User Manual

801 Palm

802 Palm

AMCO VEBA
A HYVA GROUP COMPANY

7845264-03 02/18
subject to change without notice

ORIGINAL INSTRUCTIONS

USER MANUAL
801 PALM - 802 PALM
INDEX

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A WARNINGS

A.1 PERSONAL PROTECTIVE EQUIPMENT

During normal crane operations the users must wear:
- helmet+ Wear a dust mask in the presence of dusts.
- safety gloves
- industrial footwear
- overalls secured using buttons and without loose or baggy parts.

IN ADDITION
+ Wear oil-proof gloves and safety goggles during maintenance tasks.
+ Wear ear protection if the noise level in the operating position exceeds 80 dB(A).
+ Wear a dust mask in the presence of dusts.
+ Wear a suitable mask in the presence of toxic fumes or poison gas.

Protective equipment

Standard protective equipment during any crane operation	
Additional protective equipment during crane maintenance	
Additional protective equipment if the noise level exceeds 80 dB(A)	
Additional protective equipment in the presence of dusts	
Additional protective equipment in the presence of toxic fumes or poison gas	

A.2 MECHANICAL HAZARDS

A.2.1 MECHANICAL RESISTANCE

The main hazards resulting from failure to follow the operating instructions described in the user manual are listed below:

ENVIRONMENTAL TEMPERATURE RANGE
- Weakening of the crane structure
- Hydraulic oil viscosity too low/high
- Hydraulic oil overheating
- Weakening of plastic components
- Degradation of flexible hoses (-40°C ÷ 100°C)

MAXIMUM INCLINATION
- Crane rotation not possible
- Excessive pressure in slewing cylinders
- Excessive stress on rack - pinion wheel or thrust block - motor coupling
- Excessive stress on crane structure
- Loss of stability

MAXIMUM OIL FLOW RATE TO MAIN CONTROL VALVE
- Overloads on the structure caused by excessive speed of movement
- Excessive oil temperature

MAXIMUM WIND SPEED
- Excessive stress on crane structure
- Excessive oscillation of the load
- Loss of stability

PRECIPITATION
- Lightening, electric shock
- General malfunctioning of the electric system

USE IN EXPLOSIVE ENVIRONMENTS
- Flammable hydraulic fluid and plastic components

INSTALLATION ON RIGID BASE
- Excessive forces of inertia

USE IN MARINE ENVIRONMENT
- Corrosion of structural components: cylinder rods, pins, winch rope (offshore cranes)
- Excessive forces due to oscillation/inclination (ship-mounted cranes)

LIFTING COMPONENT
- Excessive forces if lifting components other than hook are used

IP PROTECTION LEVEL
- Electric system faults (safety and controls)

WARNINGS

- Do NOT use the crane if the operating conditions are incompatible with the instructions given in this manual. Specifically, the user must contact the manufacturer of the crane in the event of environmental temperatures outside the range indicated in this manual.

- Clear any snow or ice from the crane arms to prevent excessive stress caused by the extra weight and to ensure that movement of telescopic components is not affected.
- Contact an authorised assistance centre before using or transporting the crane in a marine environment.
- The lifting component to which the diagrams refer in this manual is the crane hook. If other lifting components are to be used the user must contact an authorised assistance centre to obtain dedicated load diagrams.
- Maintenance on the machine which requires welding or grinding is forbidden. Refer to an authorised assistance centre if repairs or modifications to metalwork are required.

A.2.2 CRUSHING HAZARD

Crushing hazards derive from moving components on the crane:

- body crushing between the crane and vehicle
- upper limb crushing between base and crane booms
- lower limb crushing under the plate for the stabiliser cylinders
- limb crushing in openings

WARNINGS

- Keep all personnel away from the hydraulic stabiliser beams during opening, if present.

- Do NOT climb on to the crane base when the vehicle's engine is running.

- When handling the crane, avoid grasping the control levers: operate them only with the fingers.

- Do NOT place hands or feet under the stabiliser cylinder plate.

- Do NOT perform maintenance when the crane is moving or when the power take-off is enabled. Do NOT touch the crane when it is moving.

- Avoid hazardous situations in which the user, other personnel or passers-by may be crushed by the crane, stabilisers or the load.

- Abide by safety distances indicated in EN 349 and make sure all others do the same.

A.2.3 CUTTING HAZARD

Residual hazard associated with movement of booms and any connecting rods. A residual cutting hazard exists for the upper limbs between moving parts associated with the booms, base and telescopic components.

WARNINGS

- When the crane is in operation do NOT place upper limbs between the boom joints, near connecting rods or in the area where stabiliser rods are retracted into the base. Do NOT insert fingers, feet or limbs inside openings on moving parts.

- Do NOT insert fingers inside unoccupied pin or securing component housings (in particular pin housing for manual extensions).
- Do NOT stand between the base and booms during crane closing.

A.2.4 DRAGGING OR ENTRAPMENT HAZARD

Residual hazard associated with failure to abide by safety distances in the crane operating area.

WARNINGS

- Do NOT insert fingers, feet or limbs inside openings on moving parts.

A.2.5 IMPACT HAZARD

Residual hazard associated with

- impact with the crane boom during opening/closing
- impact with the moving load
- impact with manual extensions
- impact caused by release of the load

WARNINGS

- Take care not to bump into moving parts on the crane. Specifically, do NOT bang your head on the boom during working operations.

- Take great care not to bump into the suspended load. The load must always be moved under safe conditions away from potential hazards and obstacles, as specified in this manual.

- Always check that the load lifting components (hook, shackle, slings, chains) are in perfect condition. Do NOT exceed the maximum load indicated on the plate. Check that the load is properly secured to prevent accidental falling. Do NOT stand under the load.

A.2.6 OIL LEAK HAZARD

Hydraulic fluid leaks can cause burns, irritation to the skin and eyes and can even penetrate under the skin.
These hazards are associated with incorrect tightening of couplings, rubbing of flexible hoses against metal objects or components, excessive bending of hoses, incorrect disconnection of hoses during maintenance, incorrect repairs, ageing, etc.


WARNINGS

- When the crane is new and used for the first time small leaks of oil from the couplings may occur due to the heat expansion caused by the high temperature of the hydraulic fluid. Tighten the couplings using the torque settings suggested in the maintenance manual. Couplings may be damaged if they are too tight.
- The crane is designed in such a way to prevent rubbing of hoses against moving parts. However the installation configuration may cause hoses to come into contact with other moving parts. If this happens use additional sheaths to protect the hoses.
- If a hose becomes damaged switch OFF the machine immediately and identify the damaged area using a piece of card or wood. Spurts of fluid from a very small hole are powerful enough to penetrate the skin.
- Switch OFF the supply to the system and release the residual pressure from the hydraulic circuit before disconnecting any hoses.
- When using blowtorches and other welding equipment for repairs (authorised assistance centres only) switch OFF the pressure to the hydraulic system and work away from hoses and steel lines.

A.3 ELECTRIC SHOCK HAZARD

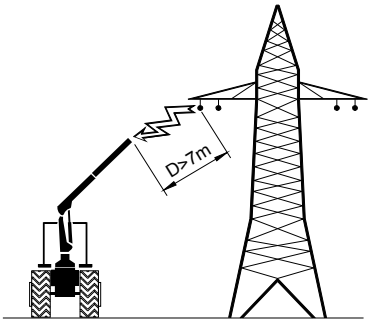
A.3.1 CONTACT WITH LIVE COMPONENTS

There is an electric shock hazard for the user under the following conditions:

- if the crane comes into contact with electricity power lines
- if the crane is struck by lightning

WARNINGS

- The crane should only be operated at a distance D of at least 7 m from electricity power lines. The crane can be used closer to electricity power lines if, following notification to the electricity supply company, suitable protection is adopted to prevent operation too close to the lines and accidental contact. The minimum operating distance must be calculated on the basis of maximum crane boom extension towards the lines and maximum movement of the lines.



- The crane should only be used near live power lines if:

- Safety distances are adhered to
- Live parts are covered or surrounded by guards
- Overhead power lines are switched OFF for the entire duration of work

PROCEDURE IN THE EVENT OF CONTACT WITH ELECTRICITY POWER LINES

Follow the procedure described below in the event that the crane touches a power line:

1. Keep calm
2. Do not leave the control position
3. Do NOT touch any metal parts on the machine
4. Warn people nearby not to approach the crane, vehicle, load or the person in the control position
5. Switch OFF the electricity power line.
6. Do NOT leave the driving cabin. If you must abandon your position, do NOT touch the crane and the ground at the same time. Therefore leave your position by jumping to the ground.

A.3.2 STATIC ELECTRICITY

The crane can accumulate static electricity. This generally occurs when the material placed between the stabiliser feet and the ground is an insulator e.g. wood, the crane is used near radio transmitters or high frequency switching systems and when a storm is approaching.

- Static electricity can affect correct functioning of pacemakers.

WARNINGS

- Accumulation of static electricity is prevented by connecting the vehicle's chassis to earth using a special device.
- People with pacemakers fitted are forbidden from approaching or using the crane.

A.4 HEAT HAZARDS

A.4.1 BURNS

These hazards are caused by:

- Contact with hot hoses, hot tanks and damage to hoses resulting in spurts of hot oil.
- Use in explosive environments

WARNINGS

- Do NOT touch any part of the hydraulic system when the temperature exceeds 50°C (EN 563).

- Routinely check that the thermometer is functioning correctly. Refer to an authorised assistance centre in the event of a fault.
- Environmental temperature can affect crane control capacity. Do NOT use the crane under extreme environmental conditions (very hot, very cold, very high relative humidity).
- Do NOT use the machine in explosive environments.

A.5 NOISE HAZARDS

There are no significant noise hazards in that the crane does not include the power source.

WARNINGS

- Wear ear protection equipment if the noise level in the operating position exceeds 80 dB(A) as a result of other machinery or equipment in use.

A.6 VIBRATION HAZARDS

There are no significant vibration hazards in that a loader crane is used for short periods and therefore there is no significant effect on the operator.

A.7 HAZARDS DUE TO TOXIC SUBSTANCES

These hazards are associated with:
- Inhalation of exhaust fumes or toxic substances caused by the working environment and/or the substances moved.
- Incorrect handling or disposal of hydraulic oil.
- Incorrect handling or disposal of grease.
- Fire caused by highly flammable hydraulic fluid.

WARNINGS

TOXIC FUMES AND SUBSTANCES
Control positions must be located so that operators are not exposed to inhalation of exhaust fumes and toxic substances caused by the working environment and/or the substances moved.
If the operator is exposed to exhaust fumes move the exhaust pipe outlet point further away from the operating position (e.g. using removable flexible hosing).
Wear a mask if the crane is used in environments with toxic fumes or substances.

HYDRAULIC OIL AND INDUSTRIAL GREASE
These substances must be handled with care in a ventilated environment. Wear protective gloves and goggles. They must be stored and moved in sealed containers to prevent leaks and accidental contact with skin and eyes.

These substances are flammable. Keep all naked flames well away.
Store used oil and grease in sealed containers at a temperature less than 65 °C. Contact an authorised waste management company to dispose of them.

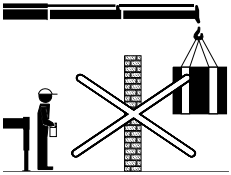
A.8 ERGONOMIC HAZARDS

A.8.1 MANUAL OPERATIONS

WARNINGS
- Do not place the body under excessive strain when operating the crane. If manual operations are required (e.g. pivoting stabilizer legs, manual extensions, other lifting components) or the load must be moved by hand do not lift a weight of more than 25 kg (20 kg for women).

A.8.2 VISIBILITY

WARNINGS
- When using the crane the operator must have a perfect view of the entire range of machine use as well as control, emergency and safety devices.



- An additional lighting system conforming to EN 1837 must be installed if the crane is used at night.
- A qualified assistant must help the operator if the latter does not have a clear view of the entire range of machine use.

A.8.3 HUMAN ERROR

WARNINGS
- Personnel and assistants operating the crane must not be temporary staff. They must be at least 18 years old and physically fit enough to perform all tasks. The following aspects must be taken into consideration:
  Physical: sight and hearing; no fear of heights; not under the effects of alcohol, drugs or prescription medicines
  Psychological: conduct in stressful situations; mental balance; sense of responsibility

- Operators must be able to read and understand the language used to write the crane documents and information plates.
- Operators must be able to understand and apply the information and prescriptions given in this manual.
- Operators moving the vehicle on public roads must have the relevant authorisation and be aware of local driving legislation.
- All those using the vehicle must receive adequate training (in accordance with ISO 9926-1) from those responsible for installing the crane on delivery. Use by all other personnel is forbidden.

A.9 UNEXPECTED START-UP AND SWITCH-OFF OF THE CRANE

Impact, crushing, load loss and stability loss hazards exist as a result of accidental crane start-up and switch-off.

WARNINGS
- Before using the crane check that there is enough fuel and that the battery is in good condition.
- Those using the crane must be in full control of the machine with control and stop devices in easy reach from the moment of start-up.
- Control and maintenance operations must be performed with the machine and engine switched OFF, the brake ON and wheels blocked using special chocks

A.10 SAFETY DEVICE FAULTS

- Tampering with safety devices can cause excessive stress on the crane, loss of stability, impact, falling loads, sudden release of the lifting components and manual extensions, accidents when moving the vehicle, etc.
- Imperfect closure of the crane when moving the vehicle can cause serious damage due to impact of protruding components against various objects (bridges, garages, other vehicles, etc.).
- Failure to apply decals to the machine may cause the operator not to take into consideration hazards associated with normal crane use.

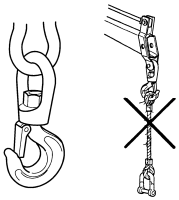
WARNINGS
- Do NOT remove, modify or disable safety devices be they mechanical (guards, locks, etc.) or hydraulic (valves, seals). Failure to abide by this regulation shall cause the warranty to be declared null and void.
- Make sure lifting components are not supporting a load and are resting on a suitable support surface before disconnecting them.
- Do NOT tamper with or remove warning labels. Do NOT clean the stickers with solvents. Do NOT use water or steam under pressure to clean the machine.

A.11 COUPLING FAULTS

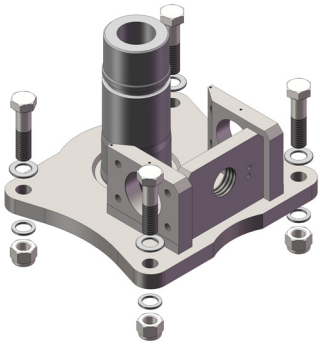
There is a serious risk of damage to property and injury to persons in the event of incorrect coupling of mechanical and hydraulic components between the crane and vehicle, crane and lifting components and between the lifting components themselves.

WARNINGS
The following checks should always be made before using the crane:
- Visually check that the hydraulic system is functioning correctly and that there are no fluid leaks between hoses and couplings.
- Visually check the integrity of the machine structure and hoses.
- Check that the load capacity of the lifting components is adequate.
- Check the integrity of the seals on the safety devices and valves.
- Check the efficiency of the safety devices.

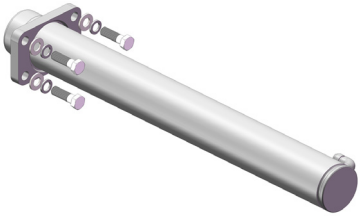
- Check that hooks, shackles, slings, cables, chains and relevant safety devices are in perfect condition.



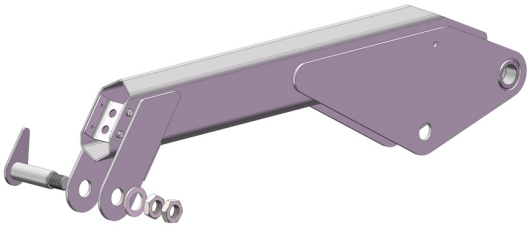
- Check that the mounting bolts used to secure the crane to the vehicle are secured correctly and that the crane is in the correct position relative to the frame of the vehicle.



- Visually check the tightness of rotation cylinder securing screws and all nuts and bolts in general.



- Check that pins and screws used in the extensions and in other lifting tools are assembled and secured correctly.



A.12 HAZARDS DUE TO INCORRECT LIFTING OPERATIONS

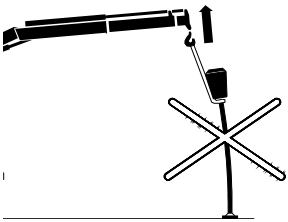
Residual hazards exist as a result of incorrect lifting operations:

- Loss of stability
- Uncontrollable load, overload, exceeding the tip-up limit
- Uncontrollable speed of movements, oscillation of the load
- Unexpected or accidental movement of loads
- Unsuitable, worn or unsafe lifting devices/accessories
- Lifting of people
- Use during high winds
- Risk of damaging load support surfaces following movement

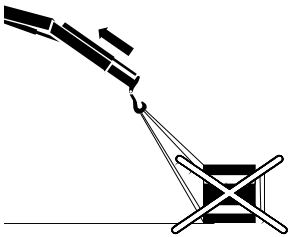
WARNINGS

The following movements and operations with the crane are strictly forbidden:

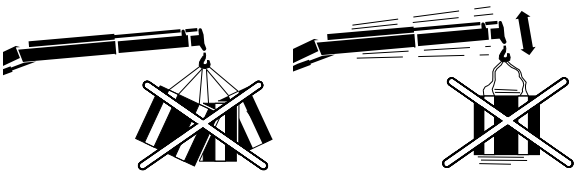
- Using the crane to drag, extract, remove, push or crush fixed or stuck objects.



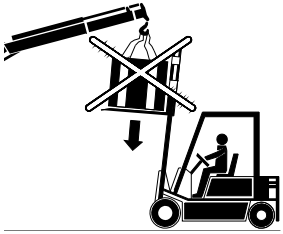
- Dragging of loads on the ground, on guides, resting against a wall, etc.

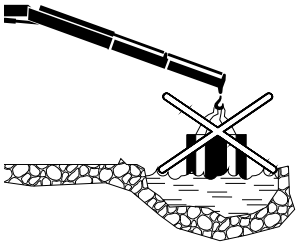


- Brisk movements (sudden rotation, ascent, descent) causing significant load oscillation or abnormal machine structure vibration.

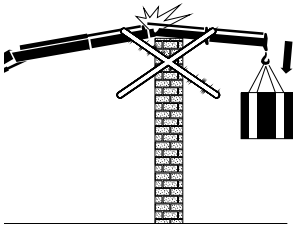


- Lifting of loads not supported by objects secured solidly to the base of the crane unless the operator knows the precise size of the load being moved (e.g. forklift truck leaving an excessive weight on the crane hook, lifting a floating weight, etc.).

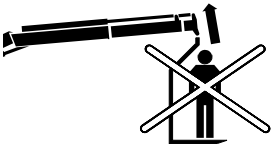




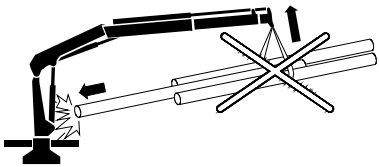
- Movements very close to fixed (walls, trees, etc.) and mobile (cranes, forklift trucks, gantry cranes, etc.) objects.



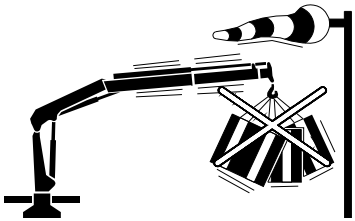
- Lifting of people.



- Using lifting components which are worn, not suitable for the load or without safety devices. Risk of accidental loss/fall, slipping, excessive rotation or tipping of the load and uncontrollable movements.



- Using the machine under adverse weather conditions (high winds).



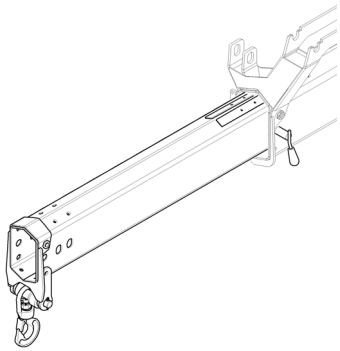
- Resting the load on surfaces with unsuitable strength, area or incline.

A.13 HOW TO TRANSPORT THE CRANE

If not installed, the crane must be moved safely, in order to avoid falls and impacts with objects and persons.
During transport of the crane, the carrier must follow these instructions:
1. The carrier is responsible for the crane and he must be qualified.
2. Use means of transport or lifting with adequate capacity.
3. Raise the crane by lift-truck, crane or bridge crane.
4. During the transport by land and sea, fix the crane or its container to the means of transport (body, container, hold, etc.).
Protect the crane properly from atmospheric agents. Never unpack the crane.

LIFTING BY A CRANE
Lift the crane by means of bands and place it in a flat and stable position on the ground. It's necessary to limit the load oscillations.

A.14 WARNINGS FOR MANUAL EXTENSIONS



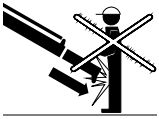
There are additional specific hazards for cranes with manual extensions as listed below:

- Hazards resulting from structural failure of a manual extension
- Crushing and cutting hazard for fingers during mounting, extraction, retraction.
- Impact hazard during extraction and retraction of extension.
- Hazard from putting the body under excessive strain when lifting manual extensions

WARNINGS

- If a manual extension is used then the maximum load for this component is valid for all operating configurations. Never lift loads exceeding the rated capacity of the extension.
  The operator can use only manual extensions supplied by the crane manufacturer and provided in this manual.
- Do NOT insert fingers inside unoccupied pin or securing component housings (in particular pin housing for manual extensions).

- If a manual extension is used avoid boom positions causing the unpinned extension to move at high speeds. Keep away from the extension's trajectory.



A.15 SUPPLEMENTARY WARNINGS FOR GRAB

There are additional specific hazards for cranes mounting a bucket or grab as listed below:

- Crushing and cutting hazard for upper and lower limbs in the grabs and moving parts.
- Entanglement hazard in the bucket and rotor parts.
- Impact hazard for people and property when load released or accidental release of lifting component.
- Impact hazard for equipment against objects.
- Structural damage hazard due to compression of equipment on load when using the crane boom.
- Hazards due to maintenance performed under unsafe conditions.

WARNINGS

- Do NOT use this accessory to move forbidden loads as specified in the user and maintenance manual for the equipment.
- Do NOT insert limbs between the grabs on the bucket and grab unit.

- Cordon off the working area using barriers to prevent people from approaching nearer than 20 m to the crane and equipment. If in specific cases the equipment requires a greater safe distance then this must be adhered to.
- Only use the crane to lift free loads. Do NOT use the crane to crash the grab against objects or material or to lift secured loads.
- Do NOT use the equipment to drag, crush or compact material.
- Release the load as close to the ground or container as possible. Take care that the load does not fall accidentally. Do NOT overload the grab.
- Do NOT operate the equipment over areas where accidental fall of the load may cause damage to property and injury to persons.

B USER MANUAL

B.1 PREMISE

Dear Customer,

Thank you for buying our product.
We have done everything we can to supply you with an excellent and safe product.
Please follow the instructions given below to ensure that your crane operates safely:

- Follow the warnings as well user and maintenance instructions.
- Perform routine maintenance to keep your crane efficient and safe.
- Keep the crane clean. Dirt increases wear of the cylinders and pins.
  Leaks of oil and other fluids are the main cause of accidents.
- Follow the instructions in this manual.
- Always keep this manual in a safe place with the crane so that it is accessible to the operator at all times.
- If the crane is sold the new owner must request an updated version of this manual.
- Refer to an authorised assistance centre in the event of damage to, even partial, or loss of this manual.

This Operator Manual is for the crane only and does not refer to the vehicle. The complete installation manual is released by the installer who is responsible for applying the CE mark to the assembly.

Yours sincerely

B.2 IDENTIFICATION

MANUFACTURER
H.C.E. s.r.l. Unico Socio

Via Einstein 4,
42028 POVIGLIO (RE) ITALY

CRANE TYPE
☐ 801 PALM
☐ 802 PALM

☐ NO CE

Serial number: _____

LIFTING COMPONENTS
☐ Hook
☐ Grab

CLASSIFICATION
Design according to EN 12999
Hoisting class: HC1
Stress history class: S2

EXPECTED OPERATING LIFE FOR INTENSIVE DUTY S2
Working days by year : 235
Working cycles by day : 85

Load capacity %	Expected working cycles No.	Operating life years
50%	500.000	25
66%	200.000	10
75%	150.000	7.5
90%	87.000	4.3
100%	64.000	3.2

B.3 DESCRIPTION AND DOCUMENTATION

B.3.1 ENCLOSED DOCUMENTATION

Assembly must be performed by an authorised assistance centre in accordance with the instructions in the installer manual released by the manufacturer and the vehicle setup specifications.

The installer must provide training for operators concerning all aspects of crane functioning at the moment of machine delivery in accordance with ISO 9926-1.

The installer must give the final customer the following crane documents, completed and signed as necessary:

- Certificate of origin;
- Certificate of warranty;
- User manual;
- Spare parts catalogue.

The owner of the crane is responsible for the routine inspections required by law.

B.3.2 MARK

All cranes are fitted with an indelible plate containing the following information:

- name and address of manufacturer
- crane model
- serial number
- year of manufacture
- maximum load
- machine weight

The plate is riveted to the first boom.
The serial number is also engraved on the crane base.
For commercial reasons it may be that the model is not the same as the crane name clearly shown on the boom. On customer request plates do not have to indicate crane weight and maximum load.

B.3.3 SERVICE CONDITIONS

The machine is designed to operate under the following conditions:

Service conditions

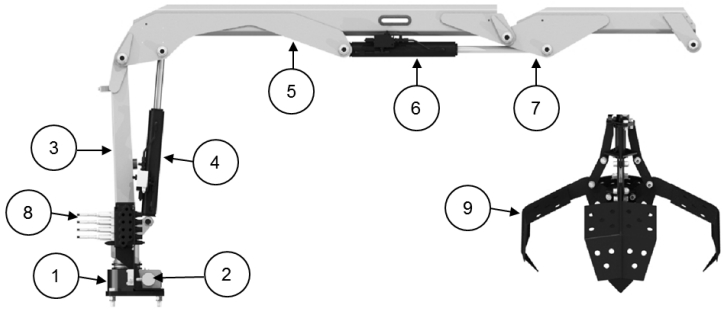
STOP DESCRIPTION	RANGE
Environmental temperature	-10°C ÷ 40°C
Hydraulic oil temperature	-10°C ÷ 80°C
Max working heel	4°
Ground bearing resistance	> max stabilizer pressure on the ground
Min distance between crane and electric power lines	D > 7 m
Max wind speed	38.8 km/h - Beaufort 5
Weather	Do NOT use during storms
Forbidden working environments	Marine and explosive environments

If any of these conditions does not exist, stop work immediately.

B.3.4 MAIN COMPONENTS

A list of the main crane components is given below in accordance with EN 12999:

MAIN COMPONENTS



1	Base
2	Slewing cylinder
3	Column
4	1st boom cylinder
5	1st boom
6	2nd boom cylinder
7	2nd boom
8	Controls
9	Grab (option)

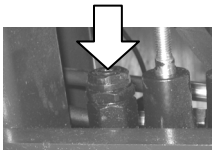
B.3.5 CRANE CONTROLS

MG1	MG2	MG3	MA1 (OPTION)
			
			
Column slewing	1st boom articulation	2nd boom articulation	Tool control

B.4 SAFETY DEVICES

B.4.1 MAX WORKING PRESSURE VALVE

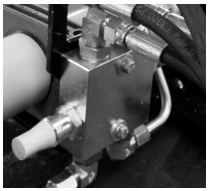
The purpose of the max working pressure valve is to limit the pump pressure to control main valve: so the working pressure of all hydraulic cylinders is limited.



The max working pressure valve on the main control valve operates as load limiting device in this condition: when into the moved cylinder the pressure reaches the max setting value, the valve diverts the oil to return line, stopping in this way the load moving.

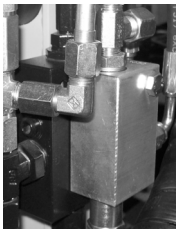
B.4.2 OVERPRESSURE SLEWING VALVE

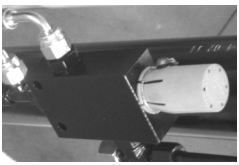
The purpose of this valve is to limit the pressure into the slewing cylinders: so the crane structure is protected from induced slewing forces.



B.4.3 OVERCENTER VALVES (OPTION)

The overcenter valves are fitted on the 1st boom cylinder and on the 2nd boom cylinder. Their purpose is to lower or block the load if the pressure into the cylinders reaches the setting value. So the crane structure is made safe.



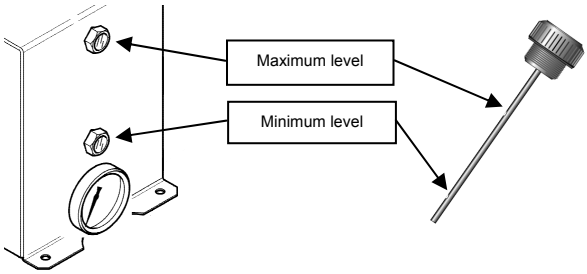


When the valve opens, the operator must retract the hydraulic extensions immediately, to stop the descent of the load.

B.4.4 OIL LEVEL INDICATORS AND THERMOMETER ON OIL TANK (OPTION)

The crane can be equipped with 3 different oil tanks:
- oil tank for light duty applications: 17.5 l
- oil tank for medium duty applications: 25 l
- oil tank for heavy duty applications: 46 l

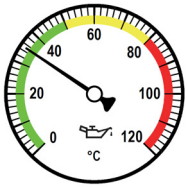
The oil tank is fitted with two visual level indicators in order to check the amount of oil in the tank.



tanks for light and heavy duty applications

tank for medium duty applications

The tank is equipped with a thermometer that monitors the oil temperaturel: when the indicator is in the yellow sector (Temp. > 50°C), it's dangerous to touch hydraulic elements because of their high temperature. When the indicator is in the red sector (Temp. > 80°C) it's necessary to stop the work operations.



B.4.5 WARNING LABELS

Stickers are stuck on crane giving operating instructions, compulsory actions and danger notices. Colour matching is as follow:

- Instructions notices: white background, black characters
- Danger notices: yellow background, black characters
- Compulsory actions: blue background, white characters

In the Annex D.10 are illustrated the labels and their position.
If there are ruined or unreadable stickers, it is necessary to go to an authorized assistance center to replace them.

B.5 OPERATING WITH THE CRANE

B.5.1 PRELIMINARY CHECKS BEFORE OPERATION

Before using the crane check:
- The integrity of the structure and safety device seals.
- There are no parts on the equipment which have not been checked or are not permitted.
- Perfect status of maintenance, coupling and tightness of hooks, shackles, cables, chains, fixing screws, screws, nuts, bolts, pins and lifting equipment.
- Presence and integrity of all labels on the crane.
- The lifting component is suitable.
- That filter clogging is less than the permitted level.
- That the oil level in the crane is above the minimum level.
- That all unauthorised personnel are outside the crane working area.
- That the MF level is on “WORK”.

If any of the above checks produce a negative result, stop work immediately, perform the necessary maintenance and if necessary contact an authorised assistance centre.

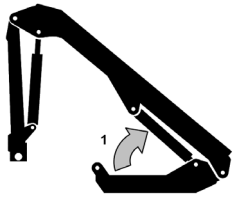
B.5.2 START UP OPERATION

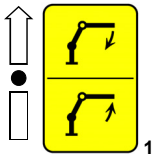
The operator must follow this procedure:
- Take the engine to the speed recommended by the installer for the crane. Push the clutch and engage the power take-off; release the clutch gradually.
  Never accelerate over the speed recommended with the power take-off engaged because the power take-off might break and the operational speed of the crane would exceed the speed considered for the structural test on the machine.
- Position the MF lever to “WORK”.

The crane is now ready for operation.

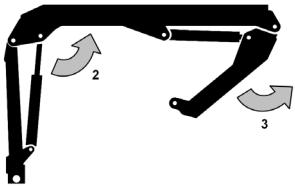
B.5.3 OPENING PROCEDURE FROM CROSSED POSITION

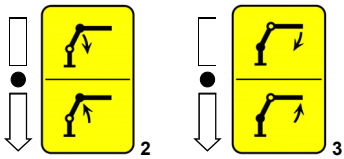
If the crane is closed in crossed position, fully retract the 2nd boom cylinder (articulation cylinder).





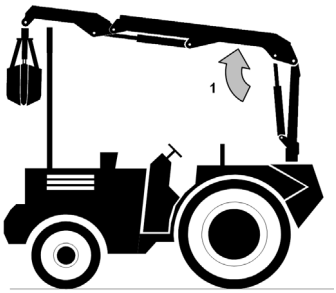
Then lift the 1st boom so that the 2nd boom can rotate freely (2).
Than take the 2nd boom into the horizontal (3).

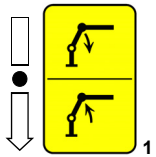




B.5.4 OPENING PROCEDURE FROM BOOM REST

If the crane's boom is stowed on a support, lift the 1st boom so that the 2nd boom and the grab can rotate freely (1). Than the operator can rotate and move the crane.

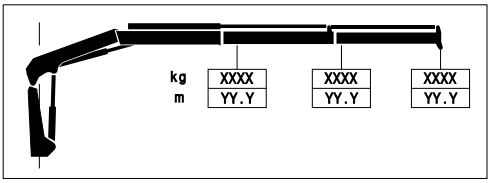




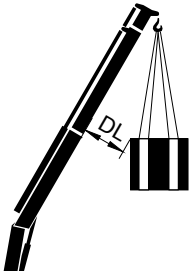
B.5.5 LIFTING OPERATIONS

Before beginning the lifting operations it's necessary to make sure that:

- the loads to be hoisted, depending on the crane straddle, are not greater than those indicated in the capacity diagram stuck on crane. The crane hoists the rated load if the boom is in horizontal position.



- never use lifting equipment (shackles, hooks, ropes, chains, bands, etc.) whose maximum capacity is lower than that be lifted.
- apply the hoisting cables, ropes, chains, bands to the hook so that their safety is not compromised.
- lift the loads from their centre of gravity and make sure that they cannot move, slide and rotate.
- avoid sudden movements, operate the control levers gently and gradually. Do not swing the load.
- do NOT interrupt the movements suddenly, mostly when lowering and rotating the loads.
- never take loads or the crane boom above the control position.
- prevent the load from colliding with parts of the crane, the vehicle or obstacles nearby. It's necessary to hold the load at safety distance DL > 1 m from the crane structure and possible obstacles.



COMBINED MOVEMENTS

The crane controls can carry out some movements at the same time by moving two levers simultaneously. The speed of each movement decreases/increases when using two functions at the same time. Pay the utmost attention when releasing/operating one control because the other function can accelerate/decelerate suddenly.

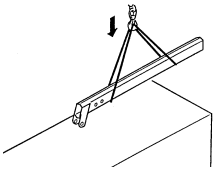
B.5.6 USE WITH MANUAL EXTENSIONS

The maximum load for a manual extension is constant (see A.14) and indicated in the load diagram. The manual extension must be removed when not in use: otherwise their weights must be subtracted from the rated capacity. This value is marked on the end of each manual extension.

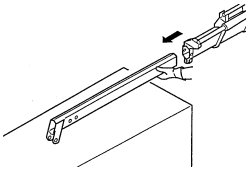
INSTALLATION OF A MANUAL EXTENSION

The procedure for a correct installation of a manual extension is the following:

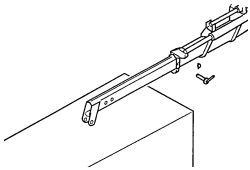
1) put the extension in a stable place with a suitable lifting tool.
2) move the crane boom close to it until the manual extensions enter it; check that the pin holes are aligned properly.
3) lock the manual extension with the pin and the safety locks.



1



2

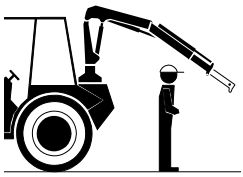


3

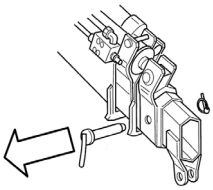
EXTRACTION OF A MANUAL EXTENSION

If a manual extension has to be extracted from the crane boom, operate as follows:

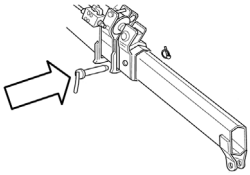
1) position the crane with the boom directed towards the ground:
2) remove the safety lock and the lock pin.
3) extract the extension until the holes on the extensions are lined up.
4) insert the lock pin with the relative safety lock.



1



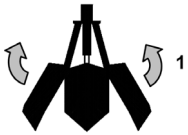
2

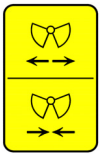


4

B.5.7 USE WITH GRAB

The grab can only be operated when the opening procedure is complete.
The control is used to open and close the grabs thus enabling lift and release of the load.

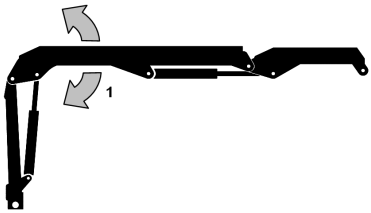




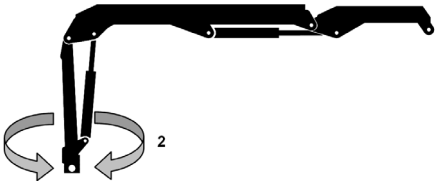
The grab must be secured directly on the crane boom to conform with essential safety requirements.
For further information refer to the bucket/grab user and maintenance manual.

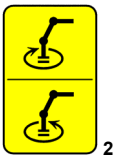
B.5.8 CLOSING PROCEDURE IN CROSSED POSITION

Move the 1st boom so that the 2nd boom can rotate freely (1).

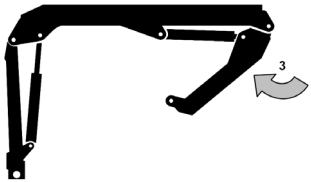


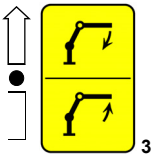
Rotate the crane column in the recovery direction indicated by the installer (2).



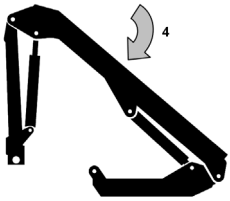


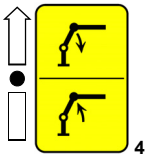
Close the 2nd boom completely, operating the control lever of the articulation cylinder (3).





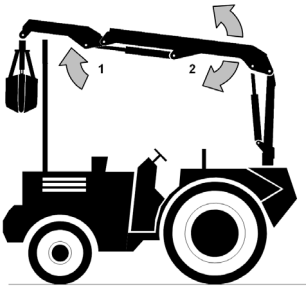
Lower the 1st boom until the crane reaches the foreseen recovery position (4).

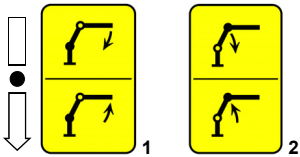




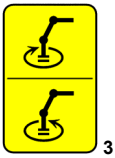
B.5.9 CLOSING PROCEDURE ON BOOM REST

Fully extend the 2nd boom cylinder and move the 1st boom so that the 2nd boom can rotate freely (2).

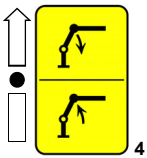




Rotate the crane column in the recovery direction indicated by the installer (3). Slow down the slewing movement in proximity to the dead point.



Stow slowing the boom on the support (4)



B.5.10 COMPULSORY SAFETY CHECKS BEFORE LEAVING THE WORK PLACE

Before leaving the work place check that:

- the power take-off is disengaged.
- (for cranes with stabilizers) the stabilizers legs are completely retracted and the stabilizer beams are blocked by the stabilizer lock device.
- the crane is placed in transport position and there are no crane components or accessories protruding outside the profile of the vehicle.
- (for CE cranes with stabilizers) the acoustic-visual control light in cab .

C MAINTENANCE

C.1 WARRANTY TERMS

The manufacturer declines all responsibility for damage to the crane caused by failed maintenance or lubrication. Preventive routine maintenance refers to machine use in non-abrasive and non-corrosive environments. Failure to abide by this stipulation shall result in all guarantees for faults being declared null and void.
All repairs, modifications and maintenance (excluding routine) must be performed exclusively by an authorised assistance centre.
All repair reports drafted by authorised assistance centres following routine and extraordinary maintenance must be recorded and archived by the owner of the crane.

C.2 ORDINARY MAINTENANCE

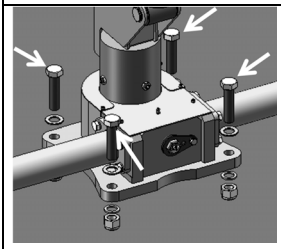
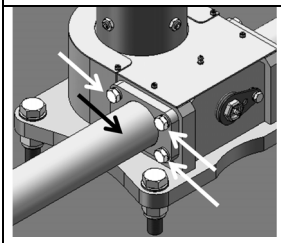
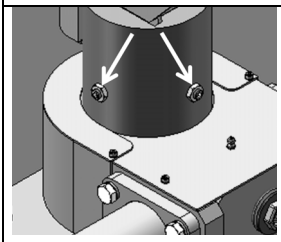
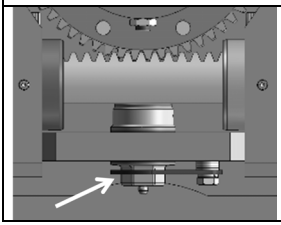
The following routine maintenance should be performed by the operator to ensure machine efficiency:
- basic maintenance tightening
- greasing
- filling up the oil tank
- crane cleaning

Check the following before performing any maintenance:
- The vehicle must be switched OFF and the brake applied
- The power supply to the crane must be switched OFF
- Maintenance personnel must wear suitable clothing and use suitable equipment.

C.2.1 BASIC MAINTENANCE TIGHTENING

Tighten the bolts and nuts below indicated at regular intervals and with a properly calibrated torque wrench to improve crane functioning and avoid mechanical troubles.

TIGHTENING CHART

	**Crane mounting bolts** No: 4 Thread size: M20 Tightening torque: 250 Nm Frequency of tightening: 100 working hours
	**Slewing cylinders fixing bolts** No: 8 Thread size: M12 Tightening torque: 52 Nm Frequency of tightening: 100 working hours
	**Column locking fasteners** No: 3 Thread size: M10 Frequency of tightening: 100 working hours Tightening procedure: - unscrew the locking nuts; - screw the socket screws up to mechanical stop (lightly tighten); - unscrew 1/2 turn the socket screws; - lock the socket screws with the nuts (tightening torque: 30Nm).
	**Rotation rack register** No: 1 Thread size: M45 Tightening torque: lightly tighten Frequency of tightening: 100 working hours

C.2.2 GREASING

Grease the machine at regular intervals to improve crane functioning and avoid unnecessary extraordinary maintenance. Greasing occurs under pressure.

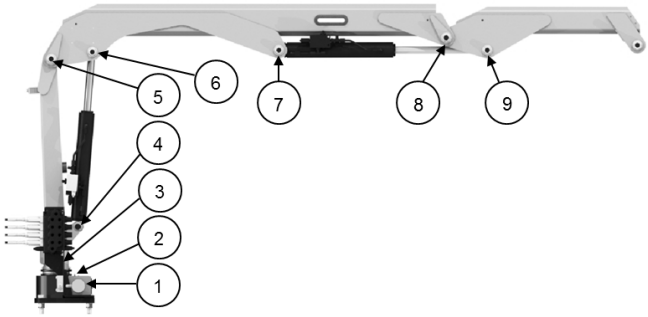
PRESSURE GREASING

Carefully clean the grease nipple. Insert new grease until the grease is coming out of the joints to ensure that all the old grease is replaced by new grease. Carefully remove any excess grease.
Do NOT use greases containing Molybdenum Disulfide.
Use a type of grease compatible with that indicated in the following table.

Recommended grease

TOTAL
CERAN CA

GREASING CHART



1		**Greasing nipple on rotation rack register** No.: 1 Frequency of greasing: 50 working hours Greasing procedure: - unscrew the rack register of 3 turns - insert new grease while slowly slewing the crane over a complete rotation - tighten the register
2 - 3		**Greasing nipples on base and column** No.: 2 Frequency of greasing: 50 working hours Greasing procedure: - grease while slowly slewing the crane over a complete rotation
4 - 5 - 6 **7 - 8 - 9**		**Greasing nipples on articulation and lifting bushings** No.: 6 Frequency of greasing: 50 working hours Greasing procedure: - grease until the new grease comes out of the bushing

WARNING

Not all greasing points can be reached from the ground. Therefore, get a ladder or another suitable means. Do not climb on the crane.

C.2.3 FILLING UP THE OIL TANK

Before using the crane, check the level of the tank oil: the level with horizontal crane at rest, must always be between the minimum and maximum level indicated. If the level is under the minimum, fill the tank up.
The oil contamination level must be lower than the indicated value, or else we suggest a prefiltering with efficiency $ß_{6\text{-}10(c)} \geq 75$ (ISO 16889).

FILLING UP THE TANK

- Take the crane to in rest and horizontal position, switch off.
- Check that the oil temperature is such as not to cause damage by burning in case of contact with the tank.
- Unscrew the oil filling plug situated at the top of the tank.
- Fill the tank up to the max. level indicated with suitable oil.
- On completing the operation check that the plug is perfectly closed.

Recommended hydraulic oils

Temperature range	Viscosity grade (ISO 3448)	Viscosity index (ISO 2909)	Cleanliness level (ISO 4406)	Recommended oils
-10°C ÷ 10°C	VG 32	98	18/16/13	**BIOHYDRAULIC TMP FR 32 AGIP OSO 32 ESSO NUTO H 32 IP HYDRUS 32 TOTAL AZOLLA ZS 32**
10°C ÷ 35°C	VG 46	98	18/16/13	**BIOHYDRAULIC TMP FR 46 AGIP OSO 46 ESSO NUTO H 46 IP HYDRUS 46 TOTAL AZOLLA ZS 46**
35°C ÷ 40°C	VG 68	98	18/16/13	**BIOHYDRAULIC TMP FR 68 AGIP OSO 68 ESSO NUTO H 68 IP HYDRUS 68 TOTAL AZOLLA ZS 68**

C.2.4 CLEANING THE CRANE

In order not to damage the corrosion-proof layers the machine is provided with, it is recommended not to use hot cleaning agents under pressure, which must never exceed 60°C in temperature.
In any case it is forbidden to direct pressurized jets close to the electric components, and anyhow all the points marked with the following symbol.

Use always biodegradable cleaning agents. To avoid oxidation of chrome plated parts, only use PH neutral cleaning agents.

C.3 PLANNED MAINTENANCE

The owner of the crane is responsible for contacting an authorised assistance centre to perform routine maintenance on the crane and accessories with the following intervals:

SERVICE 10: after the first 10 hours of service
SERVICE 100: after the first 100 hours of service
SERVICE 500: after the first 500 hours of service
SERVICE 1000: after the first 1000 hours of service
SERVICE "n# hours": every 1000 service hours

The maintenance register in Annex D.13 lists the checks which must be made during routine maintenance.

C.4 EXTRAORDINARY MAINTENANCE

Extraordinary maintenance means all maintenance not described as part of routine maintenance (e.g. problems relating to crane defects and accidents).
Extraordinary maintenance must be performed by an authorised assistance centre.

C.5 INACTIVITY

After long periods of inactivity (generally over 6 months) it's necessary to provide an extraordinary maintenance for the machine in an authorized assistance center.
If considered necessary, for any reason, to remove the crane from the vehicle, it is compulsory to call an authorized assistance center.
In this case it is recommended to close the crane in rest position, to take her in a sheltered place and to protect the chrome plated parts with a film of lubricant.

C.6 TAKING THE CRANE OUT OF SERVICE

At the end of its working life or for other reasons, it may be necessary to take the crane out of service. You must contact an authorised assistance center to put the crane out of order.

C.6.1 DISASSEMBLY

Follow this procedure in case of disassembly of the crane:
- Prepare a site suitable for disassembly and a lifting device of sufficient capacity.
- After positioning the vehicle and applying the parking brake, fold the crane into its transport configuration.
- Disconnect the hydraulic connections to pump and tank. Beware of escaping oil.
- Connect the crane to a lifting device, remove the crane mounting bolts.
- Lift the crane and place it in a flat and stable position on the ground.
- Remove pump, PTO and cardan shaft and replace the original covers on the vehicle's gearbox take-off.
- Protect all disassembled crane parts from atmospheric agents.

All crane parts (plastics, batteries, hydraulic oil, hoses, etc.) must be properly disposed to protect the environment.

C.6.2 STORAGE

The crane must be stored with the following precautions:
- Close the crane in transport position, on flat and stable ground.
- Cut off the hydraulic and electric circuits.
- Secure the crane properly in order to avoid falls due to accidental impacts.
- Carry out all precautions in order to avoid leakage of polluting materials and substances of the crane (oil, grease, plastic, hoses, etc.)
- Protect the crane from atmospheric agents (humidity, marine environment, etc.) with suitable package.

C.6.3 DISPOSAL

The crane and all components must be disposed of by an authorised waste management company in accordance with current legislation. Verify that all components cannot be re-used.

D ANNEXES

D.1 TECHNICAL DATA

D.1.1 GENERAL SPECIFICATIONS

	801 PALM		802 PALM		
Max net capacity for use with hook / grab					
	120 kg	85 kg	280 kg	245 kg	205 kg
Max net capacity with extension	90 kg	55 kg	-	-	-
Grab weight	-	35 kg	-	35 kg	75 kg
Crane weight without grab	190 kg		190 kg		
Weight of man. extension (option)	10 kg		-		
Max dynamic moment	520 daNm		1045 daNm		
Max vertical force on the base	350 daN		540 daN		
Slewing torque, net Slewing torque, gross	120 daNm 185 daNm		140 daNm 205 daNm		
Max working pressure	90 bar		160 bar		
Max oil flow rate	12 l/min		12 l/min		
Min. oil tank capacity	25 l		46 l		
Slewing angle	330°		330°		
Max working heel	4°		4°		
Absorbed power	2.4 kW		4.2 kW		
Base fixing bolts	M20 UNI 5738 - DIN 960 Property class: 10.9 Tightening torque: 250 Nm		M20 UNI 5738- DIN 960 Property class: 10.9 Tightening torque: 250 Nm		
Slewing cylinder fixing bolts	M12x40 UNI 5737 - DIN 931 Property class: 8.8 Tightening torque: 52 Nm		M12x40 UNI 5737 - DIN 931 Property class: 8.8 Tightening torque: 52 Nm		

D.1.2 EXTENSION TIMES OF HYDRAULIC CYLINDERS

Cylinders	Extension time	Retraction time
Slewing (330°)	8 s	8 s
1.boom cylinder	3 s	2 s
2.boom cylinder	8 s	7 s

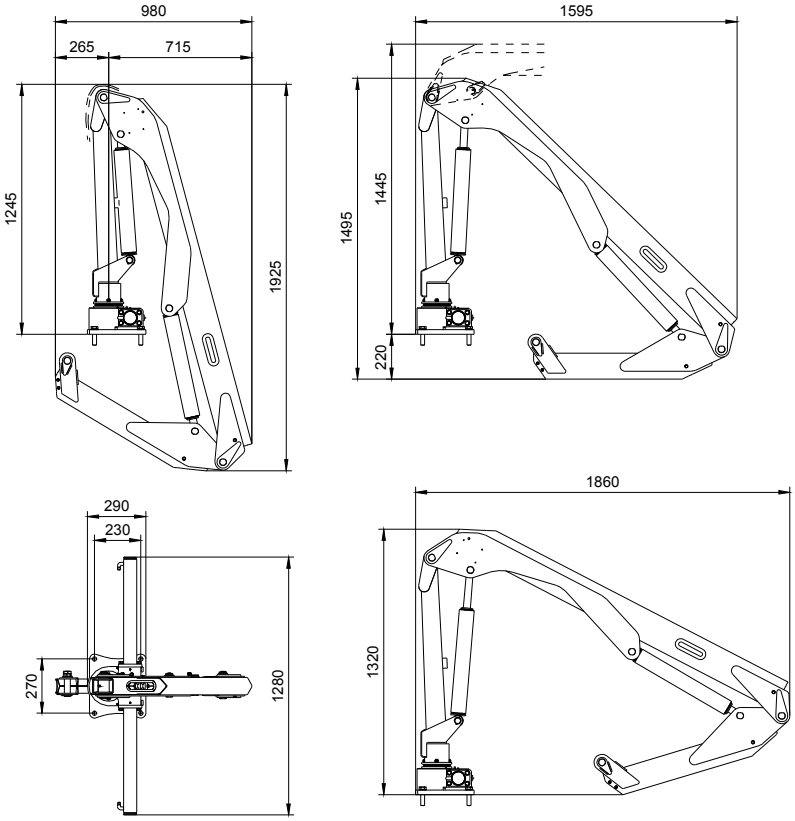
The times are indicative and referring to a crane without load and with oil temperature of 50°C.

D.1.3 CAPACITY OF HYDRAULIC CIRCUIT

	Cylinders extended	Cylinders retracted
PALM	5.3 l	4.5 l

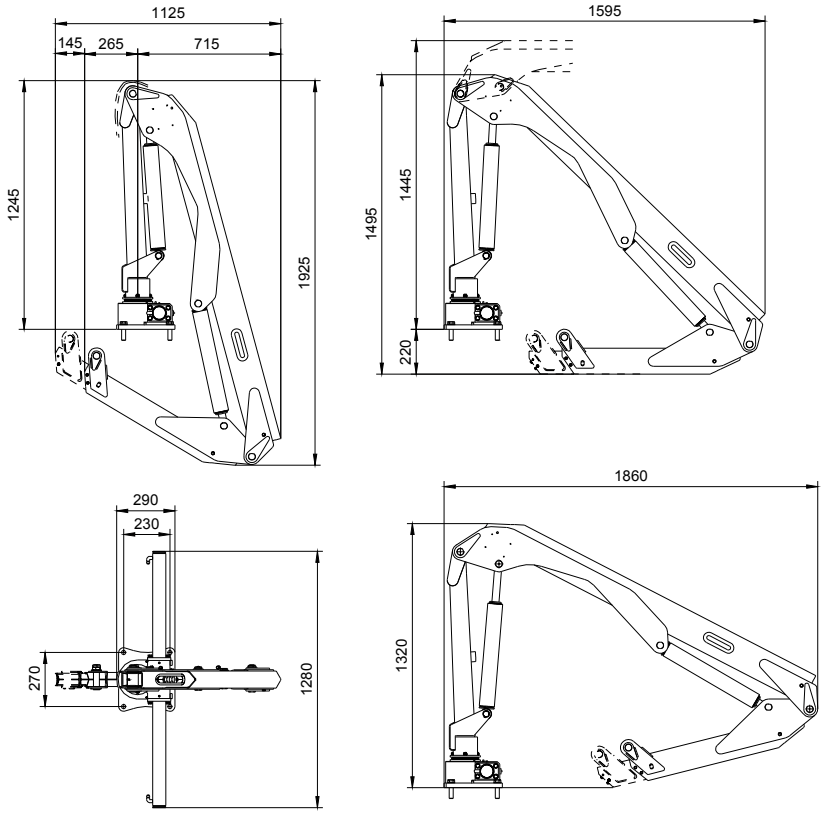
D.1.4 OVERALL DIMENSIONS

801 PALM
802 PALM



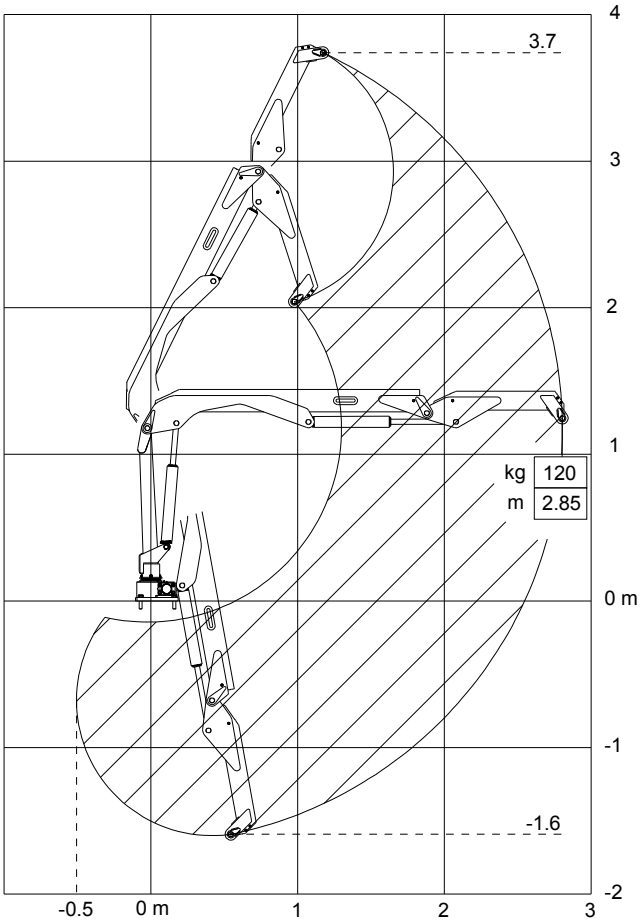
OVERALL DIMENSIONS

801 PALM WITH MANUAL EXTENSION



D.1.5 LOAD CHARTS

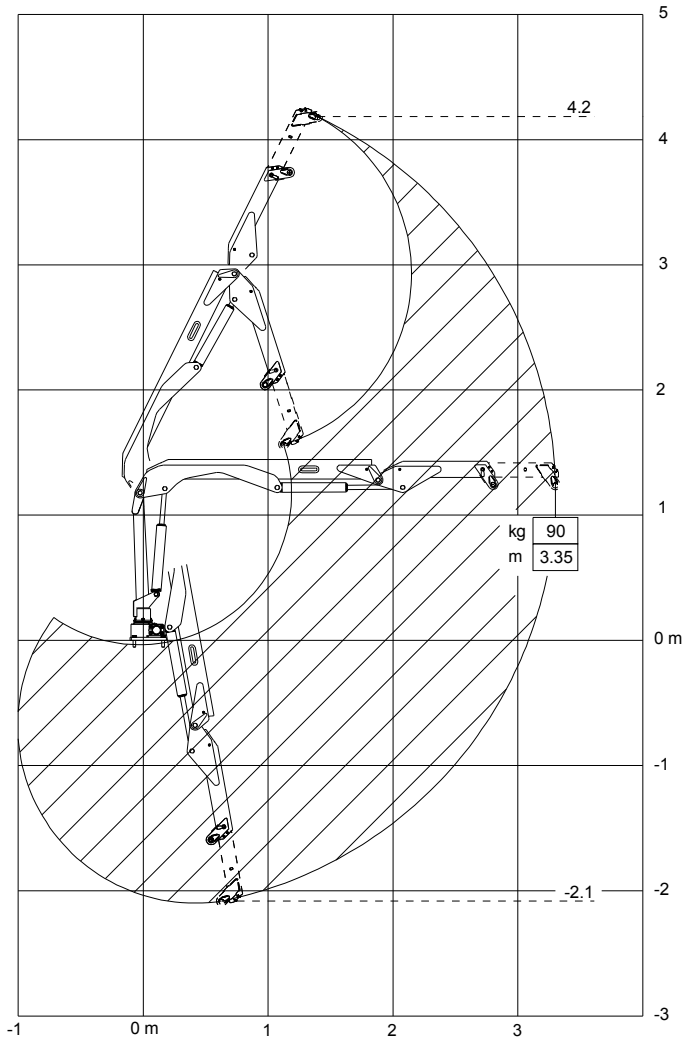
801 PALM



To obtain the net capacity for grab, you have to subtract the grab weight from the rated capacity.

LOAD CHARTS

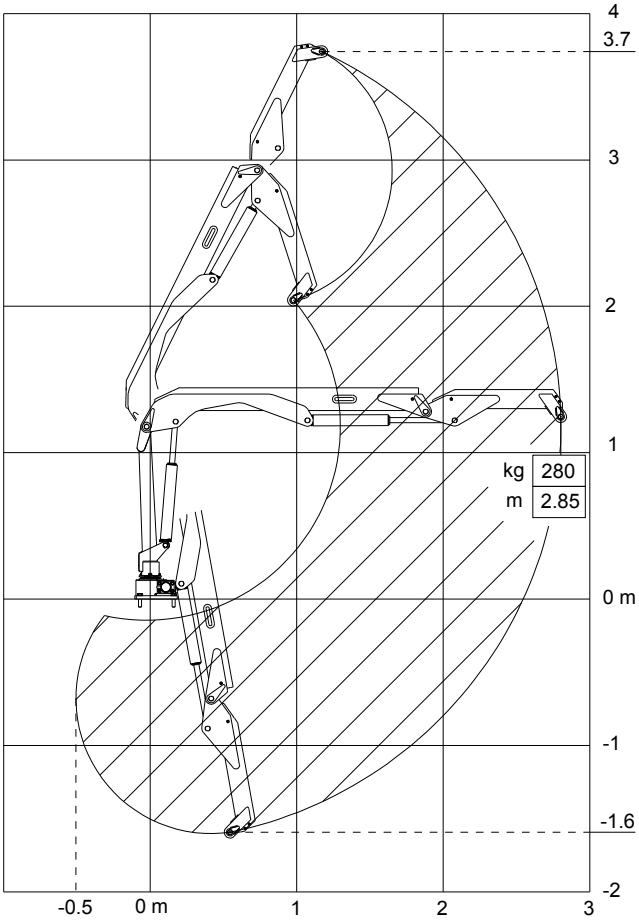
801 PALM WITH MANUAL EXTENSION



Use is allowed only with extension out.
To obtain the net capacity for grab, you have to subtract the grab weight from the rated capacity.

LOAD CHARTS

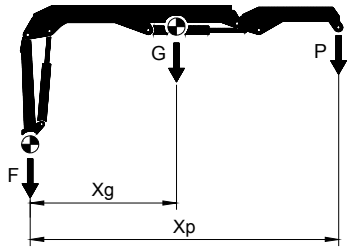
802 PALM

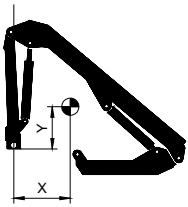


To obtain the net capacity for grab, you have to subtract the grab weight from the rated capacity.

D.1.6 WEIGHTS AND CENTERS OF GRAVITY

This annex contains the data needed for the stability and load test calculations in accordance with EN 12999.



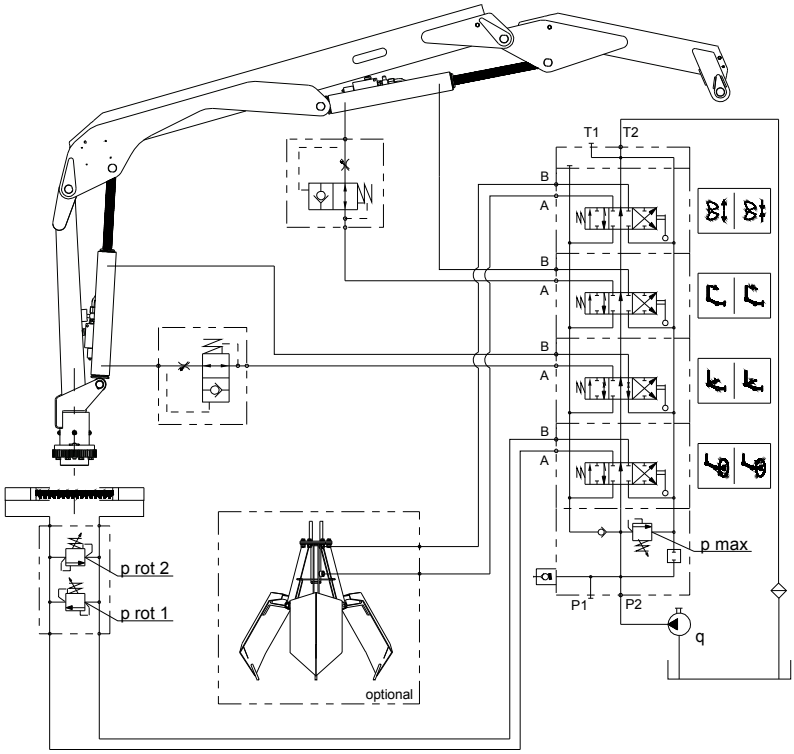


Key:
F = weight of fixed parts
G = weight of booms
Xg = distance between G and column axis
P = rated capacity
Xp = distance between P and column axis
TL = test load
X, Y, Z = coordinates of center of gravity for crane folded in transport position

801 PALM	F kg	G kg	Xg m	P kg	Xp m	TL kg	X mm	Y mm	Z mm
	105	85	1.30	120	2.85	152	380	335	0
	105	95	1.50	90	3.35	117	385	310	0

802 PALM	F kg	G kg	Xg m	P kg	Xp m	TL kg	X mm	Y mm	Z mm
	105	85	1.30	280	2.85	350	380	335	0

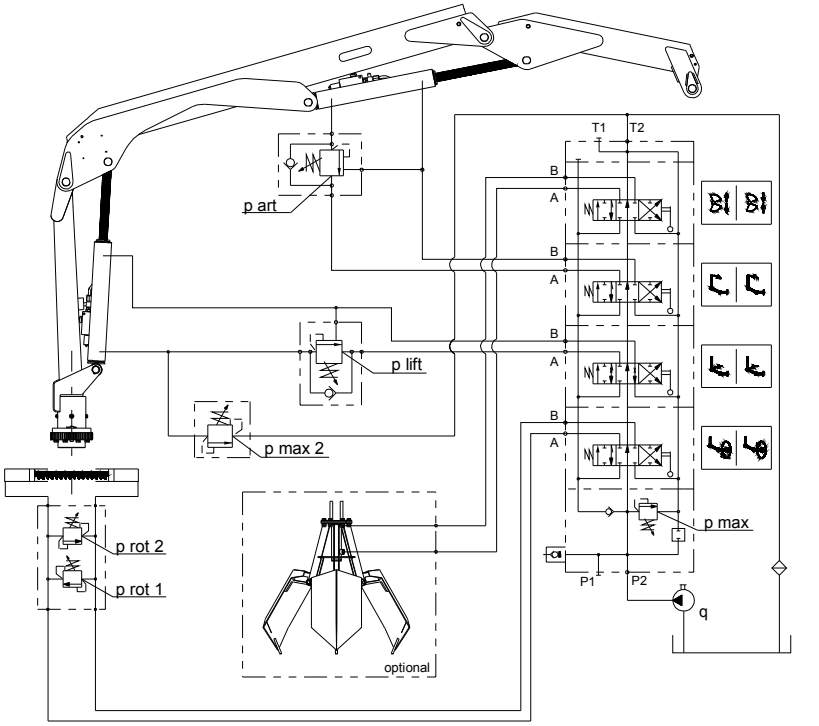
D.1.7 HYDRAULIC SCHEMATICS
CIRCUIT WITHOUT OVERCENTER VALVES



1020491

801 PALM	802 PALM
q = 12 l/min	q = 12 l/min
pmax = 90 bar	pmax = 160 bar
prot1-2 = 100 bar	prot1-2 = 100 bar

HYDRAULIC SCHEMATICS
CIRCUIT WITH OVERCENTER VALVES (OPTION)



1020490

801 PALM	802 PALM
q = 12 l/min	q = 12 l/min
pmax = 90 bar	pmax = 160 bar
part = 135 bar	part = 135 bar
plift = 175 bar	plift = 175 bar
pmax2 = 175 bar	pmax2 = 175 bar
prot1-2 = 100 bar	prot1-2 = 100 bar

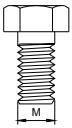
D.2 WARNING LABELS

Label	Position	Description
	At controls	Read the operator's manual; Do NOT use water jets on controls; Do NOT bang on the boom during crane opening and closing; wear helmet, gloves and industrial footwear.
	On base	Dead point position for crane slewing.
	On column	Read the user manual; It's possible to download it from the indicated website.
	On 1st boom	Position of the bands when lifting the crane.

D.3 TIGHTENING TORQUES

SCREWS - BOLTS

Coarse thread pitch
Lightly oiled
Damping factor = 0.15

THREAD DIAMETER (mm) 	TIGHTENING TORQUE Nm		
	Property class		
	8.8	10.9	12.9
M 6 x 1	9.5	14	16.4
M 8 x 1.25	23	34	40
M 10 x 1.5	46	67	79
M 12 x 1.75	79	116	136
M 14 x 2	127	187	219
M 16 x 2	198	291	341
M 18 x 2.5	283	402	471
M 20 x 2.5	402	570	667
M 22 x 2.5	552	783	917
M 24 x 3	691	981	1148
M 27 x 3	1022	1452	1700
M 30 x 3.5	1387	1969	2305

WARNINGS
In case of GEOMET-screws, it is necessary to multiply the tightening torque by the k factors given in the table below:

Connection	k
GEOMET + NO GEOMET	0.85
GEOMET + GEOMET	0.70

JIC FITTINGS

EXTERNAL PIPE DIAMETER (mm - in) 	TIGHTENING TORQUE Nm
6 - 1/4"	13 - 15
8 - 5/16"	18 - 25
10 - 3/8"	24 - 31
12 - 1/2"	45 - 52
16 - 5/8"	65 - 72
20 - 4/5"	92 - 100

D.4 TROUBLESHOOTING

Trouble	Possible causes	Troubleshooting
The crane decreases in efficiency, the oil temperature increases, it is necessary to increase the speed of the engine to obtain the required speed.	Pump wear	Check the pressure on the pump delivery. If it's necessary to replace it, go to an authorized assistance center
The crane fails to lift the required load with all movements.	1) General overpressure valve worn, no more seal or dirty 2) Oil leakage at some part of the circuit	1-2) Go to an authorized assistance center
The crane moves slowly.	1) Crushed or dented suction hose 2) Air suction	1) Replace the suction hose 2) Check the tightness of the fittings on suction hose
The crane does not complete its movements.	Low oil level.	Restore the oil level in the tank
Operating the control levers produces no movement of the crane.	No motive power	Check there is motive power
Crane lifts, but does not hold the load.	1) Wrong boom valve setting 2) Worn cylinder seals.	1) Set the valves 2) Replace the seals
Oil leakage from the cylinders, lowering of the load with stationary pump, loss of power.	Cylinders seals wear.	Go to an authorized assistance center.
The slewing movement is not regular.	1) Vehicle beyond the max permitted heel. 2) Slewing flow regulator valve and/or anti-shock valve on distributor element incorrectly set or dirty. 3) Worn slewing cylinder seals.	1) Return the vehicle to within permitted tolerance 2) Set or clean the valves 3) Replace the seals
Vibrations in the crane cylinders, boom extension cylinders jerk during the initial manoeuvres.	Hydraulic oil temperature too low	Perform manoeuvres without load for several minutes in order to warm up the oil
Metal particles found in the oil filters.	Some parts of the hydraulic circuit may be in a state of deterioration.	Go to an authorized assistance center.
Squeaking on articulation points or slewing unit bushing.	Lack of lubrication	Grease articulation points or bushings

D.5 MAINTENANCE REGISTER

SERVICE 10		
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Crane stop operation	☐	
Fittings and oil tank leaks	☐	
Suction and pressure pump connections	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

SERVICE 100		
Return-line filter cartridge	☐	
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Main valve fittings	☐	
Pipes and hoses fittings	☐	
Filling up the oil tank	☐	
Suction and pressure pump connections	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

 Visual check	 Tightening check	 Change	 Oil change
 Lubrication	 Setting	 Operating test	 Tool maintenance

MAINTENANCE REGISTER

SERVICE 500		
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Safety devices	☐	
Warning labels	☐	
Greasing	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

 Visual check	 Tightening check	 Change	 Oil change
 Lubrication	 Setting	 Operating test	 Tool maintenance

MAINTENANCE REGISTER

SERVICE 1000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 2000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 3000		
Return-line filter cartridge	☐	
Oil change	☐	
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

 Visual check	 Tightening check	 Change	 Oil change
 Lubrication	 Setting	 Operating test	 Tool maintenance

MAINTENANCE REGISTER

SERVICE 4000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 5000		
Return-line filter cartridge	☐	
Oil change	☐	
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 6000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 7000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 8000		
Return-line filter cartridge	☐	
Oil change	☐	
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

 Visual check	 Tightening check	 Change	 Oil change
 Lubrication	 Setting	 Operating test	 Tool maintenance

MAINTENANCE REGISTER

SERVICE 9000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance

MAINTENANCE REGISTER

SERVICE 10000		
Return-line filter cartridge	☐	
Oil change	☐	OIL
Crane mounting bolts	☐	
Rotation rack adjustment	☐	
Controls and tank support screws	☐	
Slewing cylinders bolts	☐	
Safety devices	☐	
Warning labels	☐	
Visible welds	☐	
Chrome plated cylinder rods	☐	
Clearance in joints	☐	
Fittings and oil tank leaks	☐	
General crane conditions	☐	
Greasing	☐	
Cylinders valves setting	☐	
Port relief valves setting	☐	
Grab check	☐	

Certify the performed controls and sign

Authorized assistance center	
Signature	Date

Legend

Visual check	Tightening check	Change	Oil change
Lubrication	Setting	Operating test	Tool maintenance