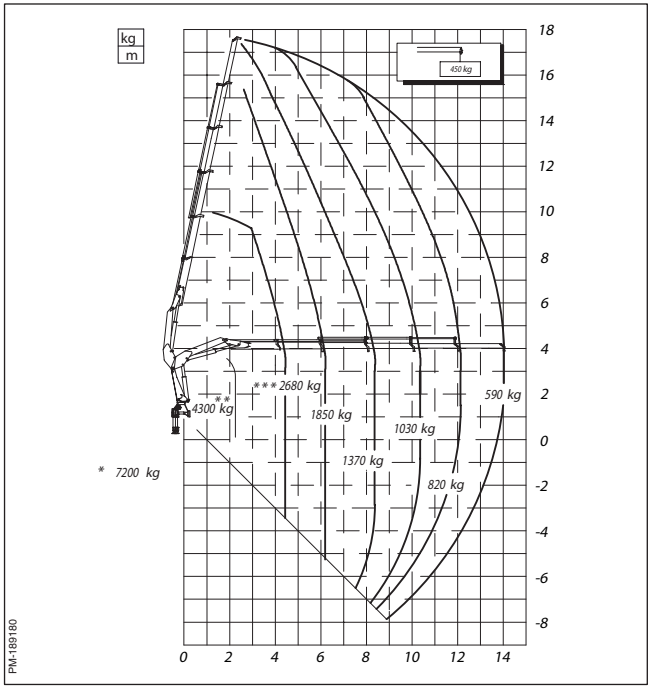
- Specifications and performances

14025 E

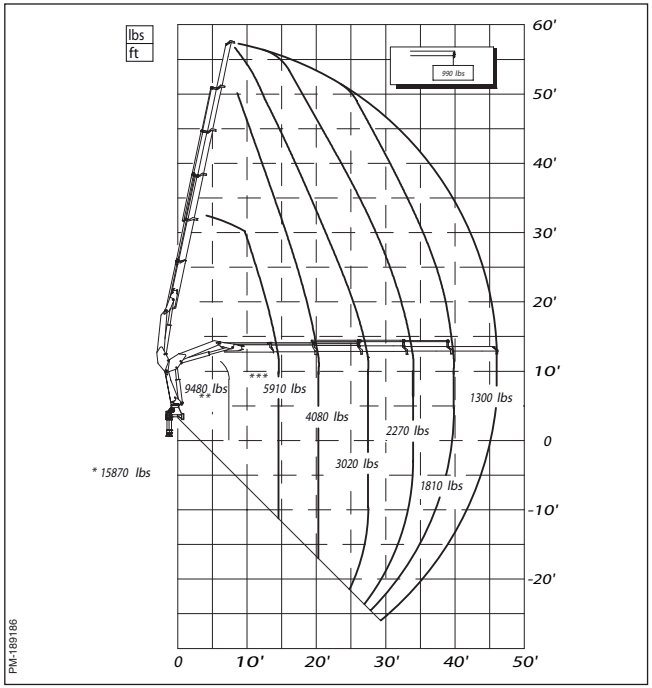
Max. lifting momentum	kNm	125	ft lbs	92195
	tm	12,7	/	/
Hydraulic outreach:				
Horizontal	m	14,40	ft	47’3”
Vertical	m	17,70	ft	58’1”
Outreach with manual extensions:				
Horizontal	m	16,15	ft	53’0”
Vertical	m	19,35	ft	63’6”
Hydraulic system:				
Recommended capacity	l/min	30	gals/min	7,9
Maximum pressure	Mpa	29,5	psi	4279
Oil tank capacity	l	88	gals	23
Rotation unit:				
Rotation angle	°	400	°	400
Rotation torque	kNm	16	ft lbs	11063
Weight of standard crane with tank empty	kg	2180	lbs	4806
Maximum power absorbed by the hydraulic pump	kW	21,9	HP	29,3
Maximum force exerted on ground by stabilisers	kN	75	lbs	16860
Specific operating pressure of each stabiliser with Ø 195 mm (7’6”) disk	Mpa	2,5	psi	362
Arm pack extension time for standard unit	sec.	60	sec.	60
“Fixed” hook (optional) - Capacity	kg	8500	lbs	18740
“Mobile” hook - Capacity	kg	7500	lbs	16535

- Capacities diagram

14025 E



* Maximum capacity at fixed hook
** Nominal capacity with mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°



* Maximum capacity at fixed hook
** Nominal capacity with mobile hook
*** Maximum capacity from horizontal to vertical
Note: the performances stated are obtained with the main arm inclined to 27°

- “CE” declaration of conformity of the machine

The figure shows a copy of the “CE” declaration of conformity; the original is issued by the manufacturer together with this manual.

a) Crane model

b) Serial number

c) Date of declaration

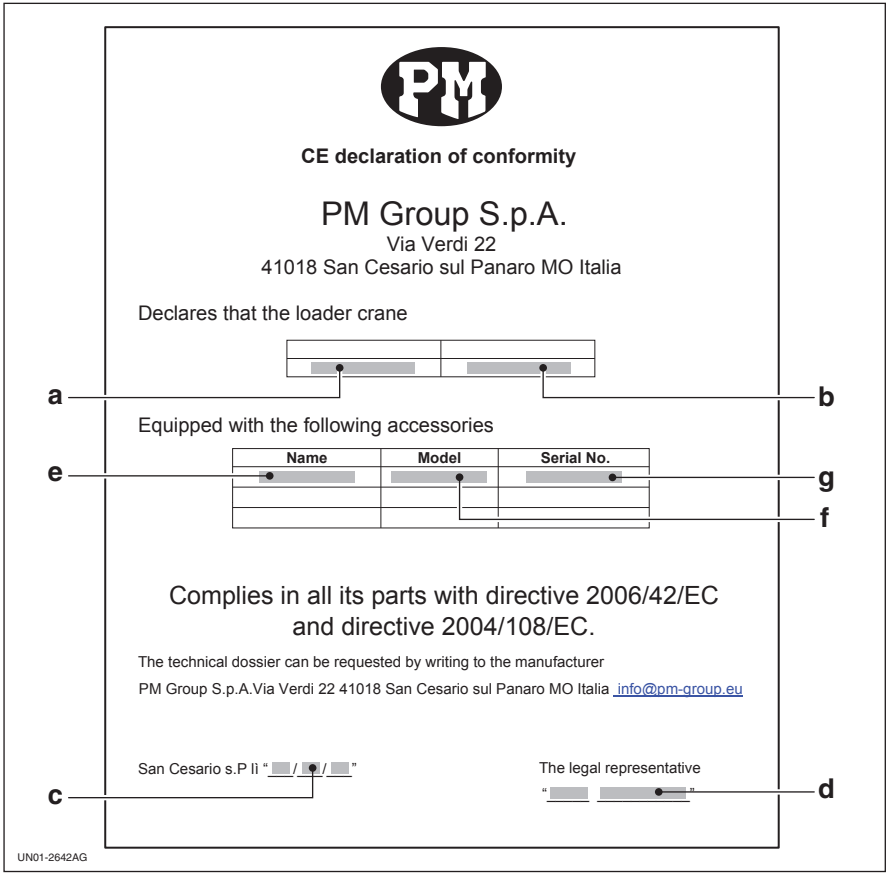
d) Signature of the person authorised to write the declaration

If the machine is equipped with accessories:

e) Name

f) Model

g) Serial number



- Record of the periodical technical inspections of the safety devices

Crane model		Year of manufacture	
Serial number		Year of installation	

Safety device inspected	Kind of inspection performed	Inspection result	Date	Date of next inspection	Name, businnes name and signature of the person responsible for inspection

Safety device inspected	Kind of inspection performed	Inspection result	Date	Date of next inspection	Name, businnes name and signature of the person responsible for inspection

Safety device inspected	Kind of inspection performed	Inspection result	Date	Date of next inspection	Name, businnes name and signature of the person responsible for inspection

Safety device inspected	Kind of inspection performed	Inspection result	Date	Date of next inspection	Name, businnes name and signature of the person responsible for inspection

Safety device inspected	Kind of inspection performed	Inspection result	Date	Date of next inspection	Name, businnes name and signature of the person responsible for inspection

NOTES

- Maintenance intervention confirmation

The service interventions must be carried out in series respecting the schedule.
Interventions must be marked with a cross.

At 500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐

stamp signature

At 1500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐

stamp signature

At 1000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐

stamp signature

At 2000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐

stamp signature

At 2500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐

stamp signature

At 3500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐

stamp signature

At 3000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐

stamp signature

At 4000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐
. Runner replacement ☐
. Hydraulic system washing ☐

stamp signature

At 4500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐

stamp signature

At 6500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐

stamp signature

At 6000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐

stamp signature

At 7000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐

stamp signature

At 7500 hours

. Hydraulic oil pollution check ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustment ☐

stamp signature

At ..... hours

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stamp signature

At 8000 hours

. Hydraulic oil replacement ☐
. Structural inspection ☐
. Valves calibration ☐
. Manual extension adjustments ☐
. Reduction gears oil replacement ☐
. Safety devices check ☐
. Runner replacement ☐
. Hydraulic system washing ☐

stamp signature

At ..... hours

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stamp signature

A

B

C