

# GORMAGH

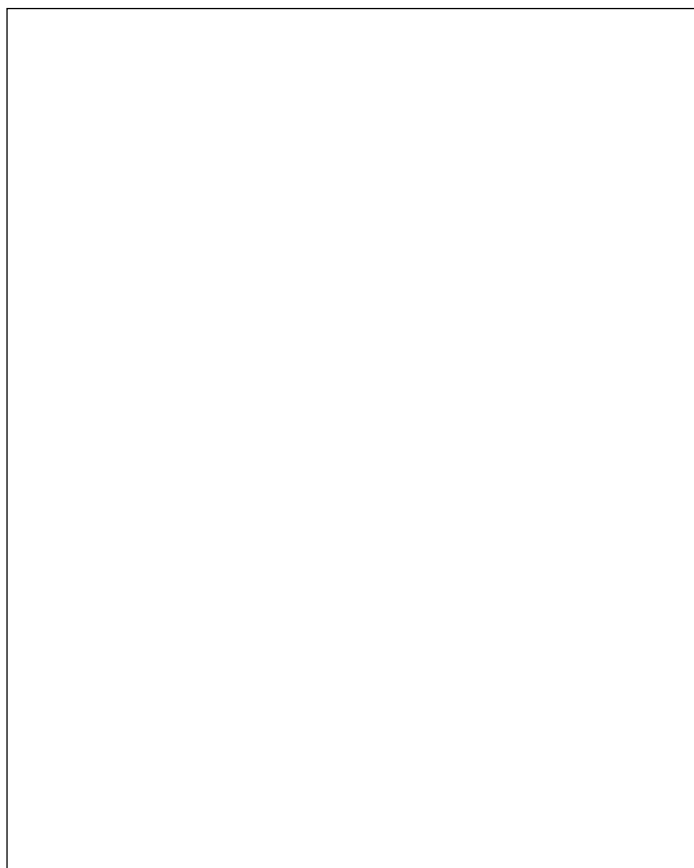
# 50000 WB

## HANDBOOK FOR USE AND MAINTENANCE

**EDITION: 1/2011**

Models

**50000 WB80**  
**50000 WB87**  
**50000 WB95**



**GORMAGH**

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**ENGLISH**

## IDENTIFICATION DATA

CRANE MODEL: **50000 WB**\_\_

SERIAL N°: \_\_\_\_\_ (The serial number is engraved in the frame, near the outriggers exit and on the crane identification plate, placed on the column).

FITTED ON VEHICLE (brand): \_\_\_\_\_ (model) \_\_\_\_\_

CHASSIS NUMBER: \_\_\_\_\_

## LIMITS IN USE

The crane/vehicle assembly is subject to the following limitations:

When stability, on front, is not granted (in front of driver's cab), the crane working area shall be limited to the rear 180°. The rotation towards the front is prevented with mechanical means. The load charts for the crane/vehicle assembly, apply only to the authorised working area.

When stability is not granted on the rear (Body side), the crane working area shall be limited to the front 180°. The rotation towards the rear is prevented with mechanical means. The load charts for the crane/vehicle assembly, apply only to the authorised working area.

When full stability is not granted, the lifting capacities in that working area are consequently limited. In the front working area **ONLY** the here joint loading chart is valid.(\*)

When stability is not granted on the front (in direction of the driver's cab), the lifting capacities, in that working area, shall be consequently limited. In the back working area **ONLY** the here-joint loading chart is valid.(\*)

When stability is not granted on the side (in forward motion sense of the vehicle), the lifting capacities shall be consequently reduced. For this crane/vehicle assembly **ONLY** the here-joint loading chart is valid.

Others (to be specified):

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(\* ) Valid only for cranes equipped with double load limiting device.

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## (Chapter 1) - TECHNICAL FEATURES

### 1.1 - GENERAL

In order to work, the lorry crane must be installed on a vehicle and, from this vehicle, take the mechanical power it needs. It follows that the correct performance and safety of the system depend on the installation.

It is important to note that the capacities given on the plate that is located on the crane are intended for lifting operations carried out with hook, pallets fork and buckets for loose material or any other device that doesn't build up other tensions on the structure the those of the hook itself.

Lifting capacities are calculated for a crane servicing the vehicle on which it is installed.

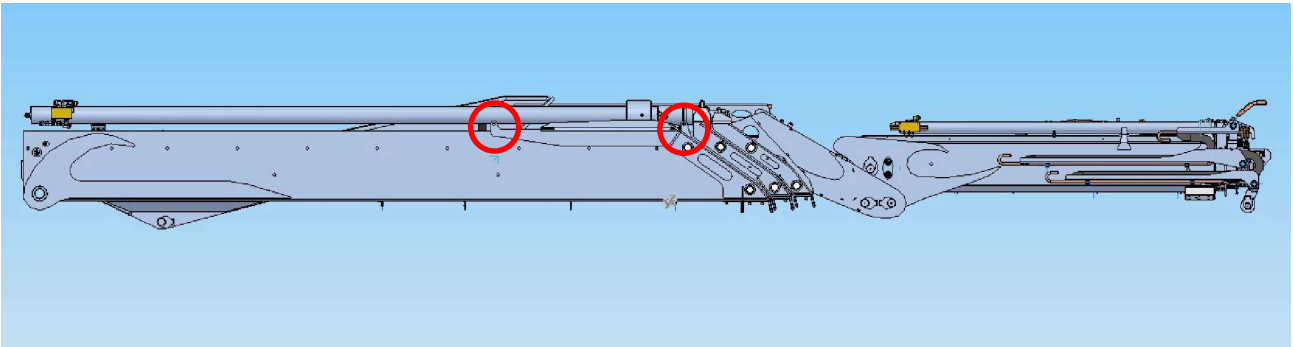
The use of the crane with the given lifting capacities is not permitted when the crane is equipped with: buckets, hearth moving, magnets or any other equipment that can cause to the crane stresses similar to those caused by the, here mentioned, devices.



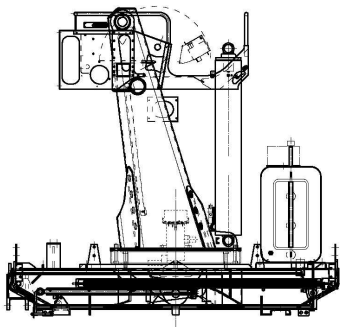
**Crane can not be used in explosive environment.**

The crane is equipped with lifting eyes that make it possible to lift the crane by respecting the gravity centre (picture 1). The crane shall be lifted with a proper lifting beam equipped with chains and shakels in proportion with the crane weight.

Picture 1



Picture 2



**The lifting points can bear the crane weight only.**

**1.2.1 Table 1 : TECHNICAL INFORMATIONS**

Model: <b>50000 WB</b>		<b>80</b>	<b>87</b>	<b>95</b>					
Identification Code :		901001001	901001003	901001002					
Max.Din.Mom.Rotat.Axle:	daN*m	63000	63000	63000					
Max. slew torque:	daN*m	4000	4000	4000					
Max. capacity:	kg	3100	2940	2780					
Dry mass:	kg	6100	6260	6410					
Max.react stab.plus loaded	daN	16000	16000	16000					
Max. pump pressure:	bar	320	320	320					
Delivery pump:	litri/min	100	100	100					
Pump type:		PISTONI	PISTONI	PISTONI					
Oil tank capacity (*):	litri	250	250	250					
Total system capacity:	litri	350	355	360					
Classificat. GRU: <b>DIN 15018 e EN 12999</b>	<b>Other type of utilisation that are substantially different must be authorised by </b>								

(\*)The oil supplied by , contained in the hydraulic system and in the tank, when the crane is mounted directly by the same, is type: (For cold climates we recommend the use of lower viscosity oils.): **mineral type L-HV gradiation ISO VG46** - temperatura di utilizzo: min. - **25°C** max. **+70°C**

**1.2.2 Table 2 : THEORETICAL TIMES AND SPEEDS FOR VARIOUS MOVEMENTS**

(100 l/min delivery) can be make more manoeuvres at the same time.

<b>Mouvements</b>	<b>WB80</b>	<b>WB87</b>	<b>WB95</b>	<b>Note</b>
Rotation 360° (35 litri/min.)	<b>58</b>	<b>58</b>	<b>58</b>	
Main boom rise (40 litri/min.):	<b>32</b>	<b>32</b>	<b>32</b>	
Secondari boom rise (40 litri/min.):	<b>28</b>	<b>28</b>	<b>28</b>	
1 <sup>st</sup> Boom extension (100 litri/min.):	<b>20</b>	<b>20</b>	<b>20</b>	
2 <sup>nd</sup> Boom extension (100 litri/min.):	<b>10</b>	<b>10</b>	<b>10</b>	
3 <sup>rd</sup> Boom extension (100 litri/min.):	<b>10</b>	<b>10</b>	<b>10</b>	
1 <sup>st</sup> Boom extension JIB (40 litri/min.):	<b>9</b>	<b>9</b>	<b>9</b>	
2 <sup>nd</sup> Boom extension JIB (40 litri/min.):	<b>10</b>	<b>10</b>	<b>10</b>	
3 <sup>rd</sup> Boom extension JIB (40 litri/min.):		<b>10</b>	<b>10</b>	
4 <sup>th</sup> Boom extension JIB (40 litri/min.):			<b>11</b>	
Outriggers extensions	<b>12+12</b>	<b>12+12</b>	<b>12+12</b>	
Outriggers	<b>10+10</b>	<b>10+10</b>	<b>10+10</b>	

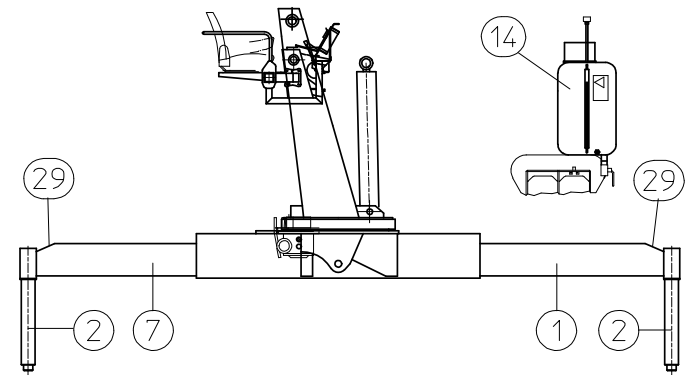
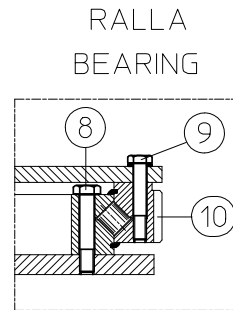
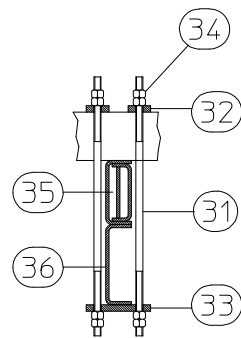
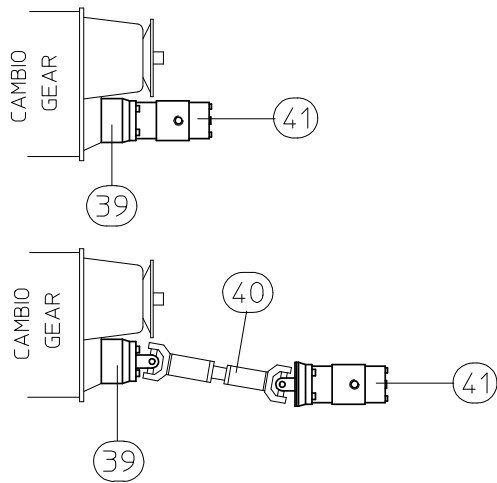
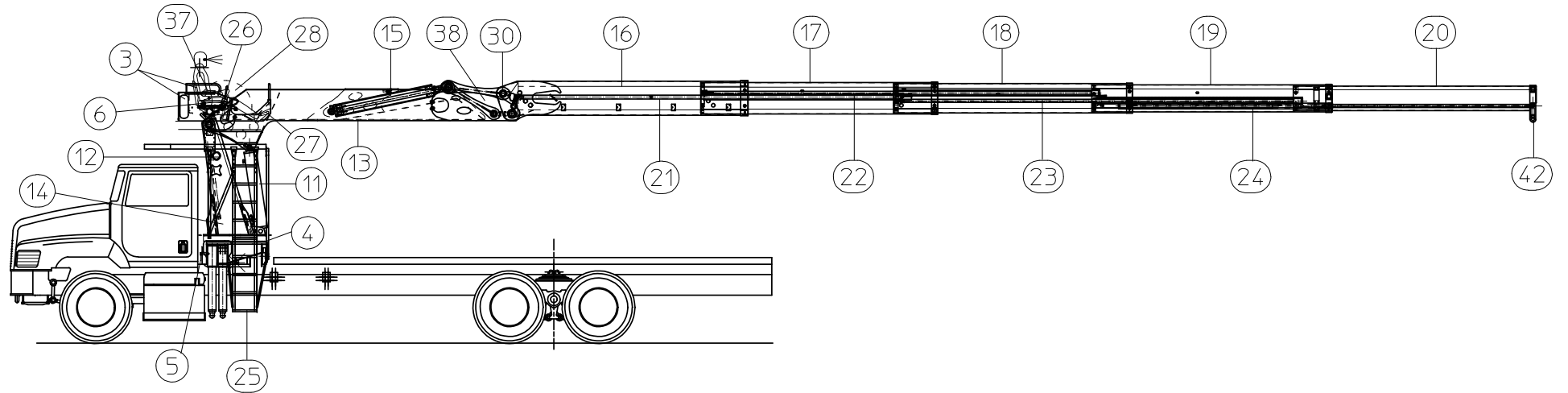
**IDENTIFICATION OF THE MAIN CRANE COMPONENTS**

The major crane components are listed below in order to make, the reading and understanding of the operator’s manual easier.

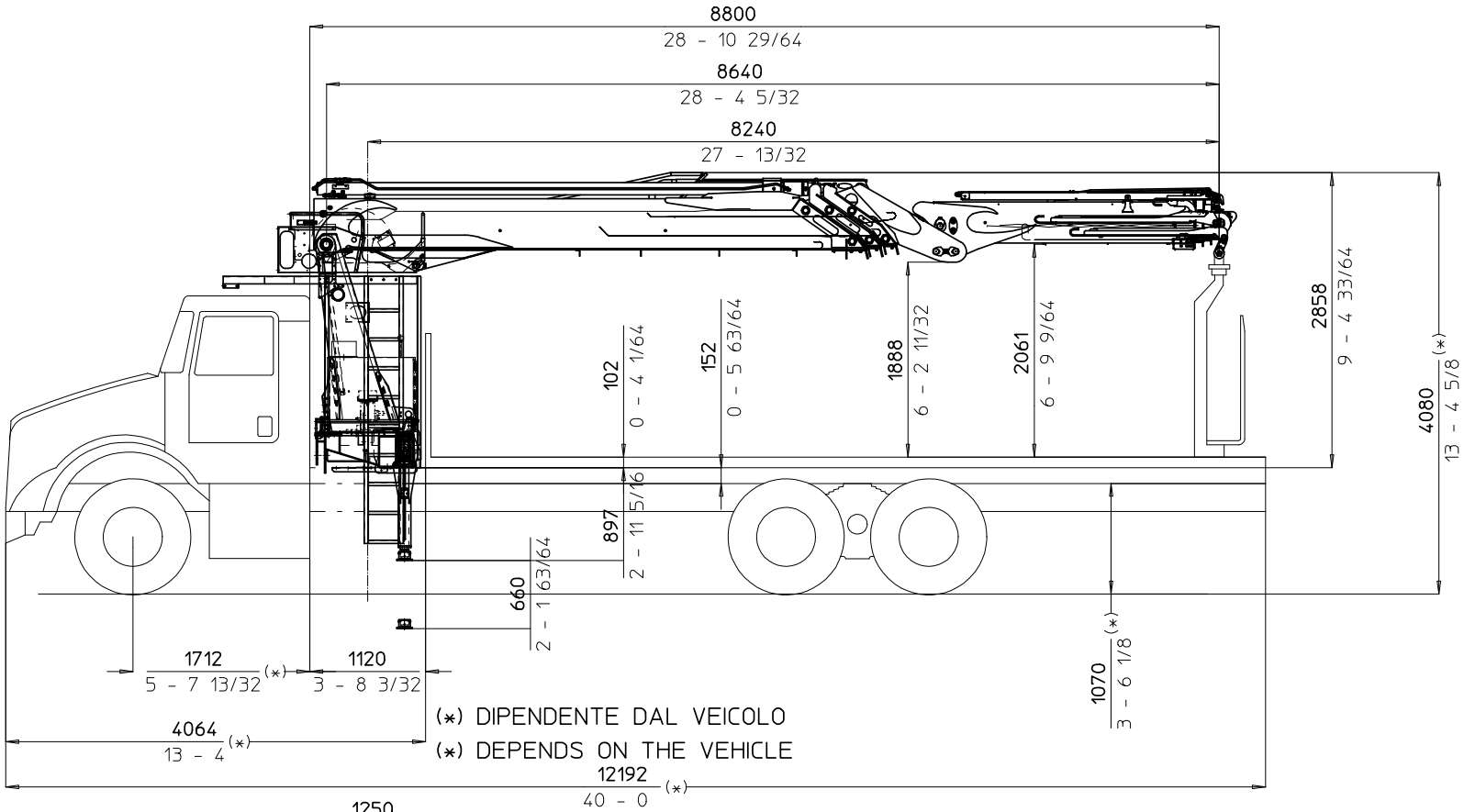
**LIST OF MAIN COMPONENTS:**

1 Right outrigger beam	26
2 Stabilising cylinder	27
3 Crane control valve	28
4 3 point linkage	29 Fitting bolts
5 Basement (chassis)	30 Top fitting plate
6 Control station	31 Bottom fitting plate
7 Left outrigger beam	32 Fitting nut
8 Screws of bearing inner ring	33 Power take off
9 Screws of bearing outer ring	34 Shaft
10 Bearing	35 Pump
11 Main lifting cylinder	36
12 Column	37 Hydraulic load limiting device
13 Main boom	38 Hydraulic load limiting device
14 Hydraulic oil tank	39
15 Second (knuckle) boom cylinder	40
16 Second boom	41 Sub frame
17 JIB boom extension cylinder	42 Vehicle chassis
18 Acces stairs	43 Grab suspension
19 Joystick	
20 Foot pedals	
21 Hydraulic extensions	
22 Lifting capacities sticker	
23 Outriggers looks	
24 Links	
25 Main boom extension cylinder	

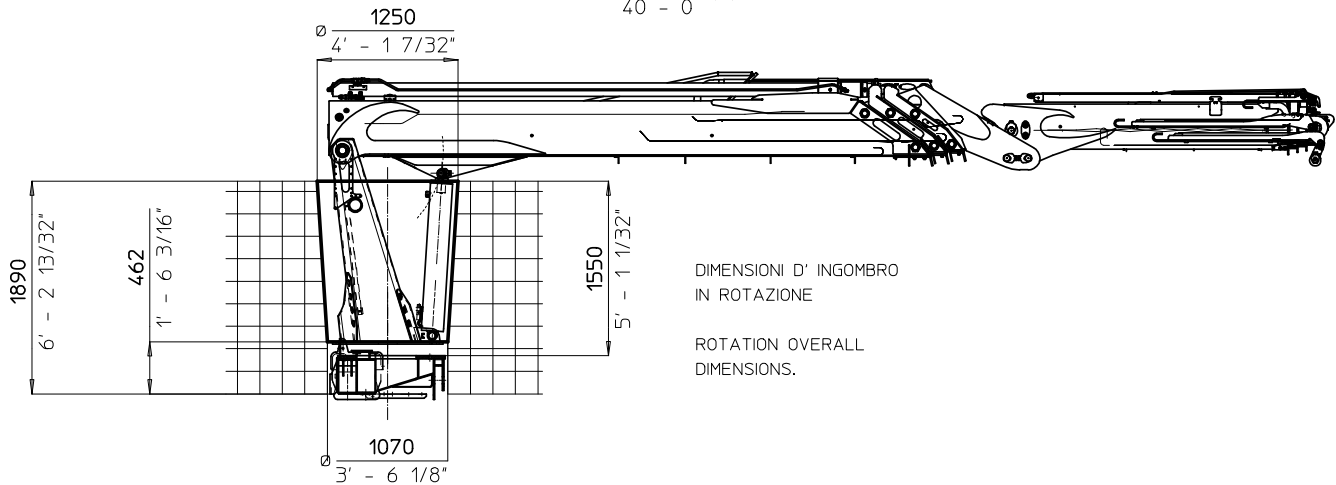
# COMPONENTI PRINCIPALI DELLA GRU - MAIN CRANE COMPONENTS



Figura/Picture 1



(\*) DIPENDENTE DAL VEICOLO  
(\*) DEPENDS ON THE VEHICLE



DIMENSIONI D' INGOMBRO  
IN ROTAZIONE

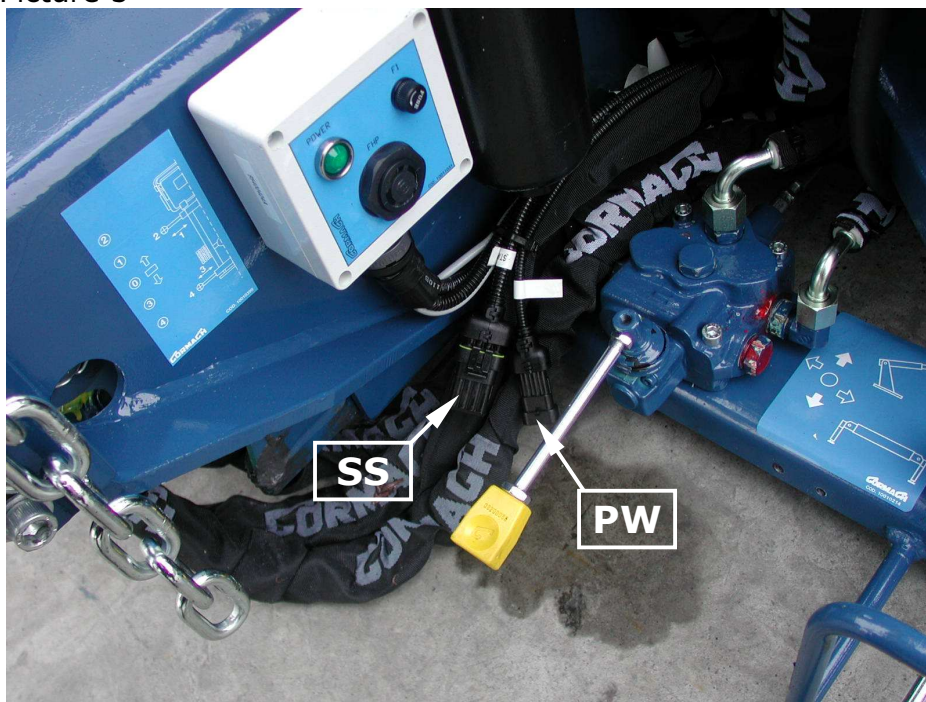
ROTATION OVERALL  
DIMENSIONS.



## 1.3 - NOTIONS FOR THE FIRST INSTALLATION

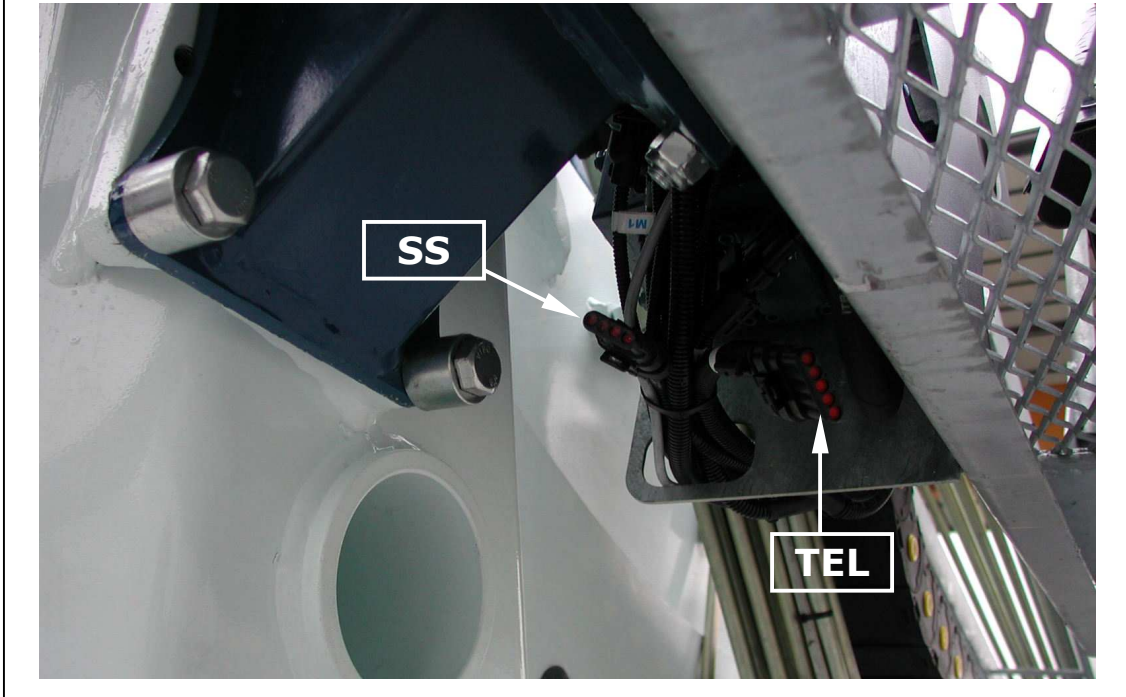
### 1.3.1 - ELECTRIC SUPPLY OF THE MACHINE

Picture 3



The 2 plugs that must be used for the connection to the power supply are located in the lower part of the crane (picture 3). Electric power (plug PW), for engine start – stop use plug see drawing in next page.

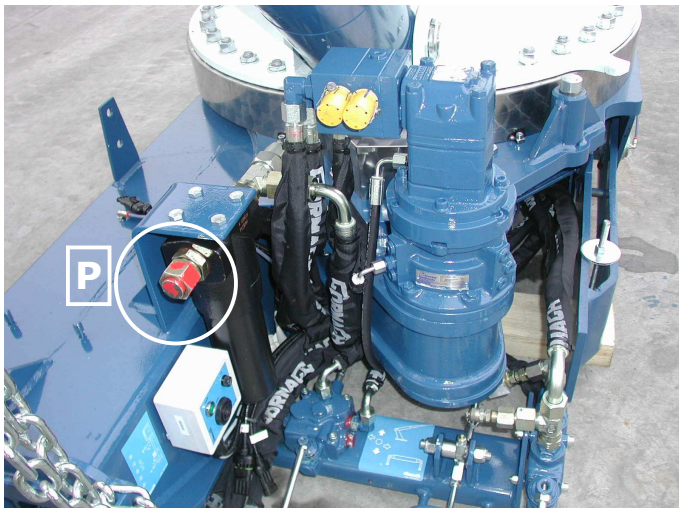
Picture 4



Under the control bank, at top seat level, (picture 4) there are 2 electric plugs (TEL and SS), they are the interfaces for the connection of a radio remote control (optional).

### 1.3.2 - HYDRAULIC SUPPLY OF THE MACHINE

Picture 5



The picture (5) shows the connection "P" for the connection to the pump outlet. REMAINDER: the crane has been prepared for the use of a variable displacement pump. In case the used pump is a fix displacement one contact Cormach technical service.

### 1.3.3 - PRESSURE-READING OUTLETS ON 50000 WB

The machine has been equipped with 3 pressure reading outlets.

1. On the left side. On the 2 way valve, picture 6 (red colour); Pressure outlet "P" (pressure gauge 1)
2. On the right side. On the outriggers control bank, picture 7 (Yellow colour); pressure outlet "S" (pressure gauge 2).
3. On the control board, picture 8 (yellow colour); pressure outlet at the function that is operated at the time (pressure gauge 3).

### 1.3.4 - SETTING OF THE VARIABLE DISPLACEMENT PUMP

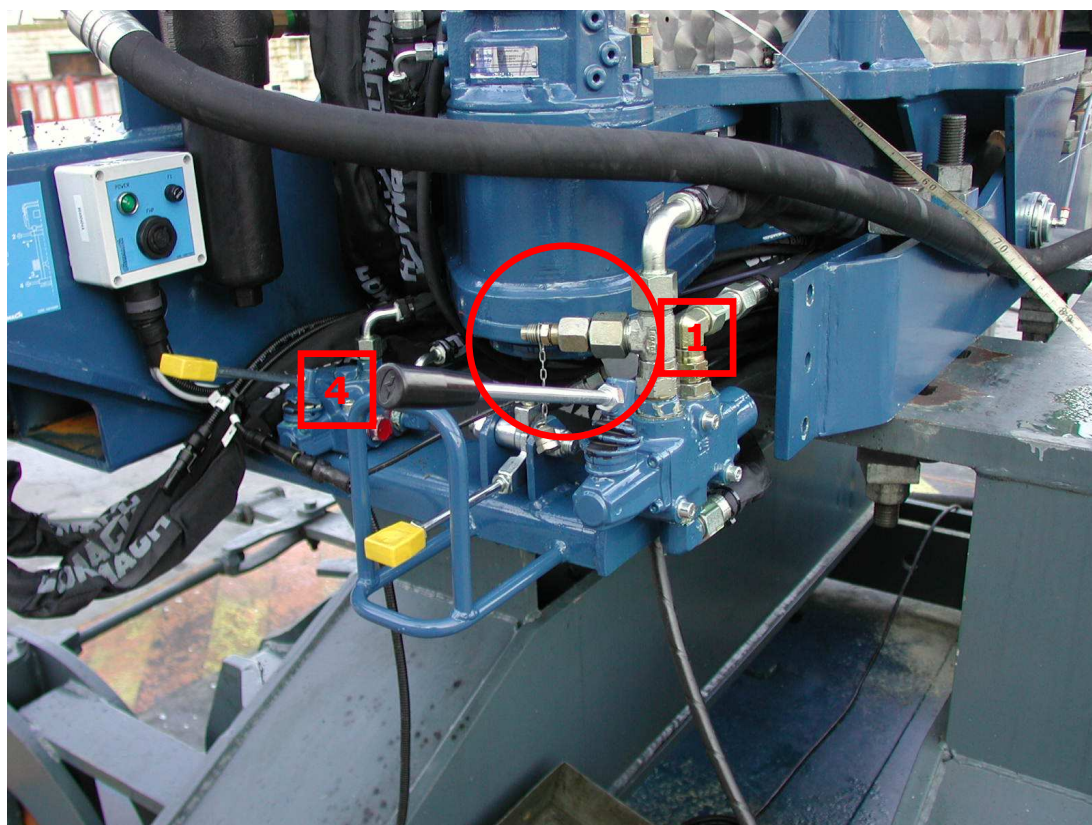
1. Set the flow controller differential pressure of the pump at 17 bar (247 psi) The setting procedure needs 2 pressure gauges with maximal pressure scale at 40 bar ( 580 psi). One pressure gauge shall be installed at the position "1" , the other one at position "2". Lower the lever (4) of the two (2) way valve (2 way valve for crane/outriggers , position 4 picture 6) so that the oil is sent to the outriggers control bank. Set the flow controller of the pump in such a way that the difference between the two pressure read at the two pressure gauges, is equal to 17 bar (247 psi). No one lever of any function shall be moved during the mentioned operation. The use of some function could cause the explosion of the pressure gauges.
2. Rise the lever of the two (2) way valve (crane / outriggers) with the oil flow in direction of the crane. , install the pressure gauge, with maximal scale at 40 bar (580 psi) at position "3" (yellow pressure outlet on the control station). The read pressure, with all levers in neutral position, shall be less than 30 bar (435 psi) setting the pressure at an higher level is causing a malfunctioning of the load limiting device.
3. Set the pump cut-off valve at 280 bar ( 3982 psi), this setting is achieved by using the valve on the pump and than slowly screw the regulator until the pressure value read on the pressure gauge "3" on the control board To the Top seat (yellow colour) when the jib is risen up to end stroke it reaches 280 bar (about).

### 1.3.5 - READING OF THE WORKING PRESSURES

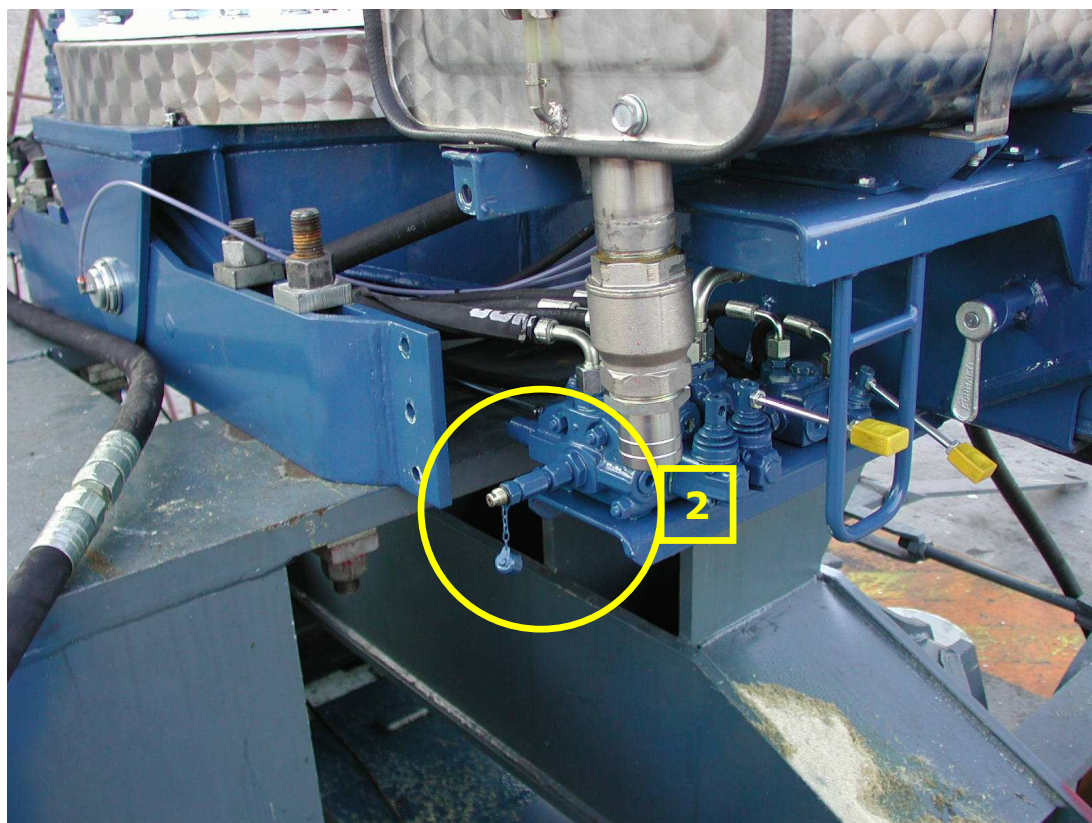
The working pressures of the crane must be taken form the pressure outlet "3" (yellow colour) located on the control station.



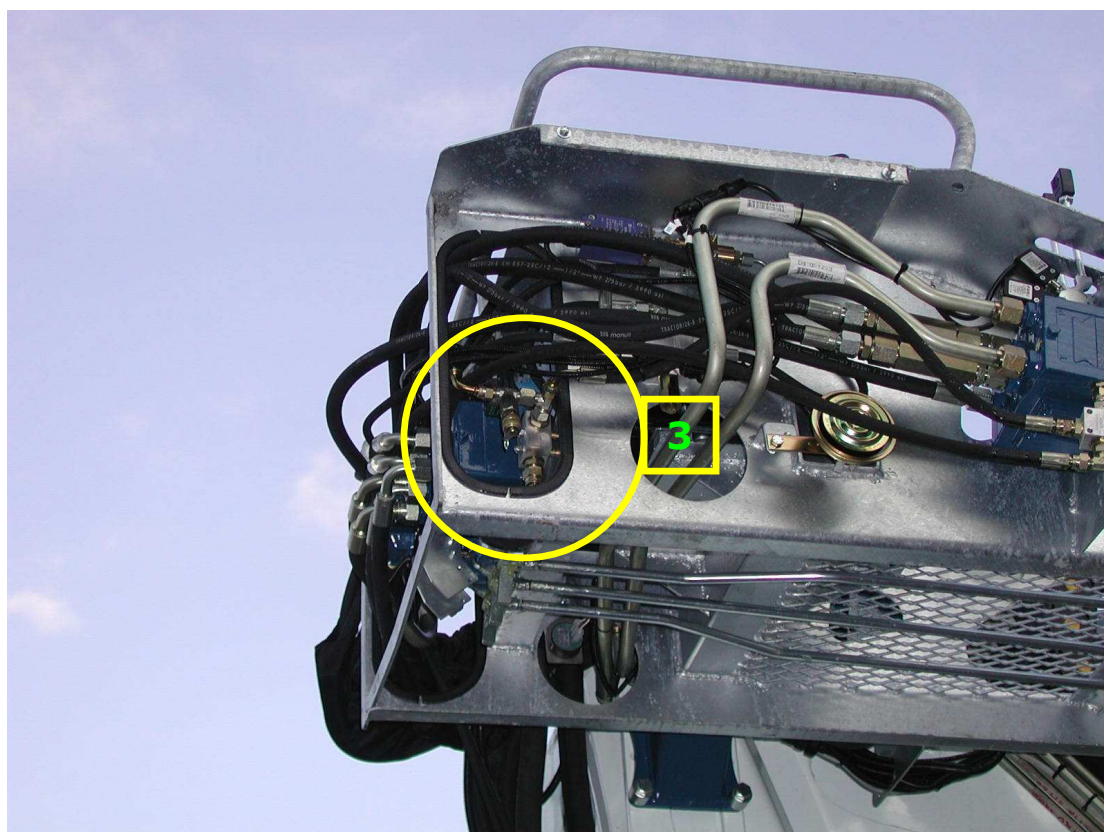
Picture 6



Picture 7



Picture 8



## (Chapter 2) - INSTRUCTIONS FOR USE



**IMPORTANT NOTE: BEFORE ATTEMPTING TO OPERATE THE MACHINE;**

- **READ ALL THE RECOMMENDATIONS AND INSTRUCTIONS FOR USE AND THE SAFETY RULES CONTAINED HEREIN AND MAKE SURE YOU UNDERSTAND THEM,**
- **FAMILIARIZE YOURSELF WITH THE OPERATING AND SAFETY DEVICES,**
- **REFER TO THE NATIONAL STANDARDS REGULATING THIS TYPE OF WORK.**

### 2.1 - SAFETY RULES

- **Before beginning the work, make sure that all protections, handles, guards around the control station and safety devices - including those for the hook and framework - are in proper working order.**
- **The crane operator must make sure that all accessories, attached to the crane, fit the crane and have been verified for the use they are intended to be used.**



**DANGER OF INTOXICATION**

- **It is necessary to deviate the exhaust gases in case the operator's station is located in proximity of the exhaust pipe.**



**DANGER OF CRANE FALLING PARTS**

- **When using the crane, the operator must wear a hard hat.**
- **Clothing suitable for the local climate must be worn, bearing in mind that the crane does not have a cab.**
- **As the crane is not equipped with its own lighting system, it cannot be used in the dark.**



**DANGER OF SQUEEZING**

- **The load shall not pass over the operator's head or any other persons.**



**DANGER OF ELECTROCUTION**

- **During manoeuvres, the boom and load must always be at least 5 metres away from any electric power lines in the vicinity. Any more restrictive national standards must be complied with. In the case of prolonged exposure to risk, it is good practice to earth the crane properly.**



- In stormy weather when there is the risk of high winds and lightning, the boom of the crane must be lowered if it is one of the highest structures in the surrounding area.



#### DANGER OF OVERTURNING

- The crane must always be operated with extreme care and attention and must never be left unattended with the load suspended.
- Never operate the crane beyond the permitted angle or drag the load.
- Do not use the crane to push or pull loads.
- Guide the load with suitable cables, and do not allow it to swing or knock against any part of the crane.
- **EMERGENCY STOP BUTTON:**

The operator's seat is equipped with an emergency button (red) that stops all crane functions, when pushed, preventing the hydraulic circuit to be pressurised.

This button must be used whenever it is necessary to halt all of the movements of the crane instantly.

For example:

A control lever remains stuck and does not allow for the movement to stop.

The emergency button does not stop the pump, therefore if the hydraulic system fails between the pump and control bank, it is necessary to stop the vehicle engine or disconnect the power take off, whichever is the quickest.

Always perform the following procedure after pressing the stop button:

- 1) Turn off the vehicle engine
- 2) Remove the cause of danger or the reason why the emergency button was pressed.



3) It is possible to re-start the engine and to release the emergency button, by rotating slightly in the direction shown by the arrows, marked on it. Only after all the causes of danger have been removed and the controls are finally in neutral position.

The emergency button cannot be used as an operating switch for the crane.

In some cases, when the power take off control, is electropneumatic, the emergency button also stops the pump. In this case, after a stop it is

necessary to reconnect the power take off using the special spanner provided. The fitter must clearly specify the system adopted.

- Like all machinery, the crane requires maintenance, checks and repairs. If this is overlooked or not done properly, it will shorten the life of the crane and affect general safety.



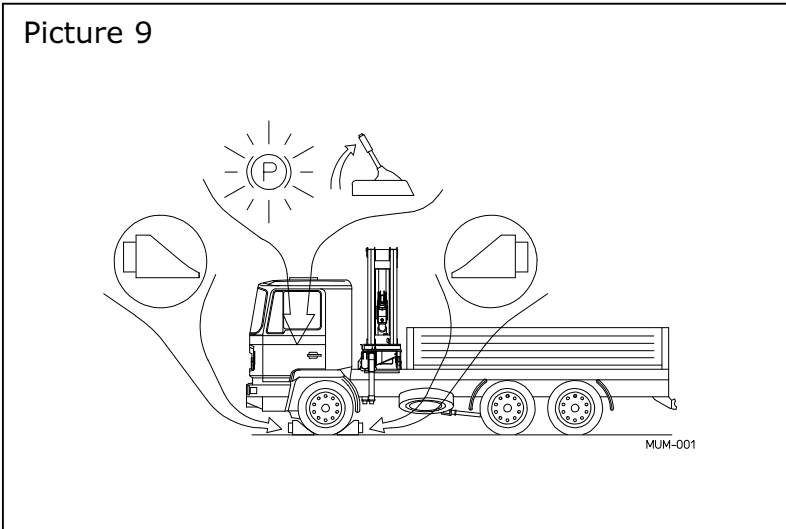
#### DANGER OF SQUEEZING

- All of the crane's cylinders are equipped with piloted check valves to prevent the load from descending in case of hose failure or power failure. In case of breakdown, do not disassemble the valves to lower the load.
- At least once a week, the crane must be overloaded in order to check if the load limiting device works properly, verify that the distance correspond to the right one indicated on lifting diagram, make sure that the red lights are on and that the acoustic signal works properly. Check weekly that the emergency stop button works properly. The acoustic signal indicates that the outer boom is in overload condition, the red light, on the control board, indicates the general overload condition.
- When the truck is moving on the road the crane must be stored in folded position. The crane boom must be extended over the truck body and the boom must be laid upon a correct support that can hold the boom lifted from the body bed and prevents the crane from rotate. The crane support must be on a fix point that shall not be installed on trailers. The movement, when approaching bends on the road, overloads pins and rotation system.



2.2 - START-UP

Picture 9



Apply the parking brake of the vehicle and block it with the chocks provided (Picture 9).

Before starting up, make sure the oil level is above the minimum line and/or at the operation level with folded crane. (Picture 10).

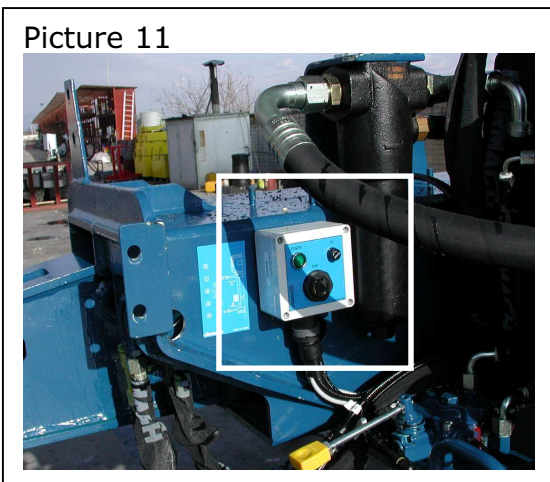
When you are certain that the compressed air system of the vehicle is pressurised, depress the clutch fully to engage the power take off and set the engine speed to around 800 R.P.M.

**Caution:** The crane will not work unless all the controls have been powered on. A green light installed on the electric box (picture 11) gives the indication to the operator that the crane has the correct electric supply. This can be seen from the ground before reaching for the top seat.

Picture 10



Picture 11



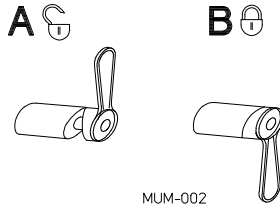
**Some minutes of use, on pressure line, the obstruction indicator of filter must be green; with red light change the filter cartridge as soon as possible. On electric box (Picture 11) there's a buzzer that hutters an acoustic signal if the filter is completely obstructed: in that case change the filter immediately. A fuse is located on the box, it protects the crane circuits. In case the electricity supply is missing verify the correct functioning of the safety fuse.**

## 2.3 - STABILIZATION



### DANGER OF OVERTURNING

Picture 12



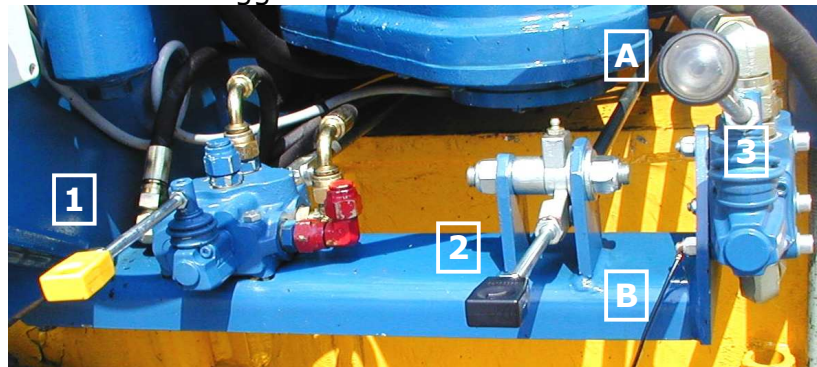
**NOTE: Outriggers must be fully extended before using the crane.**

**VEHICLES EQUIPPED WITH PNEUMATIC SUSPENSIONS; unload them completely before the stabilisation of the crane to avoid their utilisation during the using of the crane.**

In the rest position, extension of the stabiliser cross member (supplied as standard) is prevented by means of a pin, which is removed by rotating

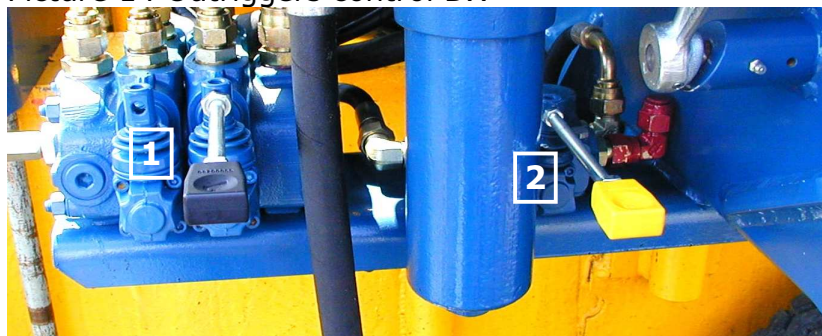
the handle 180° (Picture 12).

Picture 13 Outriggers control SX



After release, activate the extension by means of the stabiliser lever and select the manoeuvre with the special diverter valve (lever 1) (Picture 13 and 14).

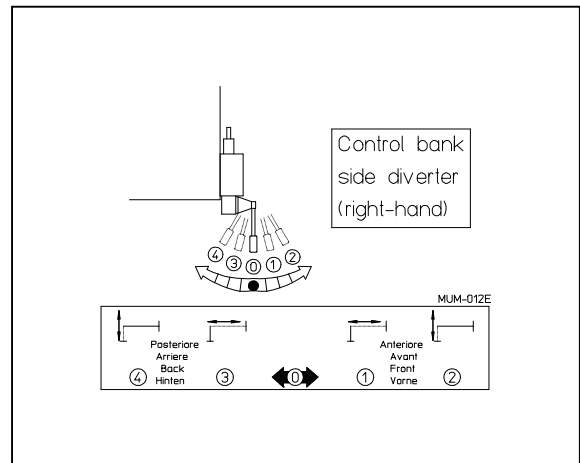
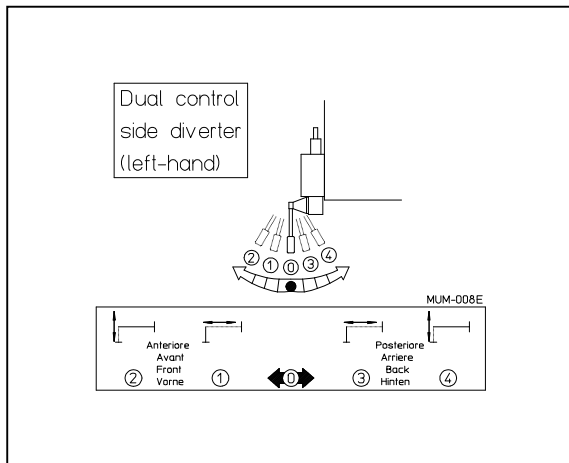
Picture 14 Outriggers control DX



When operator wants to move the outriggers, lever 3 (located on 1st control board, picture 13) must be on position "outriggers" (lever pushed down in position B).

Each diverter valve has four positions corresponding to the following manoeuvres:

Picture 15



**LEFT DIVERTER**

- 1) front left stabiliser extension
- 2) front left stabiliser descent
- 0) controls off
- 3) left auxiliary stabiliser extension
- 4) left auxiliary stabiliser descent

**RIGHT DIVERTER**

- 1) front right stabiliser extension
- 2) front right stabiliser descent
- 0) controls off
- 3) right auxiliary stabiliser extension
- 4) left auxiliary stabiliser descent

Right and left stabilisers must be moved alternatively in order to maintain the truck chassis as straight as possible. Make sure the vehicle is levelled by using the level gauges located near by the stabiliser control levers.

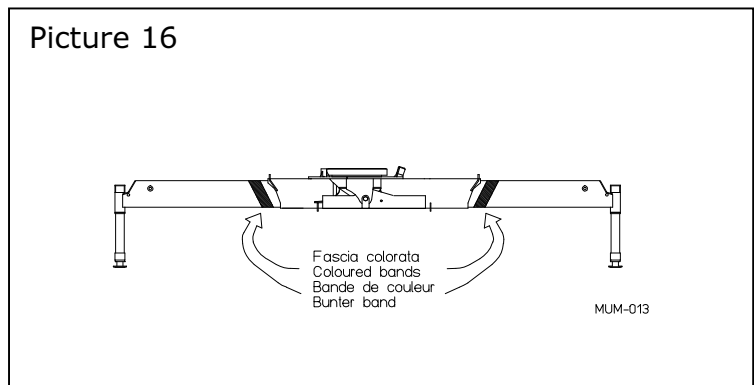


**DANGER OF OVERTURNING**

Control extension of the stabilisers **keeping the body far enough away from them to be hit or dragged along the ground. In particular, never stand between the stabilisers and any other obstacle.**

The stabilisers are fully extended when the strip, painted on the beam is fully visible, (Picture 16).

Picture 16



Control the lowering of the stabilisers; by acting alternatively on the right or left control, until the crane basement reaches the closes position to the horizontal.



For each stabilising beam the last manoeuvre shall be the lowering of the stabiliser.

Remember that the crane may only exceptionally operate at full power up to a maximum inclination of the base of  $5.7^\circ$  equal to an angle of approximately 10% and only to a boom extension equal to 11 m.

NOTE: DO NOT OPERATE THE EXTENSION OR RETRACTION CONTROL WHEN THE STABILIZERS ARE RESTING ON THE GROUND.



### **DANGER OF OVERTURNING**

**It is also necessary to keep to the following rules for stabilisation:**

**A) Before using the crane, make sure all of the stabilisers are completely extended and resting on the ground, independently whatever the sector you are operating in.**

**B) The wheels of the vehicle must not be completely off the ground.**

**Whenever working off the road, on soft ground or asphalt, arrange distribution plates under the stabilisers (supplied on request) or planks of wood of a suitable thickness to reduce the pressure.**

**Check that the stabiliser supporting surface is suitable because should one of the stabilisers sink in, the vehicle will overturn. In particular, make sure the stabilisers do not rest on drain covers, over cavities or on any surface that is not sufficiently resistant.**

**In difficult working conditions, the crane transmits a force to the stabiliser which may be as high as 16000 daN.**



### **DANGER OF SHEARING**

#### **GENERAL NOTE ON SAFETY:**

**WHEN OPERATING THE STABILIZERS, MAKE SURE ALL LIMBS ARE KEPT WELL AWAY FROM THE DANGER AREA TO PREVENT CRUSHING. IN PARTICULAR KEEP YOUR HANDS ON THE CONTROLS, WELL AWAY FROM ANY MOVING PARTS AND KEEP YOUR FEET OUTSIDE THE AREA WHERE THE CRANE IS STANDING.**

## 2.4 - RETRACTING AND HOMING THE STABILIZERS

- Raise the stabilisers fully acting on one at a time to prevent the vehicle chassis from undergoing excessive torsion stress and to prevent overloading any of the stabilisers.
- Remove the support plates and replace them in their housings.



### **DANGER OF SQUEEZING**

- In order to avoid squeezing between the moving and still parts, when retracting the outriggers, place yourself at proper distance from the moving parts.
- When the beam is fully retracted turn the handle of the locking system by 180 degree and verify that the beam is properly secured. (Picture 12).

**Repeat this procedure for each stabiliser.**



### **DANGER OF CIRCULATION**

#### **WARNING:**

**IF ANY ONE OF THE OUTRIGGERS IS NOT LOCKED IN POSITION IT MAY EXTEND WHILE THE VEHICLE IS TRAVELLING AND CREATE A VERY SERIOUS HAZARD FOR TRAFFIC.**

At the end of the operation, uncouple the power take off and turn off the power switch, if any.

If gear changing is difficult, reverse in particular, it is probably because the power take-off is still coupled.



The pads of the stabilising cylinders are screwed into the bottom of the cylinder and locked, make sure they are properly locked before beginning to travel. Tighten the pads in case they are found loose, to prevent the risk of losing one.

## 2.5 - EXTENDING THE BOOM

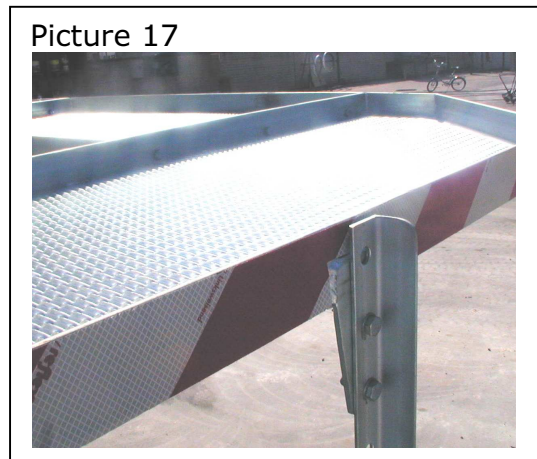


Before the crane boom can be moved, the lever n° 3 (Picture 13) must be placed in position crane (lever must be moved up in order to pressurise the control valves located on the top seat).



### **DANGER OF FOLLING OBJECTS**

Always verify that access stairs to the control seat, as well as handles and protections are in good shape before reaching for the top seat. In case the crane should be equipped with catwalk, be advised that the catwalk can be used only as an access to the crane top seat or for service jobs. The catwalk has been engineered for this porpoise only, it can stand the weight of one person only (100 Kg). **It is expressly forbidden to have more than one person on the catwalk at any time.** Walking on the catwalk must be made with extreme care paying attention to the side reinforcements (picture 7).



The levers shall not be used as a climb support when reaching for the control station, on the top seat.ì, they could cause uncontrolled movements of the boom.

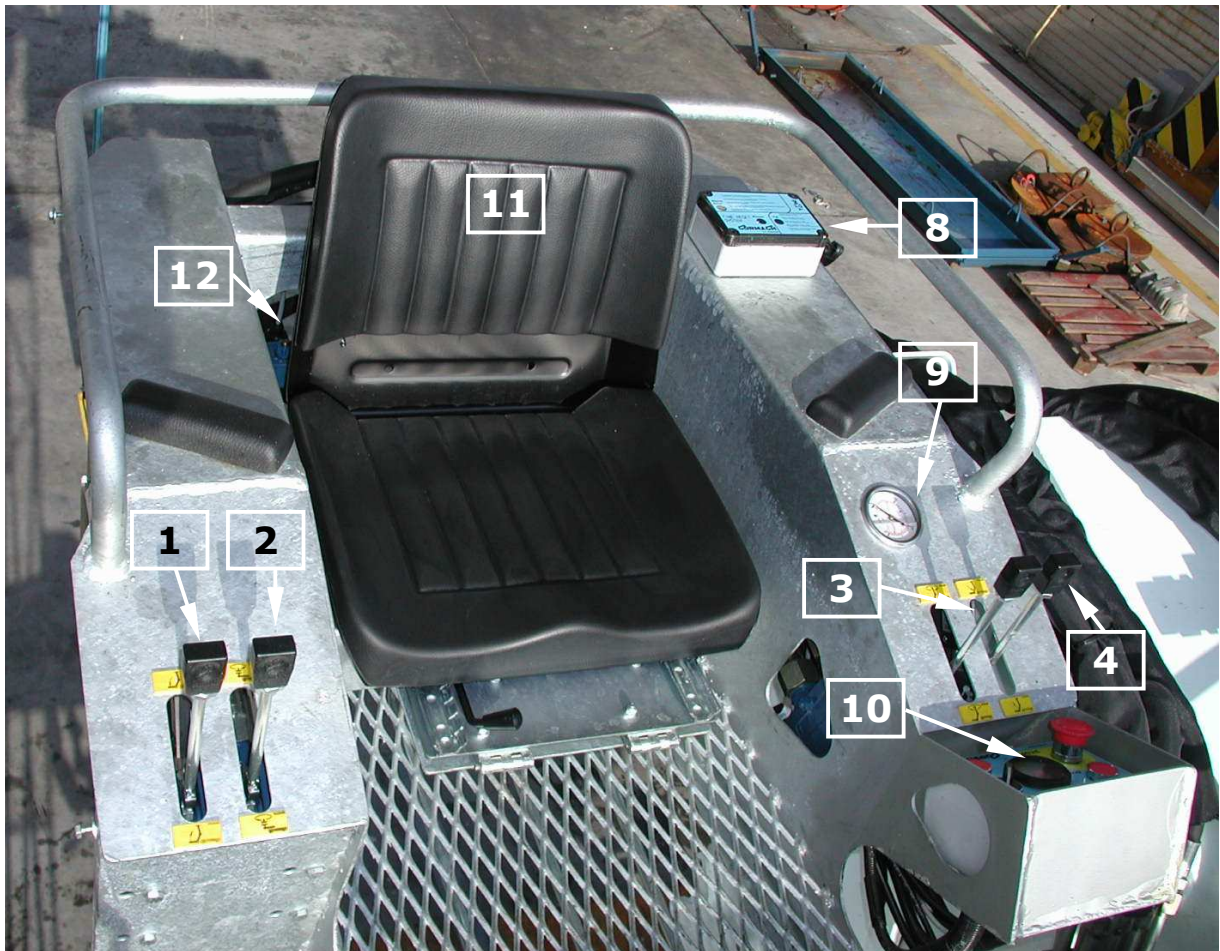


While reaching for the top seat make sure that the truck engine is turned off. It prevents uncontrolled movements of the boom. The truck engine must be started with the push button located on the control pane, after the operator is correctly seated in the correct working position. The same is valid when the operator is leaving the control position of the top seat, the truck engine must be turned off before the operator begins to descend from the top seat.



Hereunder there is a short list of the elements that can be found on the control station of the top seat;

Picture 18



1. Rotator control lever.
2. Knuckle boom cylinder control lever.
3. Main boom rising cylinder control lever.
4. Rotation control lever.
5. Main boom extension cylinder control foot pedal.
6. Knuckle boom extension cylinder control foot pedal.
7. Fork opening and closing functions control foot pedal.
8. Timer reset.
9. Pressure gauge connected with the main boom lifting cylinders.
10. Main control box.
11. Tilting seat.
12. Electric valve for the by pass of the load limiting device in case of emergency.

Picture 19



Picture 20



1. Green light which is on when the crane is working correctly.
2. Red light which is on when the load limiting device, connected with the main boom lifting cylinder, has been activated.
3. Red light which is on when the load limiting device, connected with the knuckle boom cylinder, has been.
4. Selector for the selection of the controls that are located on the control station (local control devices) or of the radio remote controls (supplied on demand).
5. Green light which is on when the controls from the radio remote controls have been activated.
6. Start button which, if connected, can be used to start the truck engine.; The engine must be started only after the operator is seated in the seat.
7. Emergency button and truck engine stop. The button has to be used in order to suddenly stop the oil supply to the crane and for shut off the truck engine. The truck engine must be shut off before leaving the top seat.
8. Horn and push button for the activation of the timer reset. By pushing this button it will be possible to use the horn and to activate the timer reset system.
9. Hour meter.



## 2.6 - FOLDING OF THE BOOM



The boom of the crane shall be correctly positioned on the boom support, while on the road. In case of incorrect positioning, on its support, the boom could rotate on its own because of sudden curves or side slips.



### COLLISION DANGER

**NEVER DRIVE OR MOVE THE VEHICLE WITH THE BOOM RAISED OR THE LOAD SUSPENDED.**

## 2.7 - MANOEUVRING



### DANGER OF OVERTURNING OR DANGER OF COLLISION

Before performing lifting operations make sure that:

- the load does not exceed the load capacity shown in the table for that particular boom
- the slinging is correct, so as to prevent any sudden movements of the load
- the hook is vertically over the centre of gravity of the load
- no one is standing within the boom range of action
- the area where the load is to be deposited is clear
- the main boom is over the horizontal line, **IT IS FORBIDDEN** to lift object when the main boom is fully lowered in folded position, (main boom lifting cylinders end stroke); in this position the load limiting device could work incorrectly.



The control levers must be operated slowly, also when returning to neutral position. Use special care when working with considerable outreaches as the peripheral speeds are proportionally higher.

Sudden movements should be always avoided because they create hazardous situations and force the crane parts and mechanisms to withstand unnecessary stress and reduce their working life.



**Do not reach the end-of-stroke positions at full speed. It forces the crane structure end cylinder to withstand heavy stresses and brings the load to oscillate dangerously.**

Use special care when the slew sector is limited with mechanical stops.



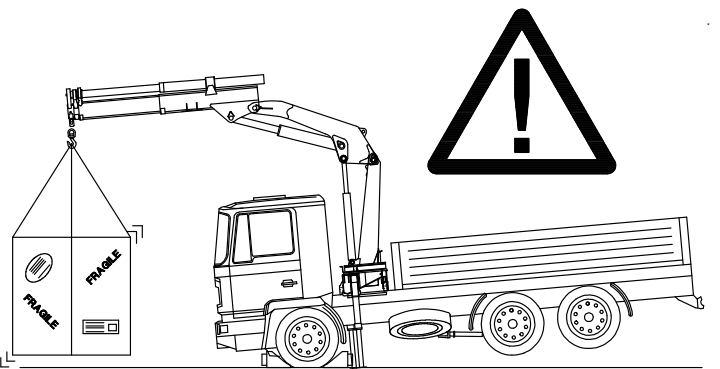
When retracting or extending the main boom, make sure to reduce speed in conjunction with the passage from one to the next extension. The operation is requested in order to prevent stress on the cylinders structure, and it also prevents dangerous load oscillations.



### DANGER OF OVERTURNING

When rotating, use great care when moving from areas with greater stability to areas with less stability.

Picture 21



When the load approaches the support line of the front stabilisers, (for cranes installed behind the driver's cab) use particular care because the load carrying capacity, on the front, is usually greatly reduced, which means that the vehicle is very likely to overturn (Picture 12).



### DANGER OF OVERTURNING

The crane is equipped with a mechanical locking system (a pin) the prevents the rotation in the front area (for cranes installed behind the cab). It is the duty of the installer to install the pin in those cases when the stability on the front is not enough. As an option it is possible to ask for the installation of a double load limiting device.



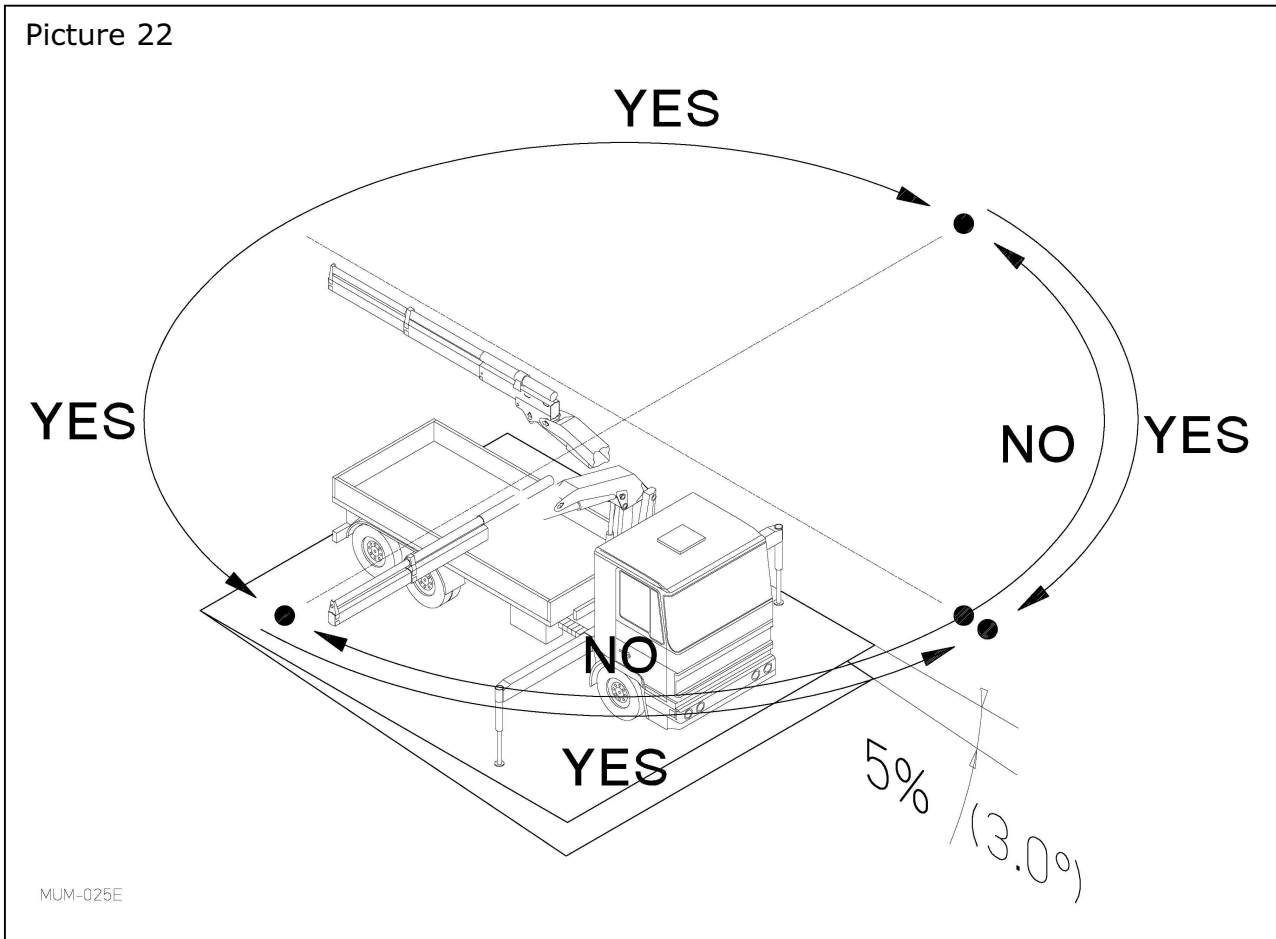
Use the crane, only after having checked that the installer complies with the Countries rules.



### DANGER OF COLLISION

With vehicle on a slope, do not rotate the load in the direction where the horizontal moment,

Picture 22



MUM-025E

due to the slope, increases. This might exceed the brake torque, and leave the crane free to rotate without control (Picture 22) and create for both, persons and objects a serious hazard.



The crane can rotate with 100% capacity with a slope of maximum 5% with the boom full retracted and the boom angle <math>< 45^\circ</math>. For working with the boom extended or at high boom angle, the base of the crane must be put in horizontal level.

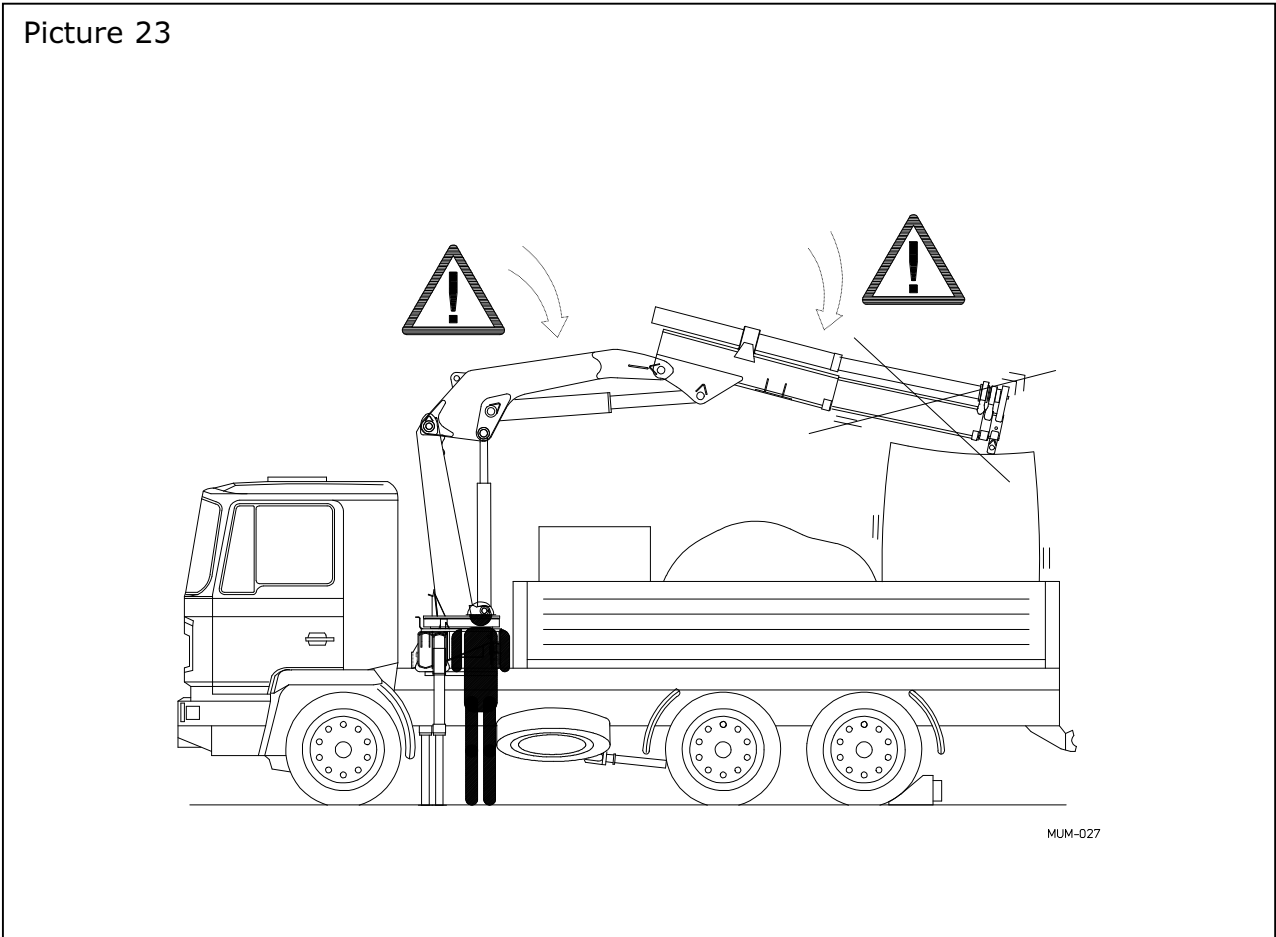


During descent with a suspended load, remember that the boom outreach increases progressively, so be very careful not to overload it. It is a good rule to retract the telescope before lowering the boom.



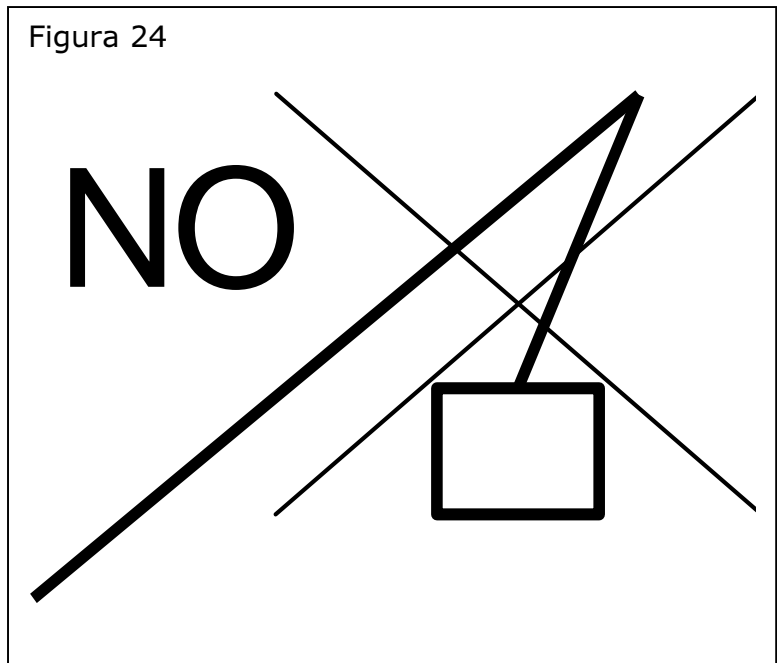
Never subject the boom to inverse loads; if this rule is not observed, serious damage to the structure of the equipment may result. (Picture 23).

Picture 23



It is forbidden to work with the outer boom at negative angles, abusing the crane with this working way may end up in serious damage to the crane structure and create dangerous situations for the operator (Picture 24).

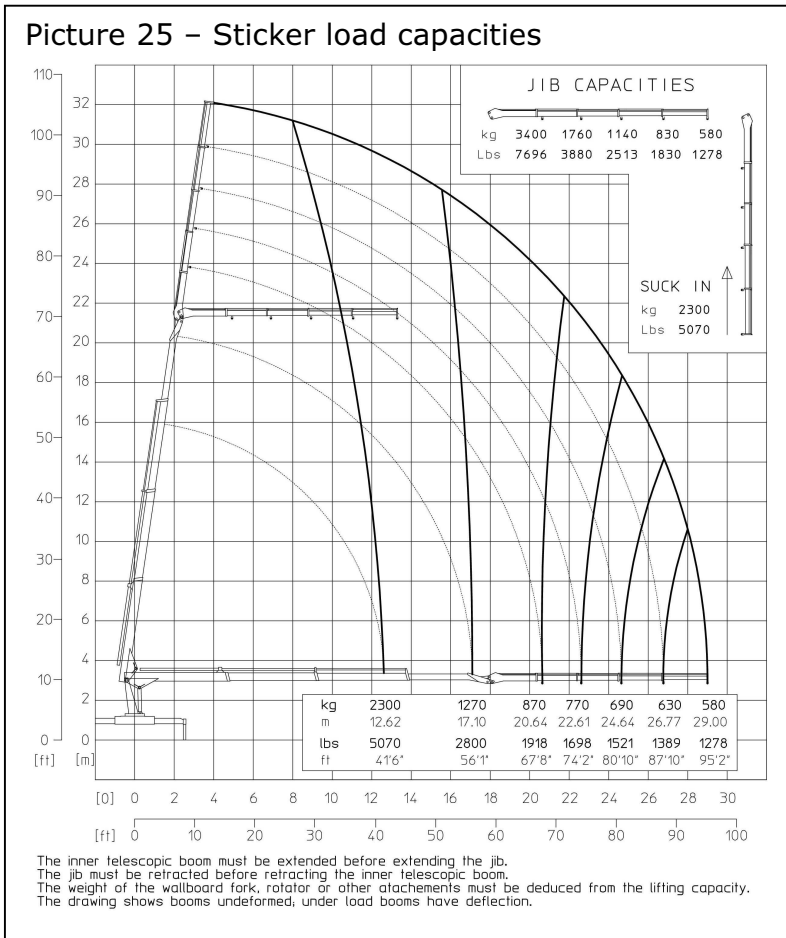
Figura 24



The extension and retraction capacity of the outer boom retraction cylinders varies on base of the main boom angle, greasing condition of the extensions and wear pads conditions. Normally the performances get better after a short period.

## 2.8 - LOAD CAPACITIES

Picture 25 – Sticker load capacities



Rated lifting capacities are valid only with: fully extended outriggers (cranes and auxiliary outriggers systems), when the crane basement is horizontal and water leveled, and the boom is used within the limit of the 180° located behind the truck driver's cab (for cranes installed behind the truck driver's cab).

The load capacities (Picture 25) are shown in the table applied to the crane and are only valid for lifting operations performed with a hook, a pallet grab, a non-grabbing bucket or other devices that do not act on the structure other than as designed for the hook.

The load capacities are calculated when using the crane on vehicle.

With these load capacities, the use of grab buckets, grabs, magnets or anything else which may cause similar action on the crane is not permitted.

Picture 26



The slinging and the holding devices are always included in the useful load capacity. Before the load is lifted make sure that the hook is over the load centre of gravity and that nobody is inside the working area. Make sure there are not obstacles between lifting and unloading areas.

To lift weights corresponding to the permitted loading capacities, to the indicated horizontal reach, it's necessary to position the main boom in the maximum power position, that is reached when the above mentioned boom is out of 30° compared to the base of the slew bearing.

The crane is equipped with 1 pressure gauge located on the top seat, it reads the working pressure and gives the load condition of the crane. The general load condition is indicated as follows: the yellow area starts at 90% of maximum moment and stops at 100%; the red area indicates overload.

Never raise loads when the pointer is in the red area.

The load limiting device is made out of two pressure switches, one is located on the main lifting cylinder and the other on the knuckle cylinder. When the pressure in one of the cylinders overtakes the pressure at which its pressure switch is set, this will be activated and will permit only those functions that are going to reduce the overload condition. Two lights on the control box located on the control panel, inform the operator if the boom in overload is the main boom or the knuckle boom. (pos. 2 and 3 Picture 20).



Machines equipped with an automatic stop device (moment limiting device) are protected against overloads; the following points should always be born in mind during operation:

- a) **The rating plate is the only instrument to establish the capacity of the crane.**
- b) **The device installed stops the machine when there is an overload. However, the values shown in the load capacity chart must always be observed.**
- c) **Should the device intervene, the green light on the control panels next to the controls goes off when the operator tries to move a function that is controlled by the load limiting device.**
- d) **To reset the load limiting device, retract the extension cylinder for a brief moment.**

All the other movements are free and must serve to **BRING THE LOAD TOWARDS THE SLEWING AXIS**, bringing the crane back to the safety position.



#### **FOR CRANES EQUIPPED WITH WIRE LESS RADIO REMOTE CONTROL**

All functions are automatically slowed down when the load-limiting device is activated. After the load limiting device is being reset, move the switch from position "rabbit" to position "snails" and after back to "rabbit" this operation will reactivate the standard operational speed mode. (The switch is located on the sender box of the radio remote control)

## 2.8.1 – TIME RESET FUNCTION

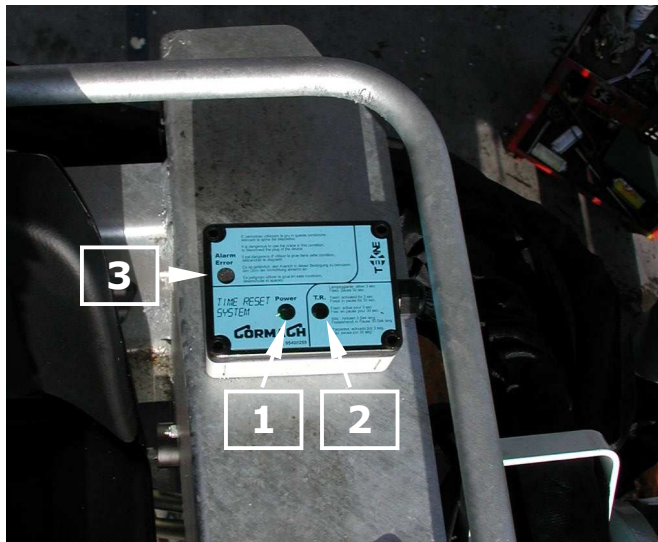
### TIME-RESET FUNCTION.

The crane is equipped with the time reset system (in accordance with the EN norm 12999). The system is activated by pressing on the push button located on the control panel (pos. picture ). The activation of the system permits to by pass, for a limited period of time, (about 3 seconds) the load limiting device, in this condition the operator can activate all functions, **with the exception of the boom extension function**. After the time is elapsed it will be necessary to wait for 30 seconds before the function, time reset, can be activated again, by pushing again on the horn button. The time reset shall be used only in emergency case in order to reset the crane when the load limiting device has shut off the crane and there is other way to go back to normal working conditions. **It is not permitted to use the system in order to overload the crane.**



As an example we can mention: the pressure available inside the main lifting cylinder is higher than the pressure at which the load limiting device is set, for this reason it is would be possible to overload the hydraulic circuit , by bringing the cylinder end stroke, also without load. In this case it will be sufficient to press the time reset push button and lower the boom in order to reduce the pressure trapped inside the barrel.

Picture 27



1. Green light on, the system is correctly fed;
2. Flashing orange light (3 seconds) The system is activated and the operator is activating one function, orange light on (30 seconds) the system has deactivated itself and for 30 seconds, it will not be possible to activate it again.
3. Red light on, the system is malfunctioning.



In case of malfunctioning of the system, when the led "3" is red and the horn is activated, it will be necessary to quit working. In fact a malfunctioning of the device, make it possible, to have the load limiting device, constantly by passed, generating potentially dangerous situations. **Re Start working only after the system has been repaired.**



**LIST OF FUNCTIONS DENIED AND PERMITTED AFTER THE LOAD LIMITING DEVICE HAS SWITCHED THE CRANE OFF.**

● = **Function denied** by the load limiting device

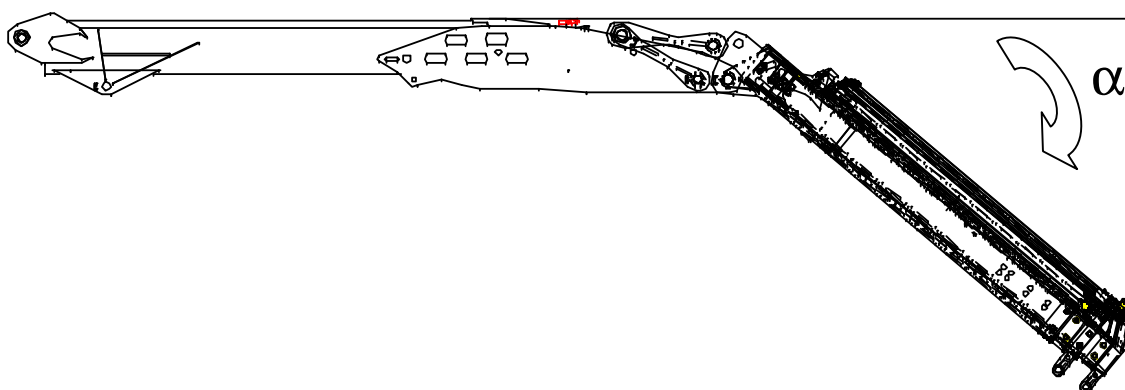
○ = **Function permitted** by the load limiting device

$\alpha$  = Angle of the second (2<sup>nd</sup>) boom in relation to the horizontal line

●  $\alpha > 20^\circ$  means that the function is forbidden only when the angle  $\alpha$  is bigger than  $20^\circ$ .

Function	First boom load limiting device	Second boom load limiting device
Inner (1 <sup>st</sup> ) boom rising	○	●
Inner (1 <sup>st</sup> ) boom lowering	●	●
Outer (2 <sup>nd</sup> ) boom rising	● $\alpha < -20^\circ$ ○ $\alpha > 20^\circ$	● $\alpha < -20^\circ$ ○ $\alpha > 20^\circ$
Outer (2 <sup>nd</sup> ) boom lowering	● $\alpha > 20^\circ$ ○ $\alpha < -20^\circ$	● $\alpha > 20^\circ$ ○ $\alpha < -20^\circ$
Inner boom extend	●	●
Inner boom retract	○	○
Outer boom extend	● ○ $\alpha < -60^\circ$	● ○ $\alpha < -60^\circ$
Outer boom retract	○	○
Rotation right/left	○	○

Picture 28 –

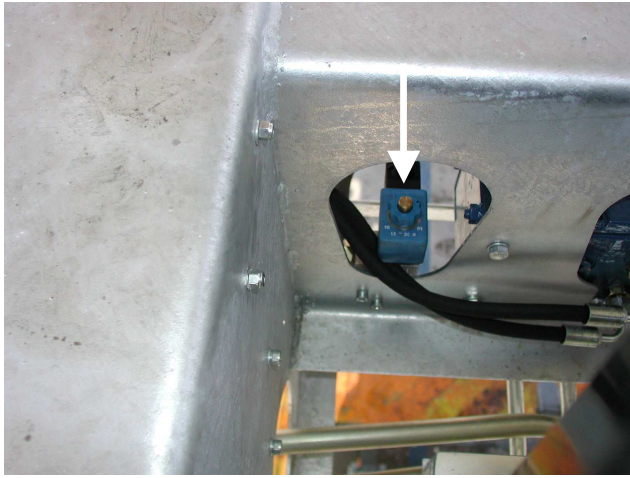


**In case the crane is not working because there is not current, it is necessary to verify the condition of the fuse.**



**DANGER OF OVERTURNING**

Picture 29



**In case of a failure of the electric system, that can not be repaired on site, it is possible to operate the crane, only in order to lower the load and fold the crane, by acting on an electric valve located behind the operator's seat (picture 29 )after bracking the Cormach sealing, keep pushing the button of the electric valve, shown in the picture, and operate in such a way that bring the crane back into safety conditions.**



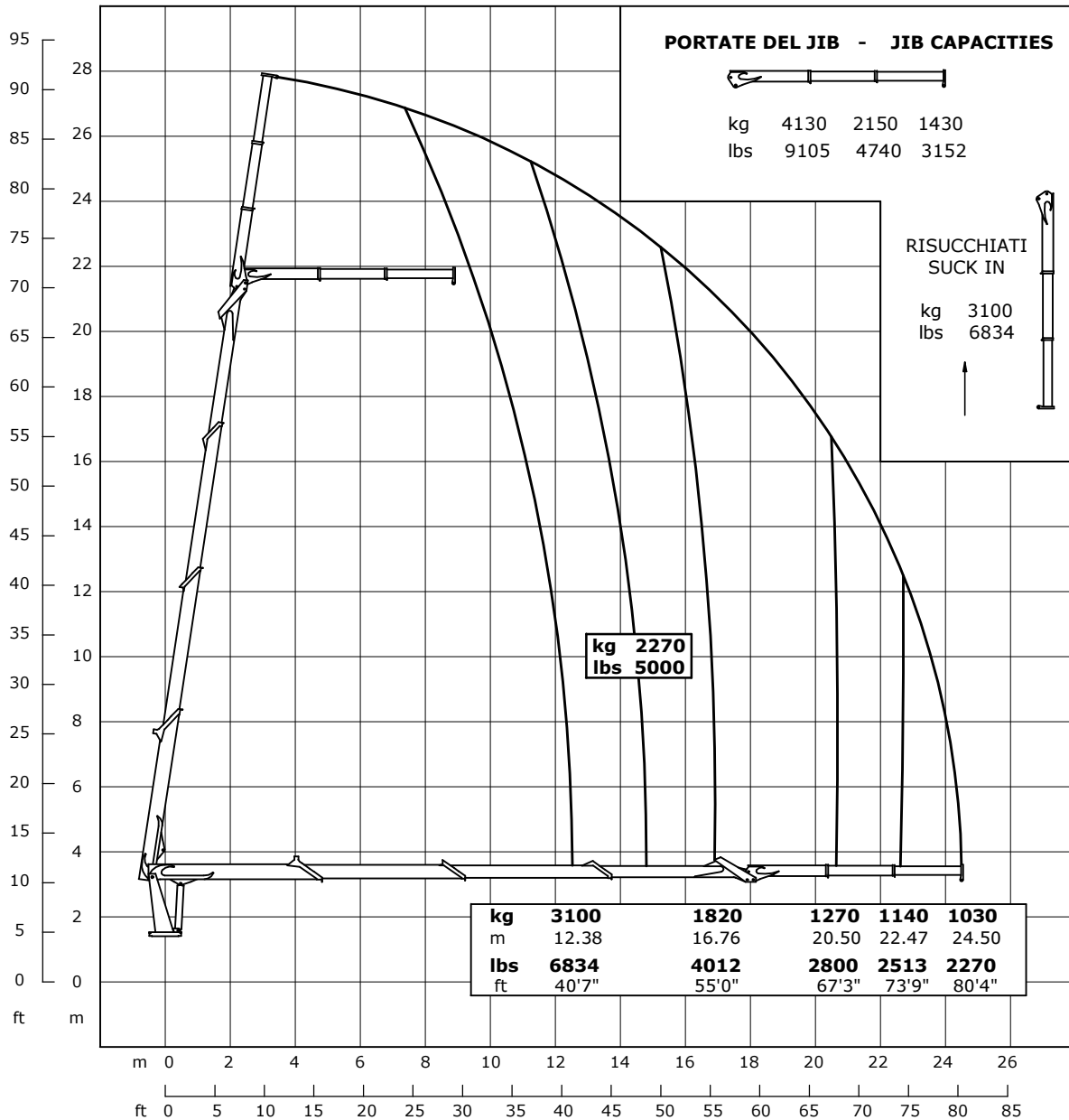
**During emergency operation, keep an eye on the load indicator so that the crane is not overloaded and only perform manoeuvres that bring the load towards the slewing axis.**

**The system must be repaired before operating the crane again and the button on the solenoid must be re-sealed with a lead seal at a workshop authorised by Cormach.**



**WARRANTY ON CRANE IS CANCELLED, THE MANUFACTURER DECLAINS ALL RESPONSABILITIES FOR DAMAGES TO PERSONS, IN CASE THE CRANE IS USED WITHOUT WORKING SAFETY DEVICES.**

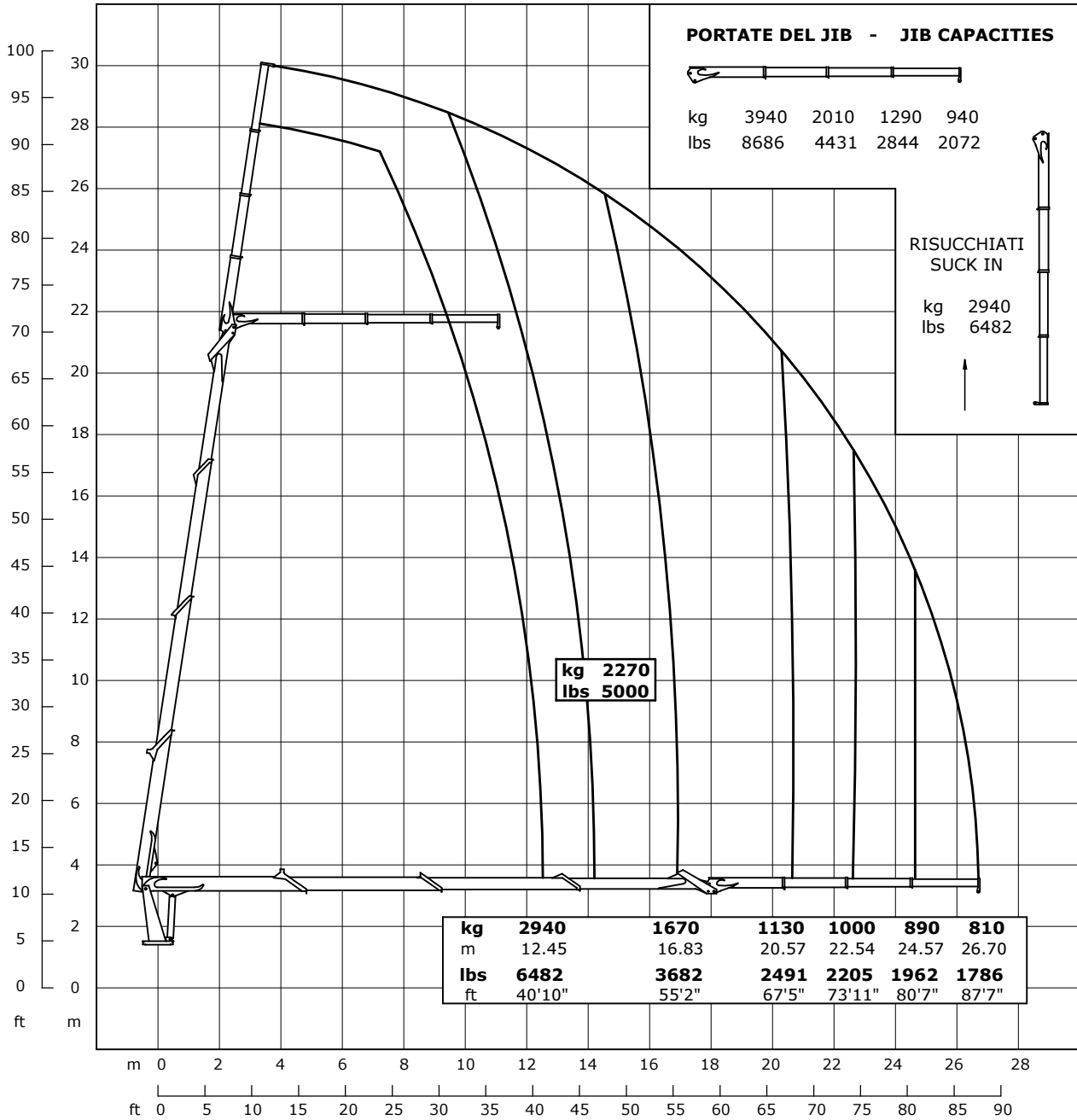
## DIAGRAMMA DELLE PORTATE - LIFTING CAPACITY CHART



The inner telescopic boom must be extended before extending the jib  
 The jib must be retracted before retracting the inner telescopic boom

The weight of the wallboard fork, rotator or other attachments must be deduced from the lifting capacity.  
 The drawing shows booms undeformed under load booms have deflection.  
 Data, descriptions and illustrations are given as information and are not binding  
 they are subject to change without notice.

## DIAGRAMMA DELLE PORTATE - LIFTING CAPACITY CHART



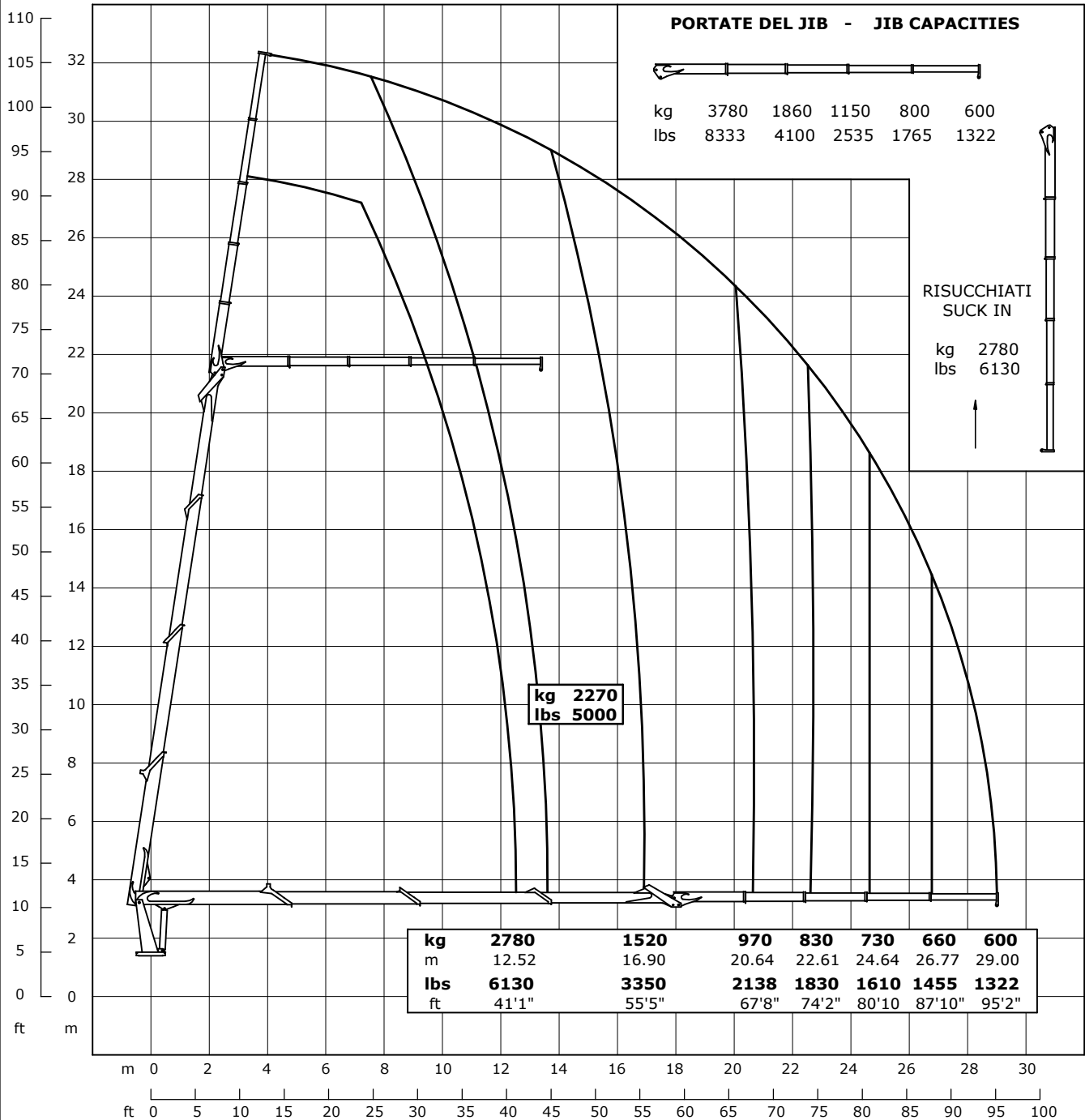
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## DIAGRAMMA DELLE PORTATE - LIFTING CAPACITY CHART

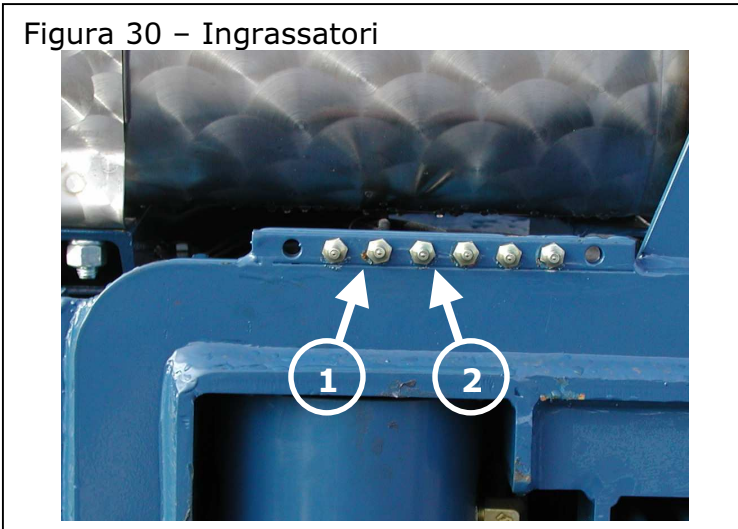


The inner telescopic boom must be extended before extending the jib  
 The jib must be retracted before retracting the inner telescopic boom

The weight of the wallboard fork, rotator or other attachments must be deduced from the lifting capacity.  
 The drawing shows booms undeformed; under load booms have deflection.  
 Data, descriptions and illustrations are given as information and are not binding;  
 they are subject to change without notice.

## (Chapter 3) - ROUTINE MAINTENANCE

Figura 30 – Ingrassatori



On the crane basement there is a number of grease nipples (zerks) that has to be used to grease the 3 poin linkage pin, the slew bearing (internal ring), the outriggers and the pinion (picture 30).

### 3.1 - AFTER THE FIRST 20 HOURS OF OPERATION

- Grease all the parts identified with the diagram in picture 31.
- Kleen or replace the filter on the pressare line.

### 3.2 - AFTER THE FIRST 300 HOURS OF OPERATION

- Check the torque of the tie rods securing the base to the chassis, using a torque wrench  
(torque: 67 daN\*m(lubricated) – 72.9 daN\*m (not lubricated)).
- Check the torque of the bolts securing the thrust bearing to the crane base and eventually tighten with a torque wrench.  
(torque: 67 daN\*m(lubricated) – 72.9 daN\*m (not lubricated)).
- Verify the tightening torque of the bolts holding the gearbox on the plate with a torque spanner  
(torque : 22 daN\*m).
- Verify the tightening of the bolts that hold the brake on the gearbox (torque 2.6 daN\*m) and between rotation motor and brake (torque: 5 daN\*m).

### 3.3 - PERIODIC MAINTENANCE

#### 3.3.1 - EVERY 20 HOURS OF OPERATION

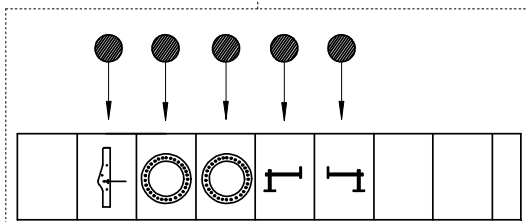
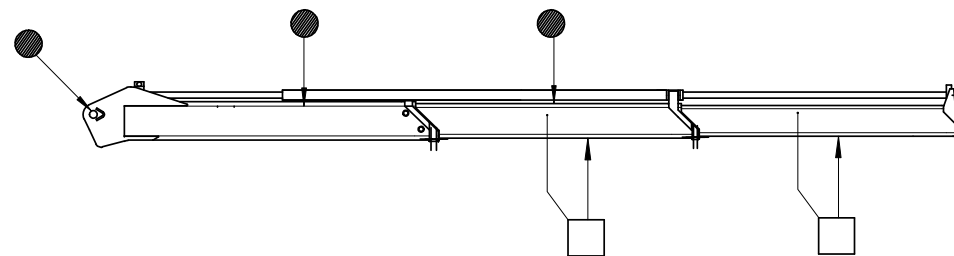
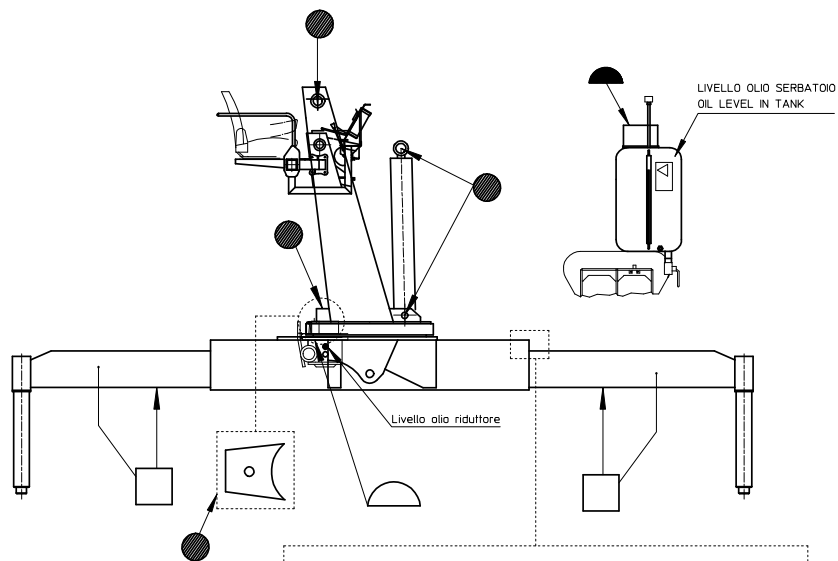
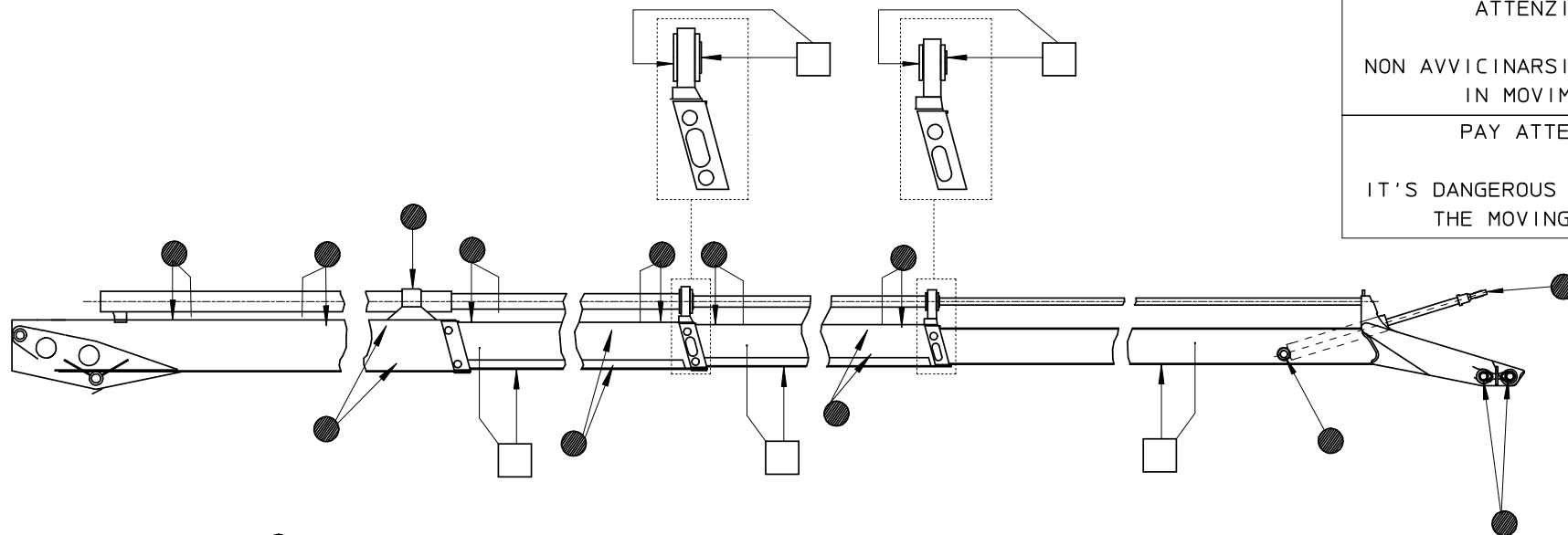
- Verify the oil level inside the hydraulic-oil tank: the level must be on the same line of the level indicator, when crane is folded and outriggers retracted. (picture 31).

ATTENZIONE!!!

NON AVVICINARSI AGLI ORGANI  
IN MOVIMENTO

PAY ATTENTION!

IT'S DANGEROUS TO STAY NEAR  
THE MOVING PARTS.



●		FELT GRASSO GREASE GRAISSE KP 2 N-20
□		FELT GRASSO GREASE GRAISSE KP 2 N-20

◐		OEL OLIO OIL ACEITE SAE 90 EP
◑		HYDRAULISCHES OEL OLIO IDRAULICO HYDRAULIC OIL HUILE HYDRAULIQUE AGIP OSO 46

GORMAGH

### 3.3.2 - EVERY 100 HOURS OF OPERATION

Lubricate the sliding shoes of the extension boom:

- For the front shoes, spread grease on the lower surfaces of the extensions (Picture 31).
- For the internal shoes, spread grease by slightly (not fully) extending the hydraulic extensions through the holes on the upper part of the extensions (Picture 31); repeat the procedure for each extension.
- On completion of each greasing phase, move the extensions backwards and forwards to ensure even spreading of grease.
- Insufficient lubrication may cause irregular action of the extension cylinders.
- Lubricate the rotating joint of the hook and its articulations.



#### **DANGER OF SQUEEZING**

- Slew bearing greasing: Start greasing from grease nipple (zerk) 1 (picture 30), grease by rotating the bearing for 180° back and forwards several times. Then use grease nipple (zerk) 2 and rotate in the opposite direction for 180° back and forward several times. This system will spread evenly the grease over all the 360° of the bearing circumference.  
**Pay attention to the moving parts.**
- Through the grease nipples (Zerks), on the side, grease the stabilisers and also the pin of the 3 points linkage.

### 3.3.3 - EVERY 200 HOURS OF OPERATION

- Lubricate all the articulation pins through the relevant nozzles (see diagram in Picture 31).



#### **DANGER OF SQUEEZING**

- Grease the rotation bearing, through the grease nipples installed on the external ring. Do the operation in more times, by rotating the turret more times in order to distribute the grease on all the circumference.  
**Pay attention to the moving parts.**
- Grease the top bearing of the gear-box, through the grease nipple located on the pinion, it can be reached by taking off the pinion cover or by taking of the plug on top of the pinion cover.
- Lubricate the slots of the extension cylinder attachments in the moving areas.
- Lubricate the stabiliser cross members by spreading the special grease in the areas of friction.
- Lubricate all the joints.
- Check the torque of the fixing bolts of the power take off and pump.
- Check and clean the oil filter as described above.

### 3.3.4 - EVERY 600 HOURS OF OPERATION OR AT LEAST ONCE A YEAR

- Check the pressures of the pilot stop valve seals (with suspended load and motor off, when manoeuvring the crane in all possible directions nothing must move) and check setting of the limiting device.

- Check the screws securing the boom sliding shoes for wear. Replace them if the downward boom arrow is clearly evident without load or the thickness is less than 80% of the origin.
- Check the hydraulic oil for pollution and general efficiency (see also point 3.3.6).
- Check the torque of the tie rod securing the crane base to the chassis and the bolts securing the thrust bearing.

### 3.3.5 - EVERY 1000 HOURS OF OPERATION

- Replace the oil filter cartridge.
- Check all the welded parts, bearing structures and parts undergoing wear and tear.

### 3.3.6 - EVERY 2000 HOURS OF OPERATION

- Change the hydraulic oil and clean the tank. **(The oil must be changed at yearly intervals even if this is before 2000 hours of operation). IF THE OIL IS NOT CHANGED AT THE SET INTERVALS, THIS MAY CAUSE DAMAGE TO THE SYSTEM AND SERIOUSLY AFFECT OPERATION OF THE SAFETY VALVES.**

N.B. The type of oil used is marked on a label on the tank. Replace the label when using a different type of oil.

- Clean the filters 15 hours after every oil change.



**Do not dispose of used oil in the environment. It must be disposed of in compliance with the local disposal regulations. Oil containers show all the data concerning product toxicity and the precautions to adopt for use.**

- Replace the boom sliding shoes.
- Replace the air filter on the tank.

## 3.4 - WHENEVER NECESSARY

- Wash thoroughly with a low pressure water jet.
- Replace any damaged pipes.
- Repair any oil leaks.
- Repeat the maintenance procedure specified above at shorter intervals depending on how heavy the working conditions are and the level of local environmental pollution, i.e. dust, tropical climate, etc..

## INSTRUCTIONS FOR THE MAINTENANCE





**IMPORTANT NOTE: NEVER WELD OR DRILL THE LOAD BEARING STRUCTURES.**



**FOR MAINTENANCE OPERATIONS ON THE HYDRAULIC SYSTEM, SUPPORT THE BOOM AND RELEASE THE PRESSURE.**



**BEFORE DISMOUNTING THE VALVES FROM THE CYLINDER, RELEASE THE PRESSURE BY COMPLETELY SLACKENING THE REGISTERS.**

**CAREFUL REGULAR MAINTENANCE WILL EXTEND THE LIFE OF THE CRANE AND MAKE IT SAFER.**

### **3.5 - MAINTENANCE TO BE CARRIED OUT AFTER A LONG PERIOD OF INACTIVITY**

**In case the crane is not going to be used for a long period of time, it will be necessary to use the following precautions:**

- **Verify the level of the oil inside the oil-tank if necessary add oil;**
- **Eliminate condensation from inside tank oil;**
- **Verify functioning of electric and safety devices.**

### 3.6 - SCHEDULE OF INSPECTIONS AND PROGRAMMED MAINTENANCE TO BE CARRIED OUT IN AUTHORIZED WORKSHOPS.

Besides the inspections foreseen by the law concerning the security of loading devices and their normal upkeep, that can be carried out by the normal users , it's necessary that the operations described at points 3.2, 3.3.4, 3.3.5, 3.3.6, and every repair are carried out at the due-dates and in workshops authorised by Cormach S.r.l. . Here follows a table-memorandum in which for every due-date the operations necessary on the crane are reminded; The workshop that materially carried out the works must put its stamps and sign to confirm the execution.

**If the operations are not carried out and/or registered, this involves the loss of the warranty and of the producer's responsibility.**

Due-date (hours of functioning)	Points where the perations to be xecuted are described	Date of execution	Stamp and sign of authorised workshop	Notes
<b>300</b>	<b>3.2</b>			
<b>600</b>	<b>3.3.4</b>			
<b>1000</b>	<b>3.3.5</b>			
<b>1200</b>	<b>3.3.4</b>			
<b>1800</b>	<b>3.3.4</b>			
<b>2000</b>	<b>3.3.5</b> <b>3.3.6</b>			
<b>2400</b>	<b>3.3.4</b>			
<b>3000</b>	<b>3.3.4</b> <b>3.3.5</b>			
<b>3600</b>	<b>3.3.4</b>			
<b>4000</b>	<b>3.3.5</b> <b>3.3.6</b>			
<b>4200</b>	<b>3.3.4</b>			

Due-date (hours of functioning)	Points where the operations to be executed are described	Date of execution	Stamp and sign of authorised workshop	Notes
<b>4800</b>	<b>3.3.4</b>			
<b>5000</b>	<b>3.3.5</b>			
<b>5400</b>	<b>3.3.4</b>			
<b>6000</b>	<b>3.3.4</b> <b>3.3.5</b> <b>3.3.6</b>			
<b>6600</b>	<b>3.3.4</b>			
<b>7000</b>	<b>3.3.5</b>			
<b>7200</b>	<b>3.3.4</b>			
<b>7800</b>	<b>3.3.4</b>			
<b>8000</b>	<b>3.3.5</b> <b>3.3.6</b>			
<b>8600</b>	<b>3.3.4</b>			
<b>9000</b>	<b>3.3.5</b>			
<b>9200</b>	<b>3.3.4</b>			
<b>9800</b>	<b>3.3.4</b>			
<b>10000</b>	<b>3.3.5</b> <b>3.3.6</b>			





## (Chapter 4) - EXTRAORDINARY MAINTENANCE

Se la gru è stata usata con cura e sono state effettuate le manutenzioni previste, essa non avrà bisogno di particolare manutenzione straordinaria per molto tempo; tuttavia diamo alcune indicazioni per ovviare anche autonomamente a possibili disfunzioni.

INCONVENIENCES	REMEDIES
<b>4.1 - THE CRANE DOES NOT WORK</b>	
a) The pump does not rotate	Check the power take off coupling
b) The 2 ways valve "crane/outriggers" is set on "outriggers"	Activate the lever of the two ways valve.
c) The tank tap has been closed	Open the tap The pump can be damaged.
d) The green light on the control block and on the box located on the frame are not going to on	Main fuse blown. Replace it.  To check the main switch
f) The dump valve does not close	Press the emergency button, if the solenoid is powered (red light in the connector on), replace it. If it is not powered, check the system. If it does not work in spite of pressing the button, dismount and clean the body of the valve or replace it.
g) An emergency stop button is activated	Check all the buttons and reset the work position
h) Boom lowering and boom extending functions do not work and when activated the green light goes off.	There is a interruption inside the load limiting device circuit: verify connections and the pressure switches
i) The crane when in overload condition, stays locked, no one function is working.	One of the micro switches activated by the control levers is broken or is locked, verify the switches.
<b>4.2 - THE CRANE MOVES BUT IT IS NOT POWERED</b>	
a) The 2 ways valve "crane/outriggers" hasn't been pushed to the end of its stroke.	Push the lever of the 2 way valves until it reaches end stroke position.
b) The solenoid valve does not close sufficiently	Proceed as in point 4.1.f



c) The general pressure valve is dirty	To clean and to reset the correct calibration
<b>4.3 - THE CRANE MOVES BY JERKS AND VIBRATES</b>	
a) Oil temperature too low	Operate the crane without load for a few minutes
b) No oil	Top up to level.
c) Suction pipe crushed or tap partially closed	Reset the correct conditions
d) Pump broken	Replace the pump and filter
<b>4.4 - THE MOVEMENTS ARE SPONGY</b>	
a) There is air in the oil	Remove the air suction points and bleed by repeatedly operating movements fully to end of stroke.
<b>4.5 - THE EXTENSION CYLINDERS VIBRATE WHEN MOVING OUTWARDS OR INWARDS AND ARE OUT OF SEQUENCE</b>	
a) Wore pads not lubricated	Lubricate sufficiently
b) Oil shortage in the tank	Top up
<b>4.6 - THE EXTENSION CYLINDERS EXTEND UNCONTROLLEDLY</b>	
a) The control valve is broken	Replace it.
b) The seals are broken	Replace them.

THE OPERATIONS DESCRIBED UNDER POINTS 4.1.a-d-e-f; 4.2.a-b-c; 4.3.d; 4.6.a-b, MUST BE PERFORMED IN REPAIR SHOPS AUTHORIZED BY CORMACH.

**IF LEAD SEALS ARE REMOVED BY UNAUTHORISED PERSONS, THIS MAKES THE GUARANTEE VOID AND NULL AND RELIEVES CORMACH OF ANY LIABILITY WHATSOEVER.**

CONTACT CORMARCH AUTHORIZED REPAIR SHOPS FOR ANY PROBLEMS THAT CANNOT BE SOLVED PROMPTLY OR THAT ARE RECURRENT.

## **APPENDIX "A" ADDITIONAL RISKS**

