

ORIGINAL INSTRUCTIONS - according to Directive 2006/42/EC, Annex I 1.7.4.1

WX168
WX188
Wheeled Excavator

OPERATOR'S MANUAL



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1 - GENERAL INFORMATION

Note to the Owner

This manual is designed as a guide for the correct and safe use of the machinery and for its correct maintenance. Always following the rules in the manual guarantees the best performance, operating economy and a long life for the machine and also makes it possible to avoid the most common causes of accidents that may occur during work or maintenance operations.

Read the manual carefully, paying special attention to the instructions regarding safety, operation and maintenance to prevent risks or injury during usage or when carrying out maintenance operations on the machine.

Before handing the machine over to an operator, check that:

- The operator has been properly trained in the correct and safe use of the machine.
- Also make sure that the operator has read the instructions in this manual and that they understand them fully.

Always keep this manual in the cab (see Keep Operator Manual storage). Make sure that it is always intact and in good condition. Contact the Dealer for further copies or a translation into a different language from the country of use. The machine has been designed and constructed in accordance with the most rigorous standards of quality and in compliance with current safety regulations. Never use the machine for applications not included in the manual. If the machine needs to be used for work that involves the use of special equipment, accessories or instruments, consult the Dealer to make sure that any adaptations or modifications carried out comply with the technical specifications of the machine and with the safety standards.

Any modification or adaptation that is not approved by the manufacturer may invalidate the original conformity of the machine to the safety requirements and the persons that carry out these unapproved modifications will be held responsible for the consequences.

ATTENTION: *the engine and fuel system on your machine is designed and built to government emissions standards. Tampering by dealers, customers, operators and users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only.*

The Dealer can also provide further information, as well as after sales service involving the purchase of genuine spare parts, a guarantee of quality and perfect reliability.

NOTE: *each machine is supplied complete with a copy of this Manual. Descriptions and illustrations herein are not binding. The Manufacturer, provided that the basic characteristics of machine types described and shown in this Manual remain the same, reserves the right to change components, parts and accessories supplied without any commitment to timely update this publication; and this any time it deems it convenient for improvement purposes or due to commercial or manufacturing requirements. For exact information, please consult your Dealer or contact the Manufacturer's Branch Offices.*

PLEASE RECORD THE FOLLOWING INFORMATION

Model _____

Product Identification
Number (PIN) _____

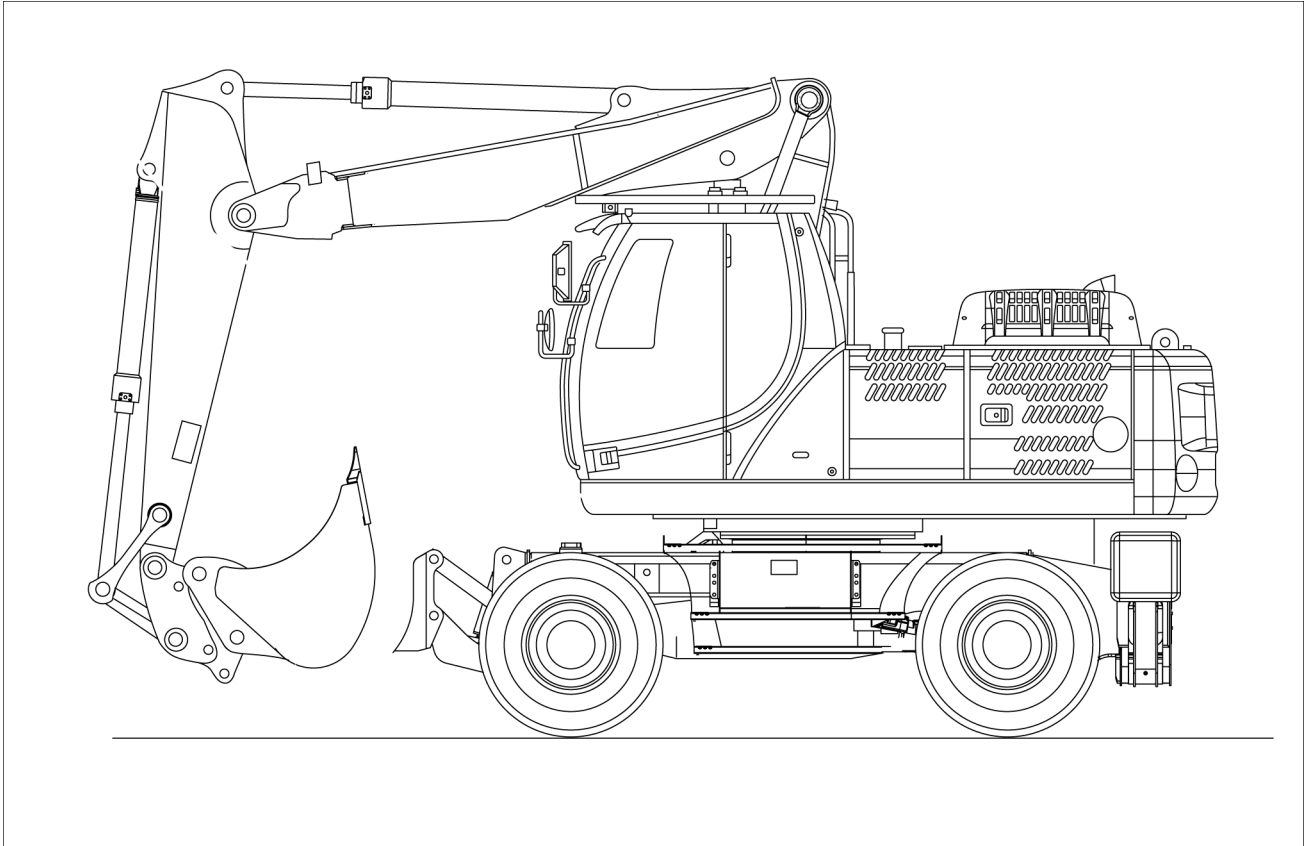
Date Purchased _____

Engine Model _____

Engine Pin _____

INTRODUCTION

The wheeled excavators **WX168 - WX188** are operation hydraulic machines. They essentially consist in a wheeled undercarriage on which a slewing bearing is mounted, which is coupled to the upper frame. The upper frame supports the front attachment, the engine, the hydraulic components, the cab, the fuel tank and the counterweight. When the operator activates the controls (electrohydraulic control levers and pedals), the hydraulic pumps rotated by the engine suck oil from the tank and convey it to the control valve; the control valve, in turn, sends it to the relevant users. A cooling system keeps the hydraulic fluid at a normal operating temperature.



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INTENDED USE

This Excavator, with standard equipment and authorized attachments, is intended to be used for below ground level digging and general earth moving purpose such as trenching, truck loading, material rehandling, and ditch cleaning. If the machine is to be used for lifting objects, make sure that the machine is properly equipped and follow the instructions and safety precautions in this manual.

PROHIBITED USAGE

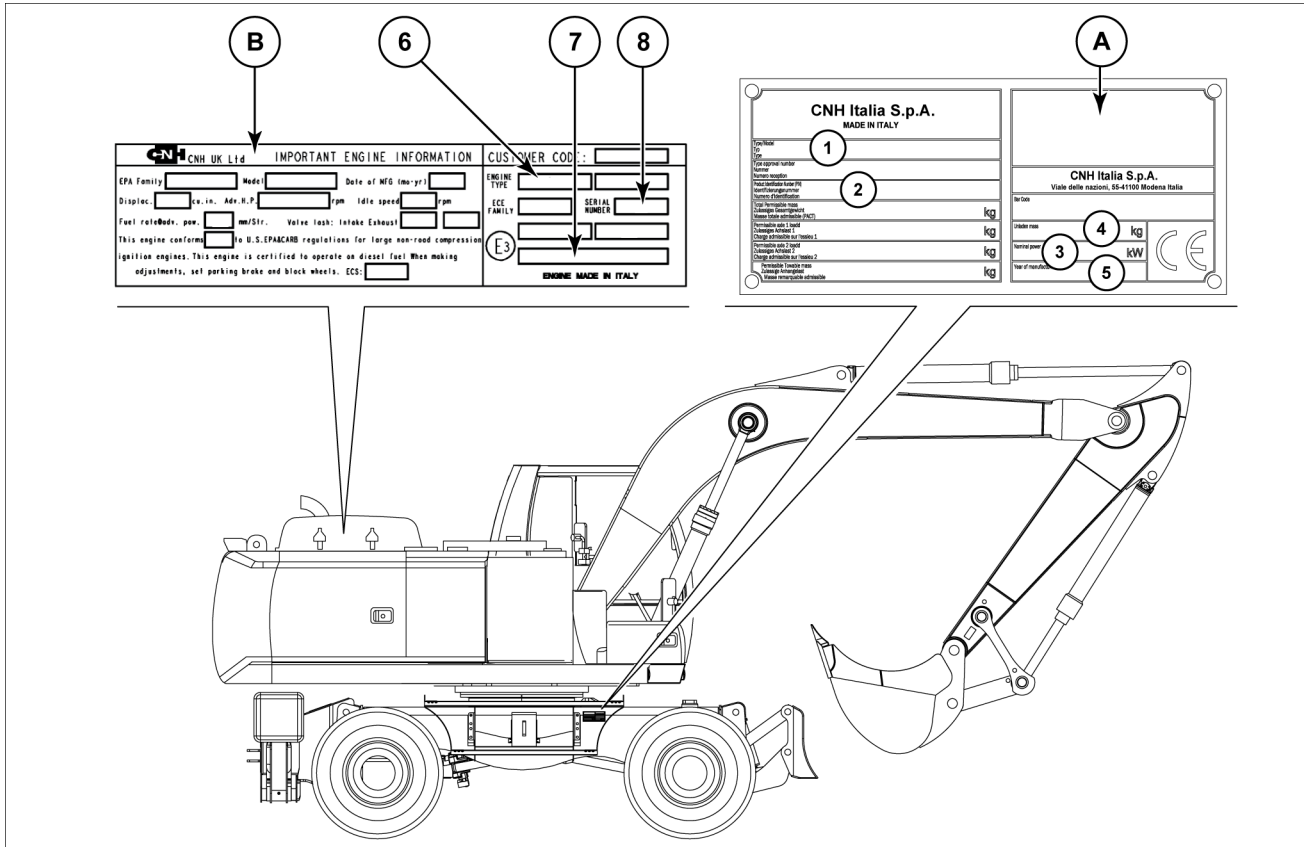
No parts or attachments should be fitted to this machine, which have not been released by CASE CONSTRUCTION. They might affect machine operation, safety of the user or other people, stability or wear characteristics of the machine. They may also void the homologation approval obtained for your country and compliance with EC directives.

NOTICE: *DO NOT use this machine for any purpose or in any manner other than as described in the manual, decals, or other product safety information provided with the machine. These materials define the machine's intended use.*

Using the excavator and its equipment for different operations, such as, for example, towing, transporting and lifting people, is considered inappropriate and is prohibited.

Product identification

IDENTIFICATION DATA WX168-WX188



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- | | |
|---|--|
| A Machine identification plate | B Engine identification plate |
| 1 Model and category (Hydraulic Excavator) | 6 Engine type |
| 2 Machine serial number | 7 Engine emission stage approval number |
| 3 Nominal Power | 8 Engine serial number |
| 4 Unladen Mass | |
| 5 Year of Manufacture | |

AFTER SALES SERVICE

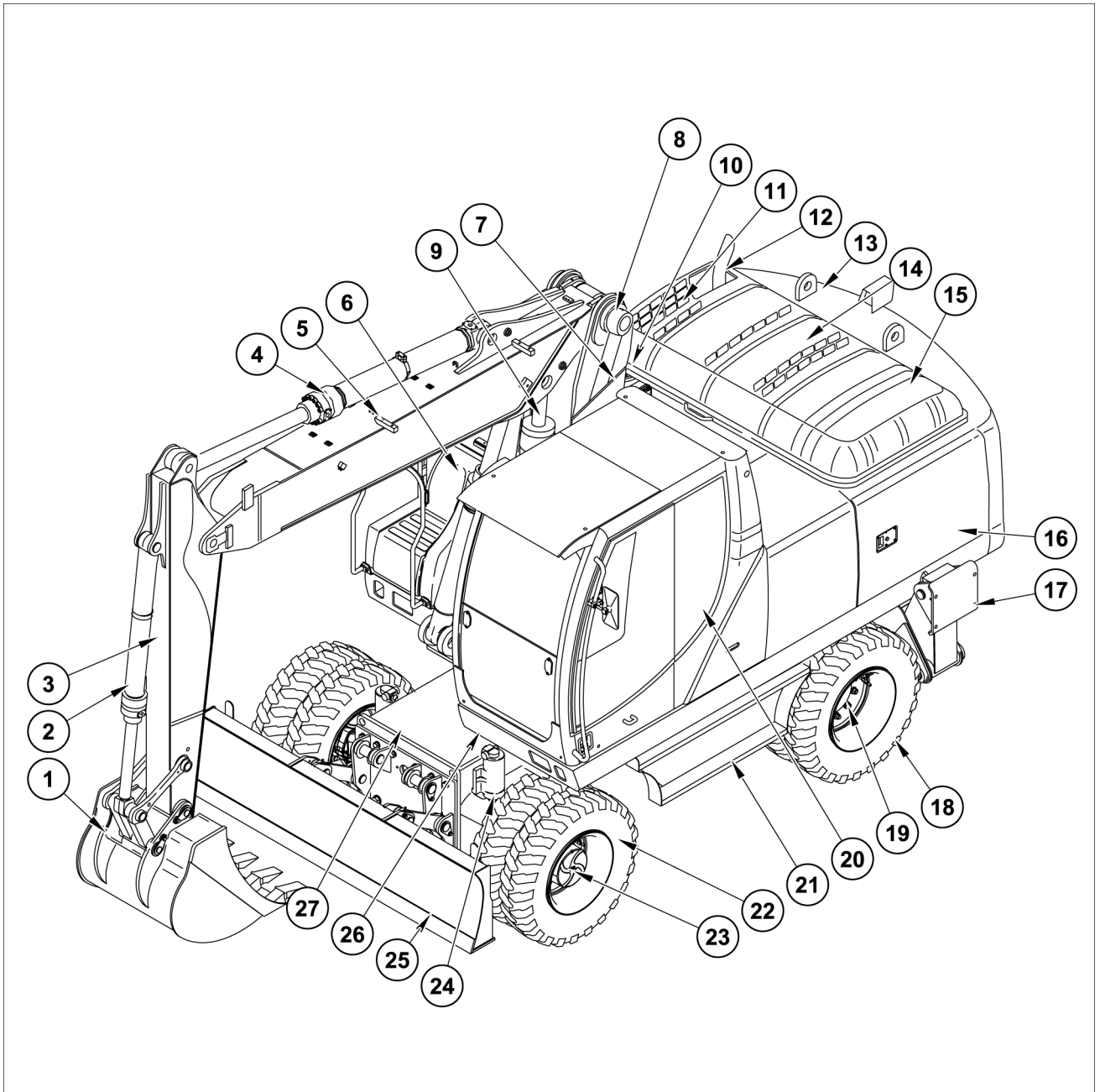
For maintenance work which cannot be easily carried out by the Owner, please contact your Dealer where you will find trained personnel, suitable tools and equipment, and genuine spare parts. Service personnel and technicians will be glad to provide you with all explanations and suggestions you may need and to carry out all required specialized repair work in case of machine unsatisfactory operation.

SPARE PARTS

To ensure a perfect performance of the machine, use exclusively genuine spare parts. To order them, it is necessary to specify:

- machine model and product identification number
- engine type and serial number
- part number of the component being ordered

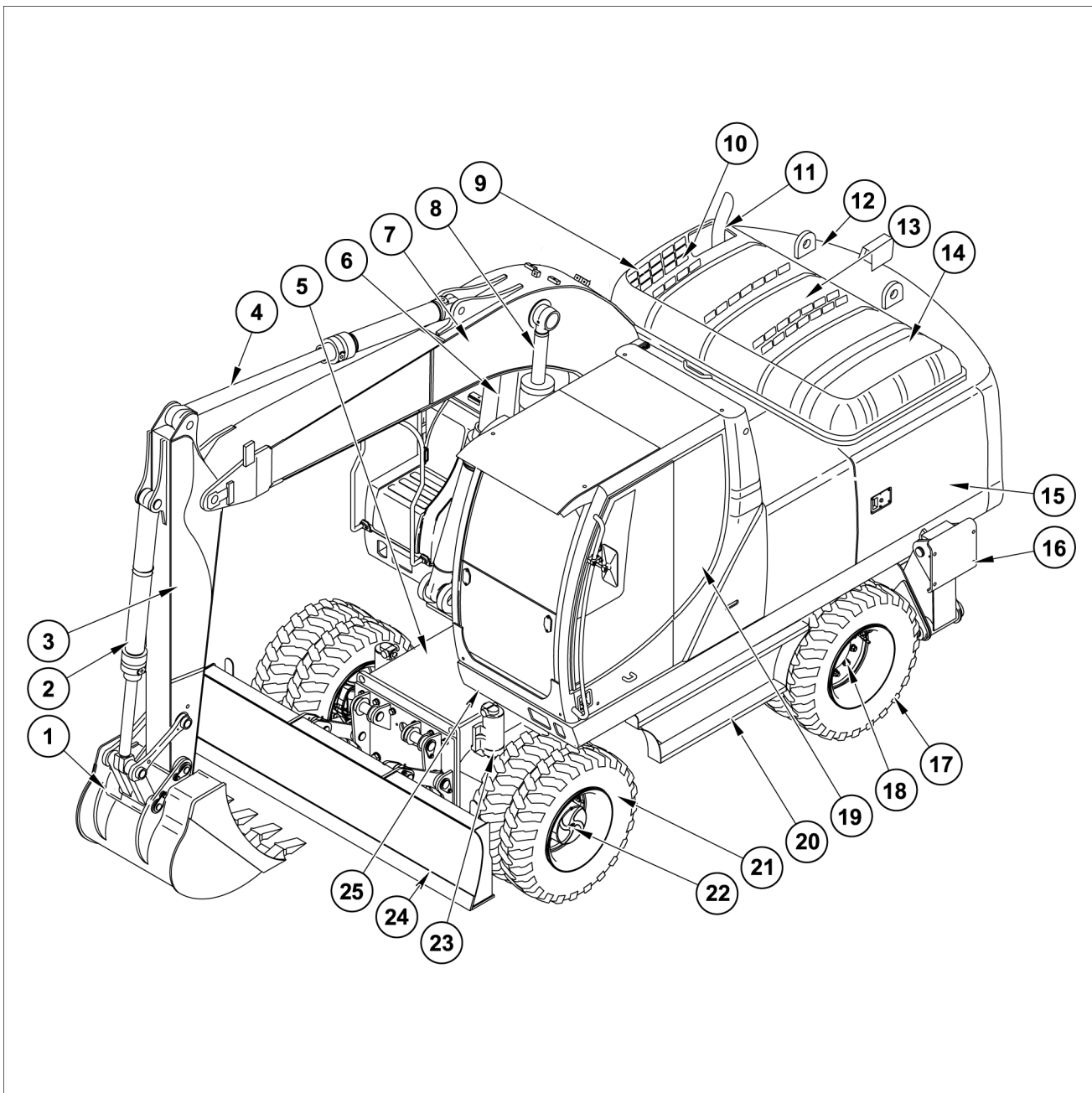
MACHINE MAIN COMPONENTS WX168-WX188 — Triple Articulation Version



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- | | | | |
|----|----------------------|----|---------------------------------|
| 1 | Bucket | 15 | Multi-cooler |
| 2 | Bucket cylinder | 16 | Batteries |
| 3 | Dipper | 17 | Stabilizers |
| 4 | Dipper cylinder | 18 | Rear wheels |
| 5 | First boom | 19 | Rear rigid axle |
| 6 | Fuel tank | 20 | Cab |
| 7 | Second boom | 21 | Stair and storage box |
| 8 | Boom cylinder | 22 | Front wheels |
| 9 | Positioning Cylinder | 23 | Front steering axle |
| 10 | Hydraulic oil tank | 24 | Axle floating locking cylinders |
| 11 | Hydraulic pumps | 25 | Blade |
| 12 | Muffler | 26 | Upper structure |
| 13 | Counterweight | 27 | Undercarriage |
| 14 | Diesel engine | | |

Mono boom attachment



F34536N1 3

- | | |
|----------------------|------------------------------------|
| 1 Bucket | 14 Multi-cooler |
| 2 Bucket cylinder | 15 Batteries |
| 3 Dipper | 16 Stabilizers |
| 4 Dipper cylinder | 17 Rear wheels |
| 5 Undercarriage | 18 Rear rigid axle |
| 6 Fuel tank | 19 Cab |
| 7 Boom | 20 Stair and storage box |
| 8 Boom cylinder | 21 Front wheels |
| 9 Hydraulic oil tank | 22 Front steering axle |
| 10 Hydraulic pumps | 23 Axle floating locking cylinders |
| 11 Muffler | 24 Blade |
| 12 Counterweight | 25 Upper structure |
| 13 Diesel engine | |

Vibration levels

The vibration level transmitted to the operator depends mainly upon the conditions of the ground on which operations take place, the mode of operation of the machine and its equipment. The exposure to vibrations can be considerably reduced when the following recommendations are complied with:

- use equipment compatible with the machine and the type of work to be done;
- adjust and lock the seat in the correct position; also inspect regularly the suspensions of the seat, performing the adjustments and repairs as required;
- perform regularly the current maintenance operations of the machine at the prescribed intervals;
- operate the equipment in a uniform manner, preventing, as far as possible, sharp movements or excessive loads;
- when travelling, avoid, as far as possible, particularly rough terrain or the impact against possible obstacles.

This machine is equipped with an operator's seat complying with the requisites of standard **ISO 7096:2008**. This ensures that the exposure of the operator's body to vibrations comply with the protection requisites for the protection against vibrations when the machine operates as required by the operational scopes, in accordance with the prescriptions of this Manual. The operator's seat has been tested in accordance with **EM6** input spectral class and has a **SEAT** transmissibility factor < 0.7.

- The weighted average quadratic acceleration value to which the operator's arms are subjected does not exceed **2.5 m/s²**.
- The weighted average quadratic acceleration value to which the operator's body is subjected does not exceed **0.5 m/s²**. These results were obtained using an acceleration gauge while digging ditches.

NOTE: the Whole-Body exposure value is determined under particular operating and terrain conditions and therefore may not be representative for all the possible operating conditions within the intended use of the machine. Consequently this single Whole-Body vibration emission value is not intended to determine the Whole-Body vibration exposure as required by European Directive **2002/44/EC**. For this purpose it is recommended to conduct working conditions measurement. If this is not feasible use of information provided in the table below from **ISO/TR 25398:2006** (*).

Working conditions	Basic emissions value			Standard deviation		
	1.4*aw,eqx	1,4*aw,eqy	aw,eqz	1.4*sx	1.4*sy	sz
	m/s² (ft/s²)	m/s² (ft/s²)	m/s² (ft/s²)	m/s² (ft/s²)	m/s² (ft/s²)	m/s² (ft/s²)
Excavation	0.52 (1.70)	0.35 (1.14)	0.29 (0.95)	0.26 (0.85)	0.22 (0.72)	0.13 (0.42)
Travel	0.41 (1.34)	0.53 (1.74)	0.61 (2.00)	0.12 (0.40)	0.20 (0.65)	0.19 (0.62)

(*) **ISO/TR 25398:2006** Mechanical vibrations – Guidelines for assessment of exposure to whole-body vibration of ride-on machine – Use of harmonized data measured by international institutes, organizations and manufacturers.

Noise level

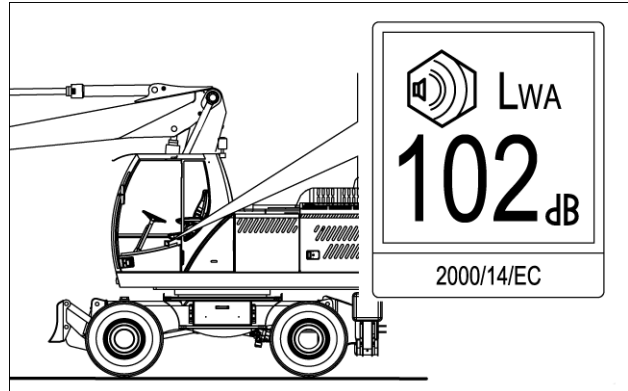
SOUND POWER LEVEL (acoustic external)

LWA:

WX168: 102 dB (A)

WX188: 102 dB (A)

Sound power level guaranteed, determined in compliance with European standard **2000/14/EC**.



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SOUND PRESSURE LEVEL IN THE OPERATOR'S SEAT (acoustic internal)

LpA:

WX168: 77 dB (A)

WX188: 76 dB (A)

Sound pressure level continuous, measured inside the cab with door and windows closed and with the heater/air conditioner blower operating at 2nd speed, measured on an identical machine, in compliance with **ISO 6396:2008** Standard.

Cab protection (ROPS and FOPS)

The machine is equipped with a **ROPS (Roll-Over Protective Structure)** and **FOPS (Falling Objects Protective Structure)** (1) for the cab. The protective structure, the fitting supports and the fastening elements on the machine are an integral part of the structure.

The **ROPS** label of homologation (2) is localized in the cab near the cab interior lighting.

In the case of work where there is a risk of frontal impact where object could penetrate the cab, a front guard may be installed.

⚠ WARNING

Roll-over hazard!

Securely fasten the seat belt. Your machine is equipped with a Roll-Over Protective Structure (ROPS) cab, ROPS canopy, or ROPS frame for your protection. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system.

Failure to comply could result in death or serious injury.

W0143A

Any damage, fire, corrosion or modification will weaken the structure and reduce your protection. If this occurs, the Protective Structure **MUST** be replaced. Contact your dealer for Protective Structure inspection and replacement.

After an accident or fire that involve the cab and/or machine tip or roll over, the following **MUST** be performed by a qualified technician before returning the machine to field or job site operation:

- the Protective Structure **MUST** be checked and replaced if necessary;
- the mounting for the Protective Structure, operator seat and seat belt, **MUST** be carefully inspected for damages and replaced if necessary;

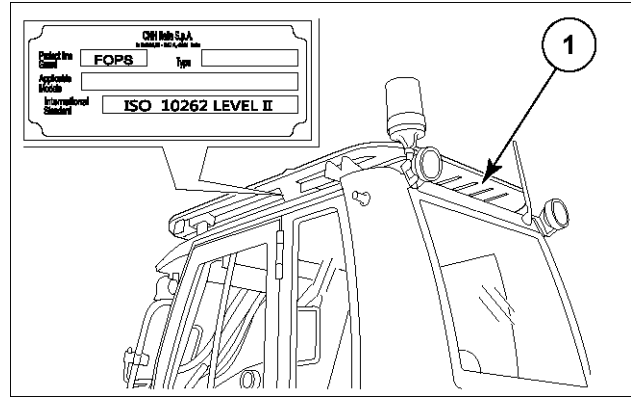
⚠ DANGER

Crushing hazard!

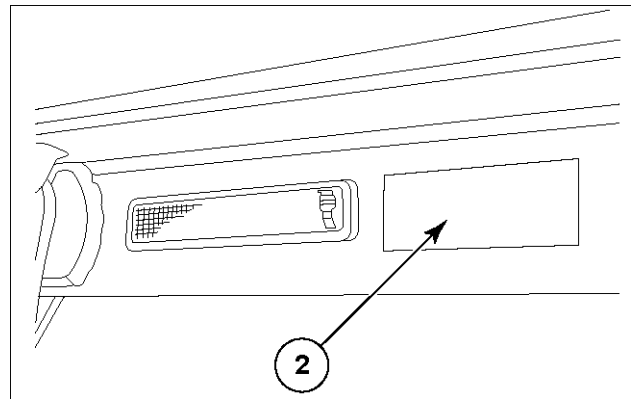
Do not change the Roll Over Protective Structure (ROPS) in any way. Unauthorized changes such as welding, drilling, or cutting will weaken the ROPS and decrease your protection. Have an authorized dealer replace the ROPS if damage of any kind occurs. DO NOT TRY TO REPAIR THE ROPS.

Failure to comply will result in death or serious injury.

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Biodiesel fuel - Biodiesel fuels

Biodiesel usage in CASE CONSTRUCTION products

Introduction to Fatty Acid Methyl Ester (FAME) biodiesel

FAME biodiesel, called biodiesel fuel in the following section, consists of a family of fuels derived from vegetable oils treated with methyl esters.

NOTICE: Biodiesel Fuel blends are approved for your engine only if they comply with Specification standards **EN 14214:2009** or **ASTM D6751**.

NOTICE: It is imperative that you check which blend is approved for your engine with your local dealer. Beware that the use of Biodiesel Fuel that does not comply with the Standards mentioned above could lead to severe damage to the engine and fuel system of your machine. The use of fuels that are not approved may void Warranty coverage

Biodiesel Fuel Usage Conditions

NOTICE: The Biodiesel Fuel must meet the fuel Specification mentioned above. Biodiesel Fuel must be purchased from a trusted supplier that understands the product and maintains good fuel quality. Biodiesel Fuel must be pre-blended by the supplier. Mixing Biodiesel Fuels on-site can result incorrect mixture that can lead to problems with both engine and fuel system. Engine performance is affected by the use of Biodiesel Fuel. There may be up to 12 percent reduction in power or torque depending on the blend used.

NOTICE: DO NOT modify the engine and/or injection pump settings to recover the reduced performance. The reduced power must be accepted if using any Biodiesel Fuel blend. Some modification may be required to allow your engine to run Biodiesel Fuel. Consult you dealer for complete information on these modifications. Biodiesel Fuel has a higher cloud point than Diesel Fuel.

NOTICE: The use of high Biodiesel Fuel blends are not recommended in cold weather conditions. With Biodiesel Fuels, it may be necessary to change the engine oil, engine oil filter and fuel filter elements more frequently than with Diesel Fuels. Biodiesel Fuel can remove rust and particles from the inside of on-site fuel storage tanks that would normally adhere to the sides of the tank. Like particle deposits that commonly occur with Diesel Fuel, these particles can become trapped by the machine fuel filters, causing blockage and shortening filter life. In cold weather, this is more likely to happen. Consult your dealer for information on cold weather operation and proper maintenance intervals when using any Biodiesel Fuel blend. When handling Biodiesel Fuel, care must be taken not to allow water into the fuel supply. Biodiesel Fuel will actually attract moisture from the atmosphere. Fuel tanks must be kept as full as possible to limit the amount of air and water vapors in them. It may be necessary to drain the fuel filter water tap more frequently. Potential oxidation and stability could be a problem with the fuel stored in the machine.

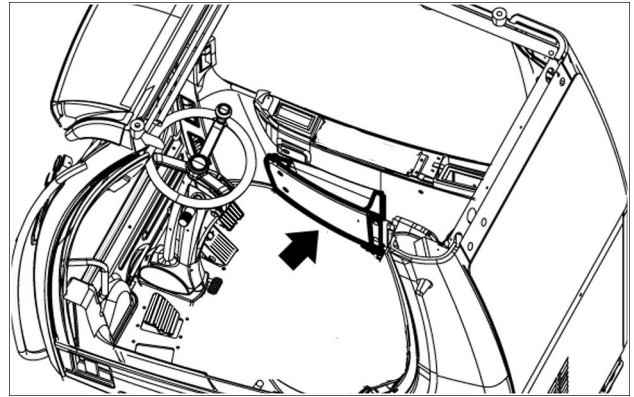
NOTICE: Machines must not be stored for more than 3 months with Biodiesel Fuel blends in the fuel system. If long storage periods are necessary, the engine must run on Diesel Fuel for **20 h** to flush the Biodiesel Fuel out of the engine fuel system prior to storage.

NOTICE: Biodiesel Fuel must not be stored in on-site storage tanks for more than 3 months. Any spillage of Biodiesel Fuel must be cleaned up immediately before it can cause damage to the environment and the paint finish of the machine. Before using Biodiesel Fuel blends you should consult with your dealer to receive full information about the approved blend for your machine and any detailed conditions of its usage.

NOTICE: Be aware that not fulfilling the requirements and conditions of Biodiesel Fuel usage will void your machine's Warranty coverage.

Operator's manual storage - Keep Operator's manual

- Keep this manual in the specified storage compartment for quick reference. Should the operator's manual become lost or damaged, contact your Dealer to order a new copy.



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2 - SAFETY INFORMATION

SAFETY PRECAUTIONS

GENERALITIES

Read the Operator's Manual carefully before starting, operating, maintaining, fuelling or servicing the machine. Carefully read the explanation to each and all safety signs in the special section of this Manual before starting, operating, maintaining, fuelling or servicing the machine.

Machine-mounted safety plates are color coded yellow with black borders when they refer to points where special ATTENTION must be paid and failure to observe them may cause a serious DANGER to the integrity of machine operators.

It is fundamental that all machine operators know very well the meaning of each safety plate as this considerably decreases operating hazards and accidents.

Do not allow unauthorized personnel to operate or service this machine.

Do not wear rings, wrist watches, jewellers, loose or hanging garments, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can get caught in moving parts. Wear certified safety clothes such as: hard hat, no-slip footwear, heavy gloves, ear protection, safety glasses, reflector vests, respirators every time the job requires it. Ask your employer about safety regulations in force and protective equipment.

Always keep the operator's compartment, step plates, grab-rails and handles clean and clear of foreign objects, oil, grease, mud or snow to minimize the danger of slipping or stumbling.

Remove mud or grease from your shoes before operating the machine. Do not jump on or off the machine. Always keep both hands and one foot, or both feet and one hand in contact with steps and/or grab rails.

Do not use controls or hoses as hand holds. Hoses and controls are movable parts and do not provide solid support. Besides, controls may be inadvertently moved and cause unexpected movement of the machine or its attachments.

Never operate the machine or its attachments from any position other than sitting in the driver's seat. Keep head, body, limbs, hands and feet inside the operator's compartment at all times to reduce exposure to external hazards. Be careful of possible slippery conditions of the steps and hand rails as well as of the ground around the machine. Wear protective boots or shoes with the soles made of highly no-slip rubber

Do not leave the machine until it has come to a complete stop.

Always check height, width and weight limitations which may be encountered in the working site and ensure the machine does not exceed them.

Assess exact paths of gas ducts, aqueducts, water pipeline, telephone lines, sewers, overhead and underground electric lines and all other possible obstacles.

Such paths should be opportunely defined by competent Authorities. If necessary, require that the service is inter-

rupted or said installations are moved prior to starting the work.

You must know the working capacity of the machine.

Define the rear upperstructure swing area and provide for opportune barriers to prevent access into it.

The operations of lifting the loads is allowed only to the machines equipped with linkage with hook or load eye.

Never exceed machine lifting capacity.

Remain within the limits shown in the loading capacity chart which located on the machine.

STARTING

Never start or operate a failed machine. Walk all around the machine before mounting.

Before operating the machine, make sure that any possible dangerous condition has been properly removed. Before starting machine, check that steering and attachment controls are in the neutral position and the safety lever is in the LOCK position. Immediately report any malfunction of parts or systems to the maintenance managers for proper action.

Prior to starting the engine, check, adjust and lock the driver's seat for maximum riding comfort and control accessibility. Prior to operating the machine and/or its attachments, check that bystanders are outside the machine operating range. Sound the horn.

Obey all hand signals, safety indications and signs. Due to the presence of flammable fluids, never check fuel level, refuel, charge the batteries in the presence of smoking materials, open flames or sparks.

Adjust all rear-view mirrors for maximum visibility of the area behind the machine.

Ensure that engine speed is appropriate to the job to be carried out.

If any hydraulic control or system exhibits erratic performance or responds abnormally, have the machine checked for air in the hydraulic system.

Air in these circuits may cause incorrect movements with consequent accident hazard. Refer to the Operator's Manual about corrective action to be taken.

OPERATING

Do not run the engine of this machine in closed buildings without proper ventilation capable to remove harmful exhaust gases which concentrate in the air.

Keep the operator's compartment free of foreign objects, especially if not firmly secured. Never use the machine to transport objects, unless proper securing points are provided.

Do not carry riders on the machine. Study and familiarize with escape routes alternative to normal exit routes. For your personal safety, do not climb on or off the machine while it is in motion.

Make sure that bystanders are clear of the machine operating range before starting the engine and operating the attachment. Sound the horn.

Obey all hand signals, safety indications and signs.

When is necessary move the machine in reverse gear, always look to where the machine is to be moved.

Be alert of the position of bystanders. Should someone enter the work area, stop the machine. Maintain a safe distance from other machines or obstacles to ensure required visibility conditions.

Always give way to loaded machines.

Maintain a clear vision of the surroundings of the travel or work area at all times. Keep cab windows clean and repaired.

When pulling loads or towing through a cable or chain, do not start suddenly at full throttle. Take up slack carefully. Avoid kinking or twisting chains or cables. Carefully inspect the towing items for flaws or problems before proceeding. Do not pull through a kinked chain or cable as the high anomalous stresses existing in this condition may induce failures in the kinked portion.

Always wear heavy gloves when handling chains or cables.

Chains and cables should be securely anchored using suitable hooks. Anchor points should be strong enough to withstand the expected load.

Keep anyone clear of anchor points and cables or chains. Do not pull or tow unless the operator's compartments of the machines involved are properly protected against possible backlash in case of cable or chain failure or detachment.

Be alert of soft ground conditions close to newly constructed walls. The fill material and machine weight may cause the wall to collapse under the machine.

In darkness, check area of operation carefully before moving in with the machine. Use all lights provided. Do not move into low visibility areas.

If the engine tends to slow down and stall for whatever reason under load or at idle, immediately report this problem to the maintenance managers for proper action. Do not operate the machine until this condition is corrected. Regularly check all exhaust system components, as exhaust fumes are toxic for the operator.

Operators must know the performance of the machine they are driving. When working on slopes or near sudden level drops in the terrain, pay attention not to lose adherence and avoid loose soft ground since overturn or loss of machine control could result.

If noise level is high and exceeds 90 dB (A) over 8 hours at the operator's ear, wear approved ear protection in compliance with local regulations.

Do not operate the machine if you are extremely tired or feel ill. Be especially careful towards the end of the working shift.

Where removable counterweights are provided, do not operate the machine if they have been removed.

When operating the machine, keep in mind height limits of overhead doors, arches, overhead cables and lines as well as width limits of corridors, roads and narrow passages.

Also, get to know load limits of the ground and paving type of the ramps you are to work on.

Beware of fog, smoke or dust that obscure visibility.

Always inspect the working area to identify potential risks such as: inclines, overhangs, trees, demolition rubble, fires, ravines, steep slopes, rough terrain, ditches, crowns, ridge trenches, diggings in traffic areas, crowded parking lots, crowded service areas, fenced zones. In such conditions, proceed with extreme care.

Whenever possible, avoid crossing over obstacles such as very rough terrain, rocks, logs, steps, ditches, railroad tracks.

When obstructions must be crossed, do so with extreme care and at a square angle, if possible. Slow down.

Ease up to the break-over point, pass the balance point slowly and ease down the other side also using the attachment, if necessary.

To overcome deep trenches or sinking ground, place the machine perpendicular to the obstacle, drastically reduce ground speed and start crossing using also the attachment if necessary, only after assessing that ground conditions allow the traverse safely and without risks.

The gradient you may attempt to overcome is limited by factors such as ground conditions, load being handled, machine type and speed, and visibility. There is no substitute for good judgement and experience when working on slopes.

Avoid operating the attachment too close to an overhang or high wall, either above or below the machine. Beware of caving edges, falling objects and landslides. Remember that such hazards are likely to be concealed by bushes, undergrowth and such.

Avoid bushes, logs and rocks. Never drive over them, nor over any other surface irregularities that discontinue adherence or traction with the ground, especially near slopes or drop-offs.

Be alert to avoid changes in adherence conditions that could cause loss of control. Work with extreme care on ice or frozen ground and on stepped slopes or near drop-offs.

The word "bulldozing" generally refers to work in virgin rough terrain, characterized by the presence of all the perils and risks listed above. We emphasize the danger represented in these conditions by large tree limbs (possibly falling on the machine) and large roots (which may act as a leverage under the machine when up-rooted and cause the unit to overturn).

Position the machine dependent upon the loading and unloading areas in order to swing leftward to load to obtain best visibility.

Never use the bucket or attachment as a man lift or carry riders. Never use the machine as a work platform or scaffolding. The machine must not be improperly used for works not consistent with its features (such as pushing railway cars, trucks or other machines).

Always pay attention to people within the machine operating range.

Never move or stop the bucket, other loads or the attachment above ground personnel or truck cabs.

Ensure the truck driver is in a safe place before loading the truck.

Load trucks from side or rear.

Use only the type of bucket recommended considering machine type, materials to be handled, material piling up

and loading characteristics, ground type and other typical conditions of the work to be performed.

When transporting a loaded bucket, keep it as rolled-back as possible. Keep boom and arm as low as possible.

Ground speed should be adequate to the load and ground conditions.

The load must always be properly arranged in the bucket; move with extreme care when transporting oversize loads.

Do not lift and move the bucket overhead where persons are standing or working, nor downhill when working on a slope as this would decrease machine stability. Load the bucket from the uphill side.

Loads to be raised using the machine should be exclusively hooked to the hitch specially provided.

The excavator is no lifting and transportation means, therefore it should not be used to position loads accurately.

When the excavator is used to lift loads special caution must be taken as follows:

- The machine must be equipped with the variant of object handling provided upon request.
- Secure the loads to be raised using cables or chains fastened with appropriate hooking mechanisms.
- Nobody should be allowed to remain under the raised load or within the excavator operating range for any reason whatever.

Never exceed specified loading capacity. Incorrect fastening of slings or chains may cause boom/arm failure or failure of the lifting means with consequent bodily injuries and even death.

Always ensure that slings and chains used for lifting are adequate to the load and in good condition.

All loading capacities are referred to the machine on a flat and horizontal surface and should be disregarded when working on a slope.

Avoid travelling across slopes. Proceed from uphill downhill and vice-versa. If machine starts slipping sideways when on a slope, lower the bucket and thrust bucket teeth into the ground.

Working on slopes is dangerous. Grade the working area if possible. Reduce work cycle time if it is not possible to grade the working area.

Do not move full bucket or a load from uphill downhill as this would reduce machine stability.

Do not work with the bucket turned to the uphill side.

Do not work with the bucket turned uphill as counterweights protruding downhill would reduce machine stability on the slope and increase risk of overturning.

We recommend to work on slopes with the bucket downhill, after checking machine stability with the bucket empty and attachment retracted, by slowly swinging the upper structure by 360°.

Position the carriage at a right angle relative to slopes, hanging walls, etc. to exit the working area easily.

Keep the machine sufficiently far from the ditch edge.

Never dig under the machine.

Should it be necessary to dig under the machine, always ensure that digging walls are opportunely propped up against landslide to prevent the machine from falling into the trench.

Do not swing the upperstructure, raise the load or brake abruptly if not required. This may cause accidents.

Prior to beginning the work near gas distribution mains or other public utilities:

- Contact the company owner of the gas mains or its nearest branch before starting the work.
- Define together which precautions should be taken to guarantee work safety.
- Decrease work speed. Reaction time could be too slow and distance evaluation wrong.
- When working near gas mains or other public utilities installations, appoint a person in charge of signalling duties. This person will have the responsibility of observing the machine, any part of it and/or the load approaching the gas mains from a standpoint more favorable than the Operator's. This signal man (flag-man) must be in direct communication with the Operator and the Operator must pay undivided attention to the signals supplied.
- The gas distributing Company, if previously advised and involved in the work, as well as machine Operator, Owner and/or any natural person or legal entity having rent or leased the machine or being responsible at the time by contract or by law, are liable for the adoption of the necessary precautions.

Working near electric lines can be very dangerous, therefore some special precautions must be observed.

Within this Manual, "work near electric lines" means when the attachment or load raised by the excavator (in any position) may reach the minimum safety distance established by local or international Safety Regulations.

To work without risks, keep maximum possible distance from electric lines and never trespass minimum safety distance.

- Contact the Company owner of the electric lines or its nearest branch before starting the work.
- Define together with the Company representative which precautions should be taken to guarantee work safety.
- All electric lines should be considered as operative live lines even though it might be well known that the line in question is out of work and visibly connected to the ground.
- The Electric Power Company, if previously advised and involved in the work, as well as machine Operator, Owner and/or any natural person or legal entity having rent or leased the machine or being responsible at the time by contract or by law, are liable for the adoption of the necessary precautions.

- Decrease work speed. Reaction time could be too slow and distance evaluation wrong.
- Warn all ground personnel to keep clear of the machine and/or load at all times. If the load has to be guided down for laying, consult the Electric Power Company to know which precautions should be taken.
- Appoint a person in charge of signalling duties. This person will have the responsibility of observing the machine, any part of it and/or the load approaching the electric lines from a standpoint more favorable than the Operator's. This signal man (flag-man) must be in direct communication with the Operator and the Operator must pay undivided attention to the signals supplied.

When working in or near pits, in ditches or very high walls, check that the walls are sufficiently propped up to avoid cave-in hazards.

Pay the utmost attention when working near overhang walls or where landslides may take place. Make sure that the support surface is strong enough to prevent landslides.

When digging, there is the risk of cave-ins and landslides. Always check ground conditions and conditions of the material to be removed. Support everywhere it is required to prevent possible cave-ins or landslides when:

- Digging near previous trenches filled with material.
- Digging in bad ground conditions.
- Digging trenches subject to vibration from railroads, working machines or highway traffic.

STOPPING

When the machine is to be stopped for whatever reason, always check that all controls are in the neutral position and that the safety lever is on the lock position to guarantee risk-free start-up.

Never leave the machine unattended with the engine running.

Prior to leaving the driver's seat, and after making sure that all people are clear of the machine, slowly lower the attachment until resting it safely to the ground. Retract possible auxiliary tools to the closed safety position.

Check that all controls are in the neutral position. Move engine controls to the shut-down position. Switch off the key-start switch. Consult the Operator's Manual.

Park the machine in a non-operating and no-traffic area. Park on firm level ground. If this is not possible, position the machine at a right angle to the slope, making sure there is no danger of uncontrolled sliding.

If parking in traffic lanes cannot be avoided, provide appropriate flags, barriers, flares and other signals as required to adequately warn the oncoming drivers.

Always switch off the key-start switch before cleaning, repairing, or parking the machine to prevent accidental unauthorized start-up.

Never lower the attachment or auxiliary tools other than from sitting in the operator's seat. Sound the horn. Make

sure that nobody is within the machine operating range. Lower the attachment slowly.

Securely block and lock the machine every time you leave it unattended. Return keys to the safe place previously agreed upon.

Drive the machine far from pits, trenches, rocky hanging walls, areas with overhead electric lines, and slopes before stopping it at the end of the working day.

Move all controls to the position specified for machine stopping.

Never park on an incline without accurately blocking the machine to prevent unexpected movement.

MAINTENANCE

Carefully read the Operator's Manual before starting, operating, maintaining, fuelling or servicing the machine in any manner.

Read all safety plates mounted on the machine and observe instructions they contain before starting, operating, repairing, fuelling or servicing the machine.

Do not allow unauthorized personnel to repair or service the machine.

Follow all recommended maintenance and service procedures.

Do not wear rings, wrist watches, jewellery, loose or hanging garments, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can get caught in moving parts. Wear certified safety clothes such as: hard hat, no-slip footwear, heavy gloves, ear protection, safety glasses, reflector vests, respirators when required. Ask your employer about safety regulations in force and protective equipment.

Do not use controls or hoses as hand holds. Hoses and controls are movable parts and do not provide solid support. Besides, controls may be inadvertently moved and cause unexpected movement of the machine or its attachments.

Do not jump on or off the machine. Always keep both hands and one foot, or both feet and one hand in contact with steps and/or grab rails.

Never service the machine with someone sitting in the driver's seat, unless this person is an authorized operator assisting in the maintenance being carried out.

Keep the operator's compartment, step plates, grab rails and handles clear of foreign objects, oil, grease, mud or snow to minimize the danger of slipping or stumbling.

Clean mud or grease from your shoes before climbing on the machine or driving it.

Never attempt to operate the machine or its attachments from any position other than sitting in the operator's seat. Keep the driver's seat free from foreign objects, especially if these are not secured.

Should it be necessary to move the attachment for maintenance purposes, do not raise or lower the attachment from any other position than sitting in the operator's seat.

Before starting the machine or moving its attachment, sound the horn and require that nobody remains near the machine.

Raise the attachment slowly.

Always lock all moving components or parts of the machine that must be lifted for maintenance purposes using

adequate external means as required by local and national regulations. Do not allow anyone to pass or stay near or below a raised attachment. If you are not absolutely sure about your safety, do not stay or walk under a raised attachment.

Do not place head, body, limbs, hands, feet or fingers near articulated cutting edges deprived of the necessary guards, unless they are suitably and safely locked.

Never lubricate, repair or adjust the machine with the engine running, except when this is specifically required by the Operator's Manual.

Do not wear loose clothing, jewellery near rotating parts. When service or maintenance require access to areas that cannot be reached from the ground, use a ladder or step platform conforming to local or national regulations to reach the working area. If such means are not available, use machine grab rails and steps. Always perform all service or maintenance work with the greatest care and attention.

Shop and/or field service platforms or ladders should be manufactured and maintained in accordance with local or national safety regulations in force.

Disconnect batteries and label all controls to warn that service work is in progress, according to local and national safety regulation requirements.

Block the machine and all attachments to be raised according to local and national safety regulation requirements.

Do not check or fill fuel tanks or install batteries near burning or smoking materials and open flames due to the presence of flammable vapors.

The fuel filler pipe nozzle must be constantly kept in contact with the filler neck and this even before fuel starts flowing in. Keep this contact from the beginning to the end of the fuelling operation to avoid possible generation of sparks due to static electricity.

Use a truck or trailer to haul a failed machine. Should it be necessary to tow it, provide for suitable danger signals as required by the local norms and regulations and observe recommendations given in the Operator's Manual. Load/unload the machine on firm level ground providing safe support to the wheels of the truck or trailer. Use strong access ramps, with adequate height and angle. Keep the trailer flatbed free of mud, oil or slippery materials. Tie the machine securely to the trailer and block carriages and upperstructure.

Never align holes or slots using your fingers; always use appropriate aligning tools.

Remove all sharp edges and burrs from re-worked parts. Use only approved and effectively grounded auxiliary power sources for heaters, battery chargers, pumps and similar equipment to reduce electrical shock hazard.

Lift and handle heavy components using hoisting devices of appropriate capacity. Ensure the parts are supported by appropriate straps and hooks.

Use lifting eyes provided to this aim.

Pay attention to bystanders near the lifting area.

Never pour gasoline or diesel fuel into open containers. Never use gasoline, solvents or other flammable fluids to clean parts. Use proprietary certified non-flammable, non-toxic solvents only.

When using compressed air to clean parts, wear safety glasses with side shields. Limit pressure to maxi. **2 bar**, in accordance with local and national safety regulations in force.

Do not run the engine of this machine in closed buildings without proper forced ventilation capable to remove toxic exhaust gases concentrating in the air.

Do not use open flames as light sources to look for leaks or inspect anywhere on the machine.

Make sure that all mechanical tools provided are in good condition at all times.

Move with extreme care when working under, on or near the machine or its attachments.

In case of attachment tests during which the engine should be kept running, a qualified operator must sit in the driver's seat at all times while the mechanic is at work.

Keep hands and clothes far off moving parts.

Stop the engine and move the safety lever to the lock position before starting adjusting or repairing an assembly.

Do not carry out any work on the attachment without prior authorization. Observe maintenance and repair procedures.

In case of field service, move the machine to level ground and block it. If work on an incline cannot be avoided, securely block the machine and its attachments. Move the machine to level ground as soon as possible.

Do not twist chains and cables. Never use a twisted chain or cable for lifting or pulling. Always wear safety gloves to handle chains or cables.

Be sure chains and cables are firmly fastened and that the anchor point is strong enough to withstand the expected load.

Keep all bystanders clear of the anchor point, cables or chains. Do not pull or tow unless the operator's compartments of the machines involved are fitted with proper guards against cable or chain backlash.

Keep the maintenance area clean and dry at all times.

Clean immediately all water and oil spillage.

Do not pile up oily or greasy rags as they represent a major fire hazard. Always store them in closed metal containers.

Before starting the machine or its attachment, check, adjust and lock the operator's seat. Also ensure that nobody is within the machine or attachment operating range before starting or operating the machine and/or its attachments.

Sound the horn.

Rust inhibitors are volatile and flammable.

Prepare parts in well ventilated areas. Keep open flames away.

Do not smoke.

Store containers in a cool well ventilated place where they could not be reached by unauthorized people.

Do not carry loose objects in your pockets that might fall unnoticed into open compartments.

Wear appropriate safety clothing such as hard hat, safety shoes and gloves, safety glasses when splinters or other particles may be ejected.

Wear the appropriate welder's equipment such as dark safety glasses or mask, hard hat, protective clothing, safety gloves and footwear always while welding or

arc-cutting. Wear dark safety glasses when you are near a welding in progress.

Do not look the welding arc without proper eye protection. Become acquainted with all your jacking equipment and their capacity.

Ensure that the jacking point on the machine is appropriate for the load applied. Also, be sure the supports under the jack and between the jack and the machine are appropriate and stable.

Always support the load onto appropriate blocking means as a safety measure before proceeding with service or maintenance work, in compliance with local or national safety regulations.

Metal cables produce steel splinters. Always wear certified protection clothes such as safety gloves and glasses while handling them.

Handle all parts carefully. Keep hands and fingers away from gaps, gears, and similar. Always use and wear certified safety clothes such as safety glasses, gloves and footwear.

The attachment is kept constantly in position by an oil column trapped into the high pressure circuit. Lower the attachment to the ground and relieve pressure from all circuits prior to carrying out any type of maintenance or repair work.

Do not service or repair the machine if it is parked downhill. If this is unavoidable, in case of emergency, block the carriages to prevent unexpected movement, particularly if the work is to be carried out on the final reduction units or travel motors.

Consult the Operator's Manual for correct maintenance procedure.

Areas near articulated cutting edges where mechanical parts are in motion are where personal injuries are most likely to occur. Pay attention to prevent possible part movements by means of blocks or by keeping clear of such zones when motion may take place during maintenance or repair.

Move the hydraulic system lock safety lever to the lock position when stopping the machine for whatever reason. Always install the safety stays for the hood and other hinged covers before performing any maintenance or repair work in the engine compartment.

TRANSFERS AND TRANSPORTATION

Before moving or transporting the machine, block upper-structure swing to prevent accidental movement.

Pay particular attention during transfer on inclines, both uphill and downhill. Keep the bucket in a position to provide a possible anchor point into the ground in case of slipping.

Never transfer the machine in the working site, in a crowded area, or near people without having at least one person charged with hand-signals who could guide the Operator.

Sound the horn to inform that you are about to move off. It is necessary to know load limits of bridges and dimensional limits of tunnels. Such limits must never be exceeded. You should also know machine height, width,

and weight. Have a signal-man help you when clearances are limited.

Check distance between boom/arm and dimensional limits during transfer or transportation.

Rough terrain may cause the machine to sway and roll to such an extent that boom/arm could get to contact electric lines or other obstacles. Cross obstacles at a right angle at low speed. Pay attention to machine shaking when the centre of gravity overcomes the obstacle.

Keep the bucket down at all times during transfers. Drive with the lights on and use appropriate signals and flags.

Get to know and respect local and national regulations. Consider boom/arm and upperstructure dimensions while turning.

Use a ramp to load the machine on a trailer. If a ramp is not available, fabricate one using blocks. The ramp should be sufficiently strong to support machine weight. Always load and unload on level surface.

Tow the machine following the instructions contained in the Operator's Manual.

ENGINE

Do not run the engine in closed buildings without proper ventilation capable to remove harmful exhaust fumes.

Do not place head, body, limbs, feet, hands or fingers near rotating fans or belts. Be especially careful near blower fans.

Loosen the radiator cap very slowly to relieve system pressure before removing it. Always top-up coolant level with the engine off or idling if hot. See the Operator's Manual.

Keep the exhaust manifold and tube free from combustible matters. Fit the machine with shields and guards when working in the presence of combustible matter free in the air.

Do not refuel with the engine running, especially if hot, as this increases fire hazard in case of fuel spillage.

Never attempt to check or adjust fan belt tensions when the engine is running. Do not adjust the fuel injection pump when the machine is operating.

Do not lubricate the machine with the engine running.

Do not run the engine with the air intakes open and not protected. If this cannot be avoided for service reasons, place protection meshes on all intakes before servicing the engine.

ELECTRICAL SYSTEM

Pay attention to connect connecting cables to correct poles (+ to +) and (- to -) at both ends. Do not short-circuit terminals. Thoroughly follow instructions given in Operator's Manual.

Always move the key-start switch in the lock position before servicing or repairing the machine.

Batteries contain SULFURIC ACID. Protect the eyes when working near the batteries against possible sprays of the acid solution. Should acid contact skin, eyes, or clothes, RINSE IMMEDIATELY IN WATER FOR AT LEAST 15 MINUTES. Immediately seek medical attention.

Battery released gas is highly flammable. Leave the battery compartment cover open during recharging to improve ventilation. Never check battery charge by placing metal objects across the posts. Keep sparks or open flames away from batteries. Do not smoke near the battery to prevent explosion hazard.

Before any maintenance or repair, make sure that there are no fuel or electrolyte leaks from the batteries. If any, correct prior to proceeding with further work. Do not recharge batteries in confined spaces. Ensure proper ventilation is provided to avoid accidental explosions due to build-up of explosive gas released during charging.

Disconnect batteries before working on the electrical system or carrying out any other type of work.

HYDRAULIC SYSTEM

Pressure fluid escaping from a very small hole can be almost invisible and still have sufficient force to penetrate the skin. Always check any suspected pressure leaks using a piece of cardboard or wood.

Do not use hands. If injured by escaping fluid, obtain medical attention immediately or serious infection or reaction may develop.

Stop the engine and ensure pressure is relieved from all systems before removing side panels, housings, guards and covers. See the Operator's Manual.

Always use gauges of adequate capacity for pressure testing.

TOOLS

Always keep head, body, limbs, feet, hands, and fingers away from the bucket and attachments, when in the raised position.

Prior to any maintenance or repair work, install all supports necessary to this aim according to local and national safety regulations.

In case the attachment is to be operated for maintenance or repair purposes, do so exclusively while sitting in the driver's seat. Sound the horn before starting the machine or moving the attachment. Require that nobody remain near the machine. Raise the attachment slowly.

Do not use the machine to transport loose objects, unless proper securing devices are provided. Never use gases other than nitrogen to charge the accumulators.

Safety rules


Personal safety





This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words **DANGER**, **WARNING**, and **CAUTION** followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION**, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation which, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word **Notice** followed by special instructions to prevent machine or property damage. The word **Notice** is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information which clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word **Note** followed by additional information about a step, procedure, or other information in the manual. The word **Note** is not intended to address personal safety or property damage.

Safety signs or informational decals - Personal safety

FOLLOW SAFETY PRECAUTIONS

Carefully read and observe all safety signs on the machine and read all safety precautions in this Manual. Safety signs should be installed, maintained, and replaced when necessary.

- If a safety sign or this Manual are damaged or missing, obtain a replacement from your Dealer in the same way you order a spare part (be sure to detail machine model and serial number upon ordering).

Learn how to operate the machine and its controls correctly and safely.

Allow only trained, qualified, authorized personnel to operate the machine.

Keep the machine in proper working conditions.

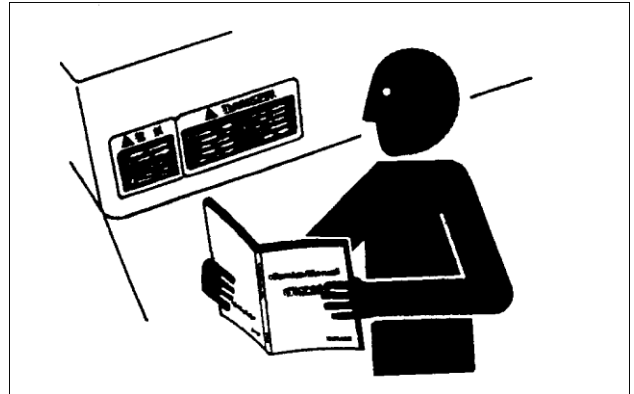
- Unauthorized changes to the machine may impair function and/or safety and affect machine life.

Safety messages in this Chapter are intended to illustrate basic safety procedures of the machine. However, it is impossible for these safety messages to cover every hazardous situation you may encounter. If you have any doubts, consult your direct supervisor prior to operating or servicing the machine.

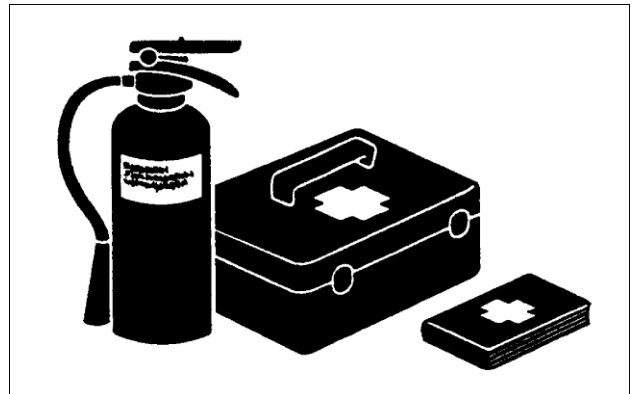
PREPARE FOR EMERGENCIES

Be prepared if a fire starts or an accident occurs.

- Keep the first-aid kit and fire extinguisher on hand.
- Thoroughly read and understand the label attached to the fire extinguisher to use it properly.
- Establish emergency priority procedures to cope with fires and accidents.
- Keep emergency numbers for doctors, ambulance service, hospitals and fire department posted near the telephone.



SP0003 1



SP0004 2

WEAR PROTECTIVE CLOTHING

Wear close fitting safety shoes, hard hat and working clothes.

Put on protective glasses, face shields, ear protection and gloves.

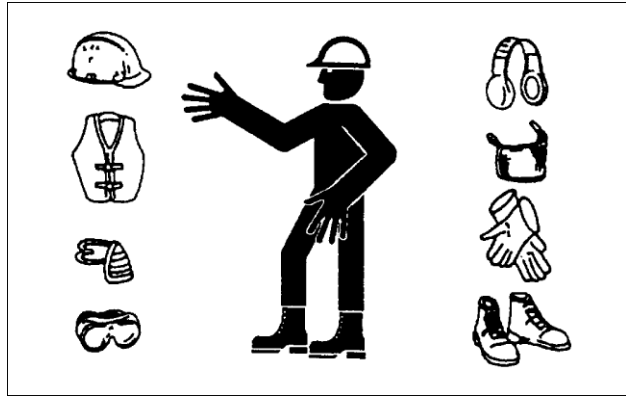
When necessary, wear reflective vest.

Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.

Do not wear headphones while operating the machine.

Work clothing that has come in contact with oil could catch fire.

Change clothes immediately.



SP0005 3

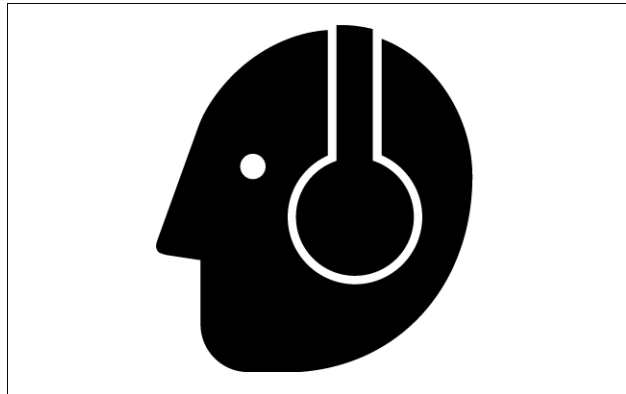
PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

- Wear a suitable hearing protection such as earmuffs or earplugs to protect objectionable or uncomfortably loud noise.

INSPECT THE MACHINE

Inspect the machine carefully every day or work shift by an attentive visual inspection of machine outside prior to starting it to prevent damages and personal injuries.



SP0006 4



SP0007 5

USE HAND HOLDS AND STEPS

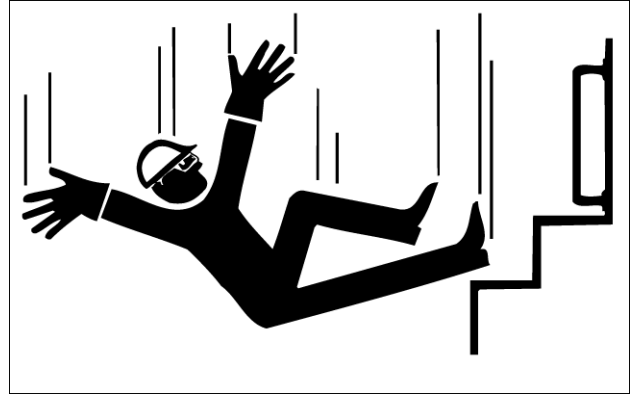
When you get on and off the machine, always maintain a three-point contact with the steps and handrails and face the machine.

Do not use any controls as hand-holds.

Never jump on or off the machine.

Never enter a moving machine.

Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



F33950 6

ADJUST THE OPERATOR'S SEAT AND SEAT BELT

A seat poorly adjusted for operator or work requirements may quickly fatigue the operator leading to improper operations.

- The seat should be adjusted whenever machine operator changes.
- The operator should be able to fully press the pedals and correctly move the control levers with his back resting against the seat back.
- If not, move the seat fore and aft, and check again.



SP0009 7

Should the machine overturn, the operator may become injured and/or thrown from the cab. Not only, the operator may be crushed by the overturning machine resulting in serious injury or even death.

- Prior to operating the machine, thoroughly examine belt webbing, buckle, and attaching hardware. If any item is damaged or worn, replace the seat belt or component before operating the machine.
- Be sure to remain seated with the seat belt securely fastened at all times when the machine is in operation to minimize injury hazard in case of accident.
- After a significant accident, replace the seat belts even though they do not look damaged.



SP0011 8

AVOID INJURY FROM REVERSE TRAVEL AND SWING ACCIDENTS

To avoid accidents due to swinging or reverse travel check the area around the machine. Before reverse travel or swinging the machine, make sure that nobody is present within its working reach. Use horn or other signals to warn bystanders before starting machine.

Take advantage of a person that watches the reverse travel if visibility is hindered. Always keep signalling person in view.

Use manual signals, according to local rules, if working condition require a flagman.

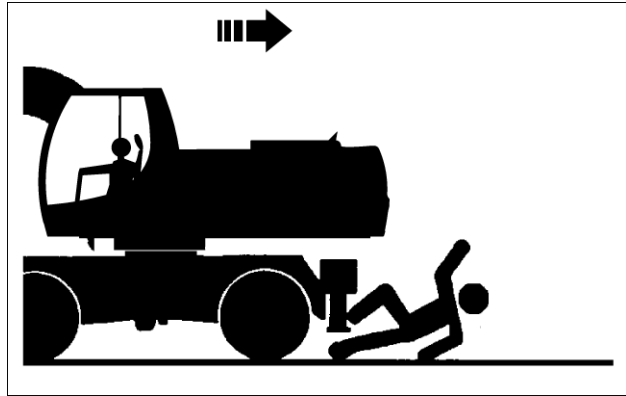
No motions shall be made unless signals are clearly understood by both signalman and operator.

Learn the meaning of all flags, signs, and markings used on the job and confirm who has the responsibility for signalling.

Keep windows, mirrors, lights and rear camera clean and in good condition.

Adjust the position of the rear view mirrors so that the side areas are completely visible. Look at the monitor of rear camera and verify the completely visibility of rear area.

NOTE: For the operations of rear mirrors and rear camera, please refer to relevant chapter in Section 3.



F34522 9



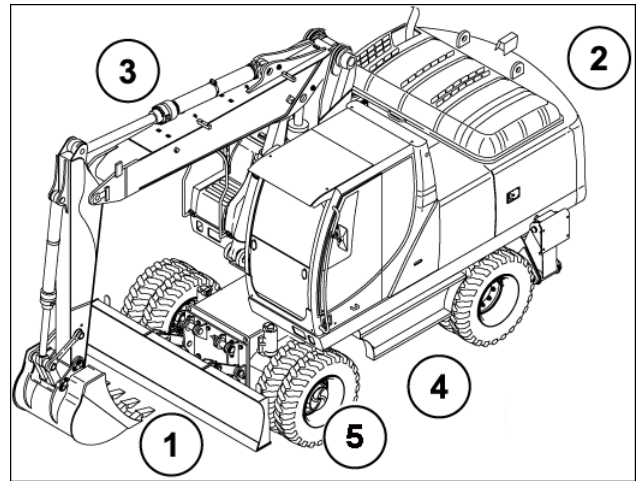
F26806 10

DRIVING THE MACHINE SAFELY

MACHINE SIDES

The terms “right”, “left”, “front” and “rear”, when used in this manual, indicate the sides of the machine as seen from the operator’s seat.

1. Front side - forward
2. Rear side - backward
3. Right side
4. Left side
5. Steering axle



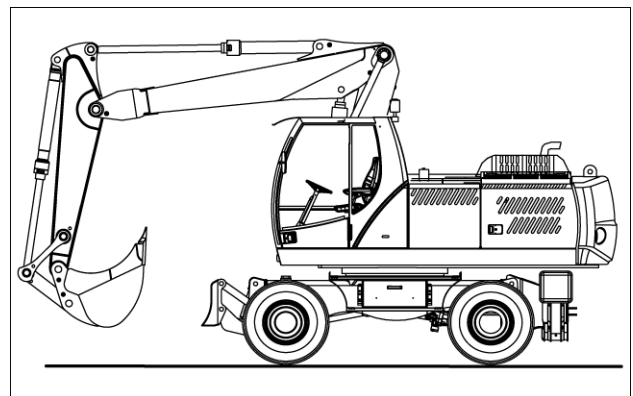
F34537N2 11

BEFORE SETTING OFF

Remove any soil, mud, snow, ice, grease and oil from your working footwear before operating the machine. You might otherwise slip from steps and pedals and thus initiate inadvertent movements. Securely fasten the seat belt. Warn persons in the immediate vicinity by sounding the horn before setting off.

TRAVELLING OVER LONG DISTANCES OFF ROAD

Before travelling over long distances, return the front attachment in the travel direction and activate the upper structure holding brake in locked mode.



F34520N 12

TRAVELLING ON SLOPES, UPHILL AND DOWNHILL

Before going on a slope put the machine in base position as showed in the illustration **12**:

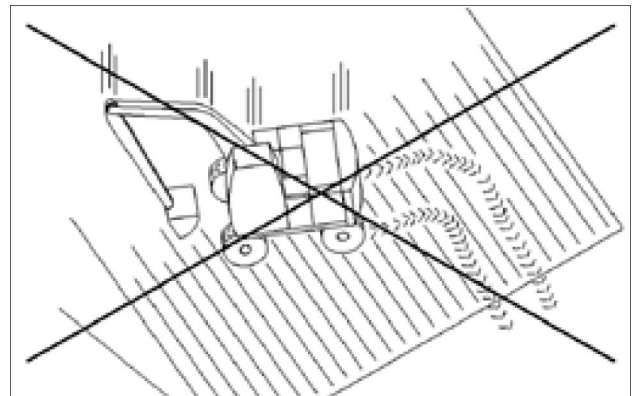
- front attachment in front position;
- steering axle pointing in the direction of travel;
- holding brake in locked position (see “HOLDING AND RELEASING THE UPPER STRUCTURE SLEWING”).

Do not travel across slopes or reverse the machine across slopes as it could slip or overturn.

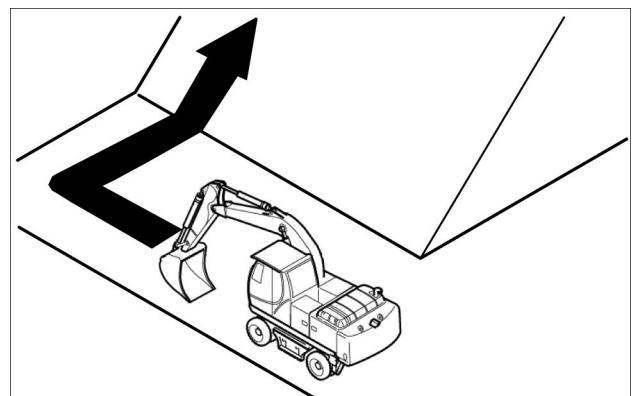
The proper way to climb a ramp is shown in the illustration **14**

Take special care on slippery soils.

Ensure that the tires offer adequate grip. Only then are the steering and braking properties of the machine maintained.



SP0093 13

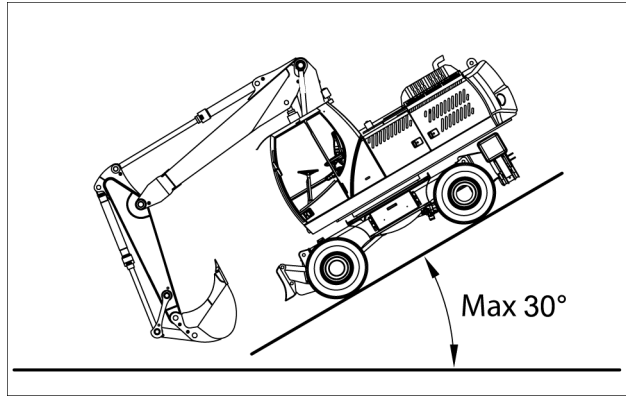


SP0095_1 14

During long tracks with exceptional gradient and at too high speed, you could loose control over the machine. Never travel tracks with a gradient higher than **30 ° - 57.7 %**.

Never travel on long downhill tracks with the service brake engaged. This may cause an extreme wear of the brake plates or the brake's breakage.

Before travelling downhill or uphill, to prevent the travel speed from becoming too fast, engage the 1st gear. With remarkable gradients, engage the creep speed.



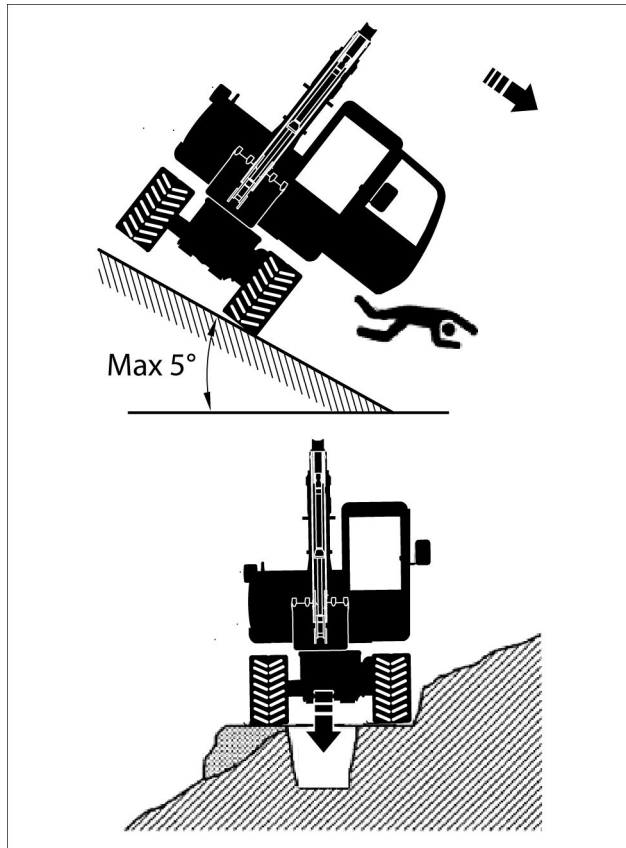
F34527N1 15

AVOID TIPPING

When operating on a slope, keep bucket low to ground and close to machine. Point chassis frame uphill to avoid tipping.

To avoid tipping:

- Be extra careful before operating on a gradient.
- Prepare machine operating area flat by grading.
- During digging and soil compaction: lock the floating axle and stabilize the vehicle by means of the blade and stabilizers.
- Keep the bucket low to the ground and close to the machine.
- Reduce machine operating speed to avoid tipping or slipping.
- Avoid changing direction when travelling on grades.
- Never attempt to travel and digging across a grade steeper than **5 °**.
- Reduce swing speed as necessary when swinging loads. Be careful when working on frozen ground.
- Temperature increases will cause the ground to become soft and make ground travel unstable.



SP0092_1 16

⚠ WARNING

Roll-over hazard!

Securely fasten the seat belt. Your machine is equipped with a Roll-Over Protective Structure (ROPS) cab for your protection. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Failure to comply could result in death or serious injury.

W0376A

TRAVELLING ON PUBLIC ROADS

NOTE: please refer to "Travelling on public roads" in Chapter 8.

ATTENTION: Road circulation (on public roads) is ruled by special provisions varying from country to country. Check beforehand with local authorities for circulation provisions.

ATTENTION: During road transfer with monoboom version the help of a flagman to signal the motion is compulsory. Car with blinking lights and flags should precede and follow the machine.

ATTENTION: ITALY ROAD TRAVEL APPROVAL: travel with traffic beams and warning beacon alight (also during the day).

GERMANY ROAD TRAVEL APPROVAL: travel with traffic beams alight (also during the day).

Assemble the front-maker lamp on the dipper linkage and connect it to outer socket, installed on the frame. Raise the stabilizer and/or the blade completely. Attach the reflectors on the blade. Switch off all work lights.

Lock the upper structure against the undercarriage by locking pin (see "Upper structure holding lock in 3-12").

Set safety lever in Lock position.

Activate the "Road travel" mode (1).

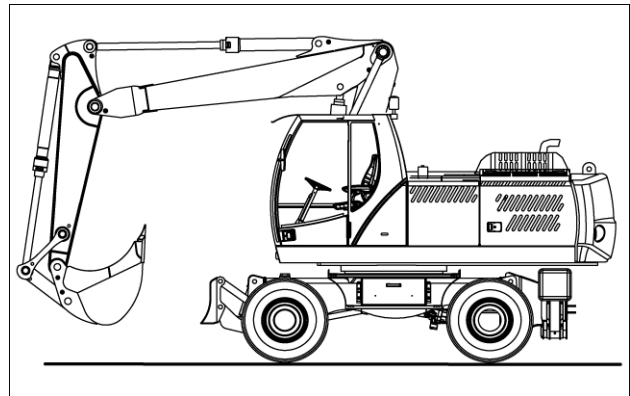
When machines are equipped with clamshell, the bucket / clamshell switching valve on the right side has to be set to "travel" position. For this position the bucket cylinder is hydraulic locked.

Fix the linkage (2) against movement during travel.

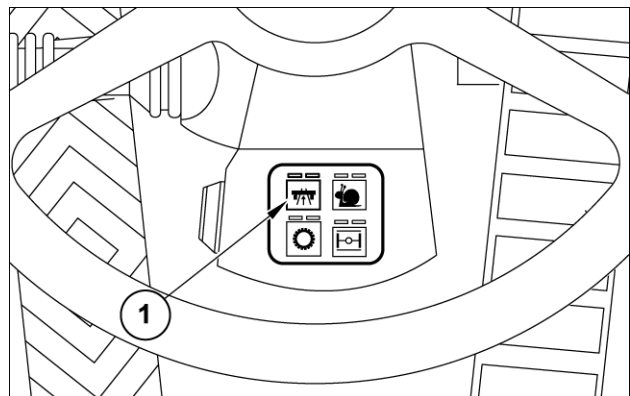
Position the clamshell into the suitable support (3) of the undercarriage.

TAKING A BEND

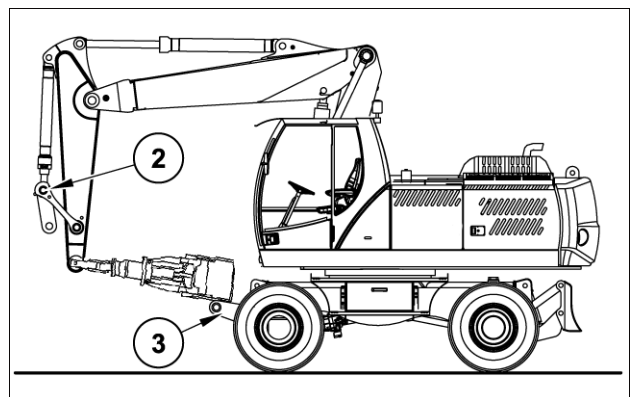
Reduce the machine speed while taking a bend. If the speed is too high and the steering wheel is wrenched round, there is a risk of the machine overturning (due to a wheel of the rigid axle being lifted off the ground). Extremely hard braking while taking a bend may also cause the machine to overturn.



F34520N 17



F33968N 18

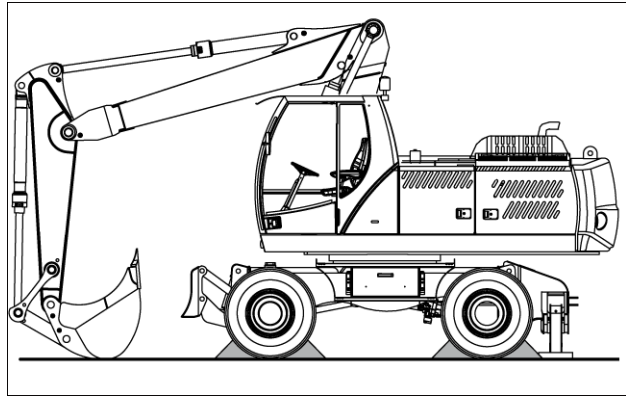


F44261N1 19

PARK MACHINE SAFELY

To avoid accidents:

- Park machine on a level surface.
- Lower bucket to the ground.
- Lower the blade and the stabilizers to the ground.
- Lock the upper structure.
- Engage the parking brake.
- Pull the safety lever to the **LOCK** position.
- Pull auto-idle switch off.
- Turn the engine speed throttle to low idle.
- Run engine at low idle speed without load for 5 minutes.
- Turn key-start switch to "**0**" to stop engine.
- Remove the ignition key from the key switch.
- Prior to leaving the machine, close the windows, the cab door and all panels.
- Put the chocks to lock the wheels.



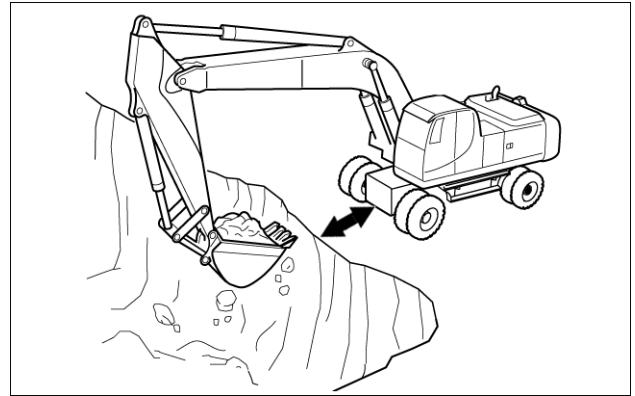
F34530N 20

JOB SITE OPERATION

INSPECT THE JOB SITE

Explore the working area to identify potential risks before starting and operating the machine. Make sure that the structure and the conditions of the ground are safe before starting operations.

- Make sure that the digging area is sufficiently stable and firm to support the weight of the machine during the work operations.
- Working near edges and ditches presents a risk for the stability of the machine. Check first that edges and the walls of the digging are sufficiently strong. If necessary, prop the edges appropriately to prevent caving-ins.
- DO NOT dig too near the machine.
- When working on a slope or near the edge of the road, have a flagman available.

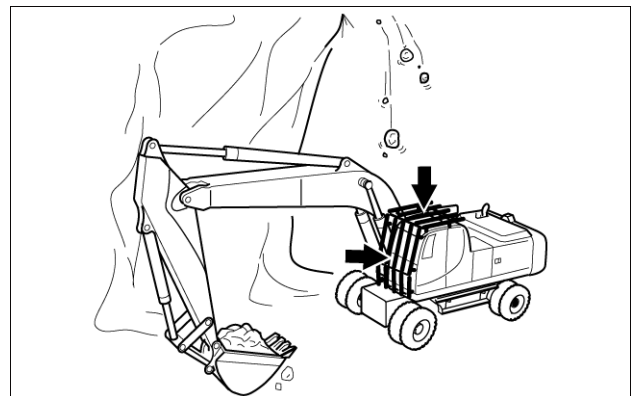


SP0022_2 21

PROTECTING AGAINST THE FALL OF ROCKS AND LANDSLIDES

When operating in zones where the possibility of falling rocks or landslides exists or when there is the risk for front impacts with objects that could penetrate the cab, make sure that protection structures are installed: F. O. P. S. (Falling Object Protection Structure) and FRONT GUARD.

- DO NOT weld, drill or modify protective structures. Any type of modification could weaken the structural integrity of the safety system, with serious consequences for the operator, in case of collision, falling objects or landslides.
- After an accident, DO NOT try to straighten or repair protective structures. Contact a Dealer to verify the functionality, to repair or to completely or partially replace the protective structures.

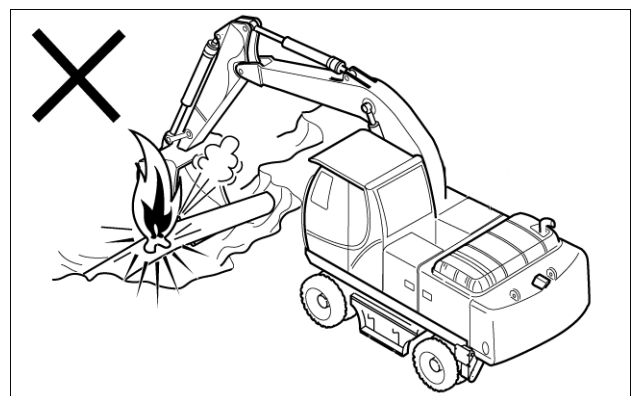


SP0023 22

DIG WITH CAUTION

Accidental severing of underground cables or gas lines may cause an explosion and/or fire, possibly resulting in serious injury or death.

- Before digging, check the location of cables, gas lines, and water lines.
- Keep the minimum distance required by law from cables, gas lines, and water lines. If a fiber optic cable should be accidentally severed, do not look into the end. Doing so may result in serious eye injury.
- Contact local authorities and/or the utility companies directly (electric power, gas, telephone, water, sewers, telecommunications, etc.) to obtain information about underground utility lines.

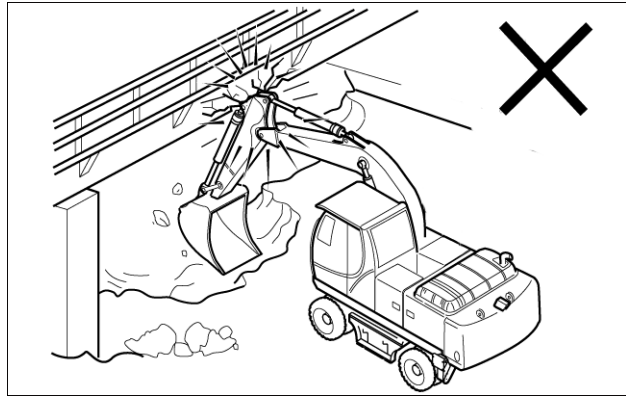


SP0024_2 23

OPERATE WITH CAUTION

If the front attachment or any other part of the machine hits against an overhead obstacle, such as a bridge, both the machine and the overhead obstacle will be damaged, and personal injury may result as well.

- Take care to avoid hitting overhead obstacles with the boom or arm.

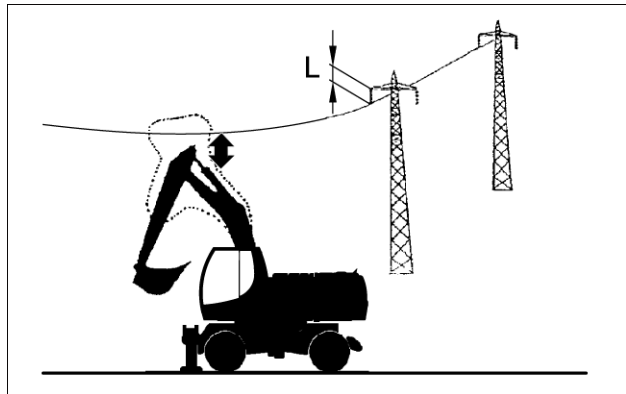


SP0025_2 24

AVOID ELECTRIC LINES

Serious injury or death can result if the machine or front attachments are not kept a safe distance from electric lines.

- When operating near an electric line, NEVER MOVE any part of the machine or load closer than **5 m (16.4 ft)** plus twice the line insulator length (**L**).
- Check and comply with any local regulations that may apply.
- Wet ground will expand the area that could cause any person on it to be affected by electric shock.
- Keep all bystanders or co-workers away from the site.

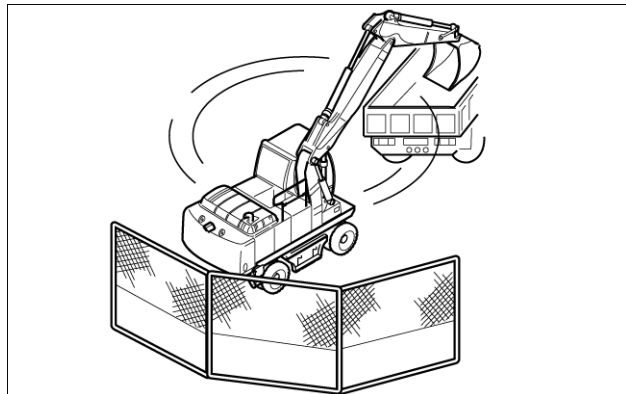


F33973N_1 25

KEEP PERSONNEL CLEAR FROM WORKING AREA

A person may be hit severely by the swinging front attachment or counterweight and/or may be crushed against another object, resulting in serious injury or death.

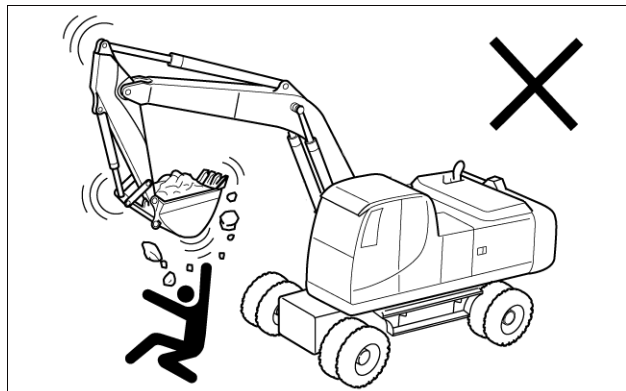
- Keep all persons clear from the area of operation and machine movement.
- Before operating the machine, set up barriers to the sides and rear area of the bucket and tail swing radius to prevent anyone from entering the work area.



SP0029 26

NEVER MOVE THE BUCKET OVER ANY ONE

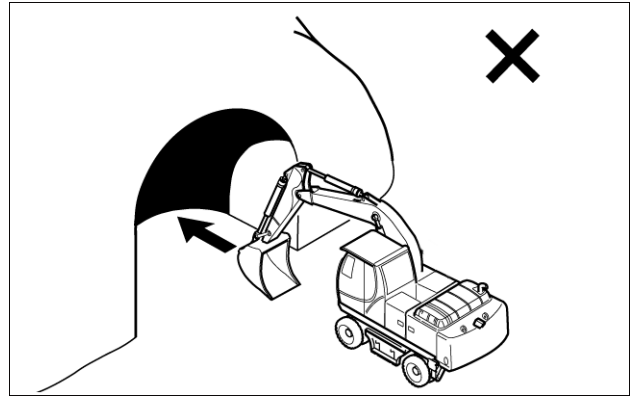
Never lift, move, or swing bucket above anyone or a truck cab. Serious injury or machine damage may result due to bucket load spill or due to collision with the bucket.



SP0030_2 27

DO NOT OPERATE IN TUNNELS

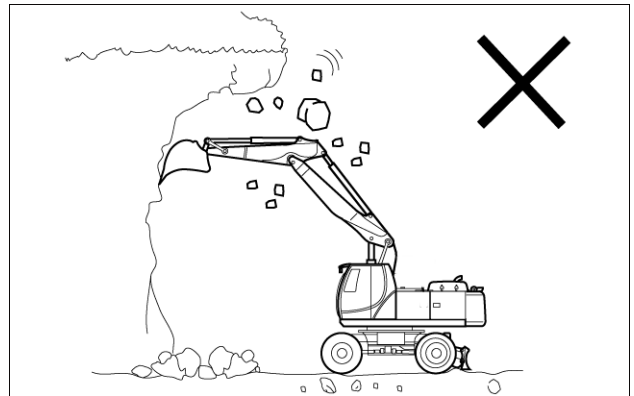
DO NOT operate the machine in enclosed spaces or, in any case, without appropriate ventilation. Operations in tunnels or underground sites where potential explosive conditions exist are not allowed. There is a danger for explosions and potentially deadly injuries.



SP0031_1 28

NEVER UNDERCUT A HIGH BANK

The edges could collapse or a land slide could occur causing serious injury or death.

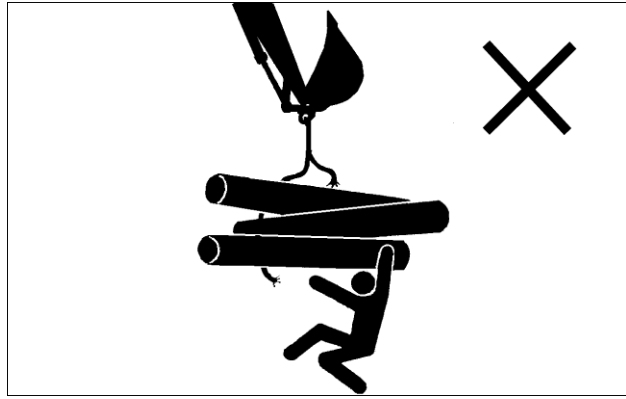


SP0027_2 29

SAFETY LOADS MOVING

The excavator is a machine designed specifically to perform digging/loading works, thus it must not be used to handle suspended loads. If it is necessary to handle materials, the following indications must be strictly implemented:

- The machine must be equipped compulsorily with the object handling variant provided upon request. Also, totally comply with the safety precautions for the operation of the excavator as a lifting equipment.
- Secure the loads to be raised using cables or chains fastened with appropriate hooking mechanisms.
- Never hook cables or chains to the bucket teeth.
- Nobody should be allowed to remain under the raised load or within the excavator operating range for any reason whatever.
- Never exceed specified loading capacity. Incorrect fastening of slings or chains may cause boom/arm failure or failure of the lifting means with consequent bodily injuries and even death.
- Always ensure that slings and chains used for lifting are adequate to the load and in good condition.
- All loading capacities are referred to the machine on a flat and horizontal surface and should be disregarded when working on a slope.
- In any case, comply with the current national or local regulations on this matter.

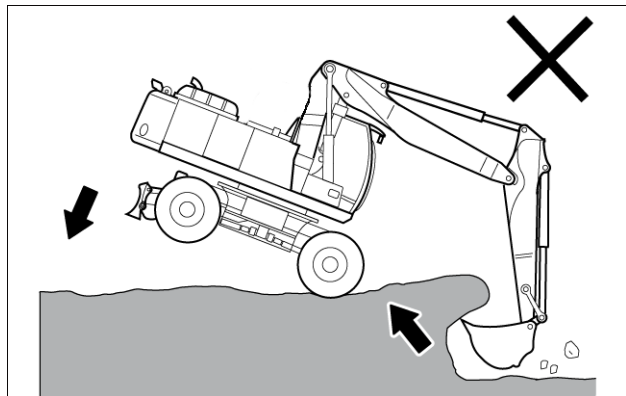


SP0028_1 30

AVOID EXCESSIVE DIGGING EFFORTS

Operate the machine complying with the load limits.

- Do not exceed the prescribed load limits.
- Do not use the strength of the attachment to travel or move the machine.
- Do not try digging exploiting the mass of the machine.

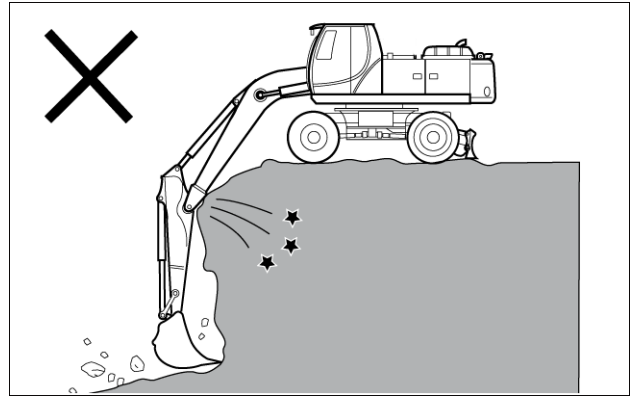


SP0032_1 31

PAY ATTENTION WHEN DIGGING DEEPLY

When digging deeply, pay special attention to prevent contacts of the attachment and the relevant hydraulic hoses with the ground.

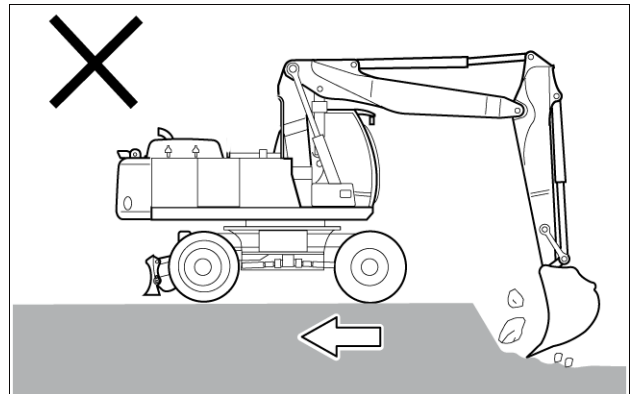
DO NOT swing the turret or the undercarriage when the attachment boom is fully lowered. Under these conditions there is the danger that the boom collides with the undercarriage.



SP0033_2 32

DO NOT USE THE TRACTION FORCE OF THE MACHINE FOR DIGGING

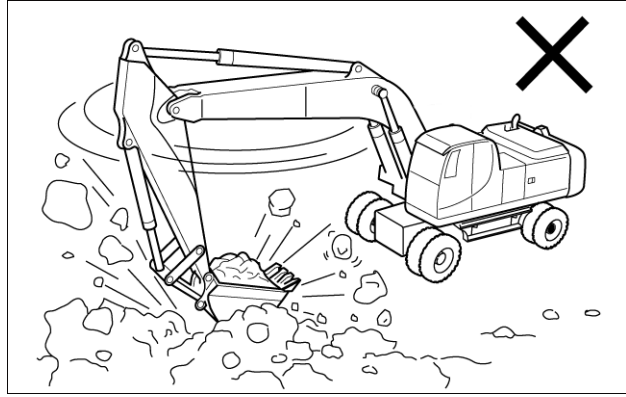
DO NOT travel the machine to dig. In doing this, an excessive stress on the front attachment could result in damages to the structure. Use the undercarriage for travelling only.



SP0034_1 33

DO NOT USE THE TURRET SWING FOR DIGGING

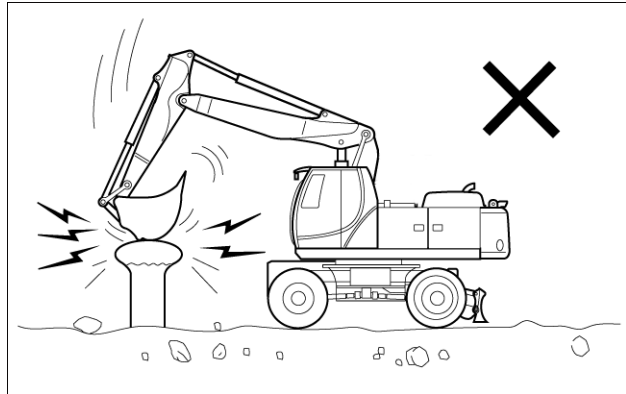
DO NOT use the turret swing for digging or moving rocks. An excessive stress on the front attachment could result in damages to the structure reducing the operating life of the swing system. Also, this inappropriate use of the machine could cause serious injuries or fatalities.



SP0035_1 34

DO NOT USE THE BUCKET AS A HAMMER

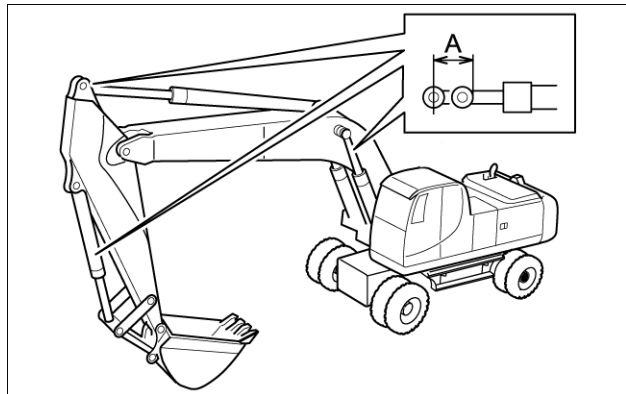
The use of the bucket as a hammer or for piling operations could cause serious damages to the bucket itself and the components of the front attachment. Also, this inappropriate use of the machine could cause serious injuries or fatalities.



SP0036_1 35

DO NOT OPERATING THE CYLINDER TO FULL STROKE

Do not extend repeatedly the bucket and the arm cylinders full stroke with the purpose of cleaning the bucket from residual materials. This could cause damages to the cylinders. To remove residues from the bucket, use water under pressure or remove them manually.



SP0037_1 36

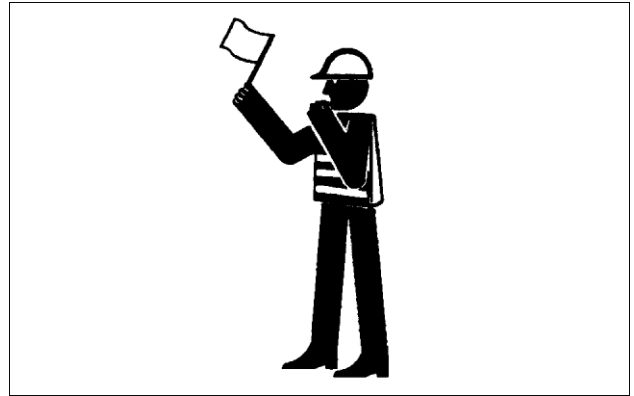
PROVIDE SIGNALS FOR JOBS INVOLVING A NUMBER OF MACHINES

For jobs involving several machines, provide signals commonly known by all personnel involved. Also, appoint a signal person to co-ordinate the job site. Make sure that all personnel obey the signal person's directions.

TRANSPORTING THE MACHINE UNDER SAFE CONDITIONS

During loading or unloading operations of the machine on a truck or trailer the danger for tipping over is always present.

- Use a truck or trailer appropriate for transporting the machine.
- Secure safely the machine to the trailer with appropriate chains or cables. Please refer to the chapter "TRANSPORTATION" of this Manual for the safe loading and unloading procedures.
- Make sure that you comply with National and local regulations when transporting the machine on open roads.



SP0065 37

SAFE MAINTENANCE

Prior to service in the machine:

- Park the machine on the level ground.
- Lower the bucket to the ground.
- Lower the blade and the stabilizers to the ground.
- Lock the upper structure.
- Engage the parking brake.
- Move the safety lever to **LOCK** position.
- Switch off the Auto-Idle.
- Turn the rotary dial in left position.
- Let the engine idle with no load for at least five minutes until it has cooled down.
- Turn the ignition key to **0** position to stop the engine.
- Remove the ignition key from the start switch.
- Prior to leaving the machine, close the windows, the cab door and all panels.
- Apply the "Maintenance in progress" tag (see SAFETY PLATE in this Chapter). This tag can be applied to the left-hand control lever, safety lever or cab door.

To avoid accidents:

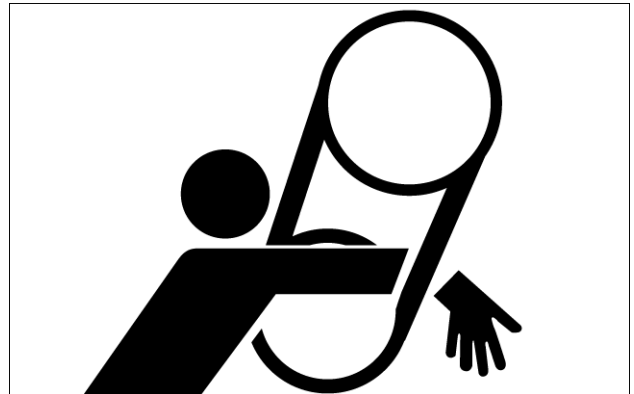
- Understand maintenance procedure before starting the work.
- Keep the working area clean and dry.
- Do not spray water or steam inside the cab.
- Do not lubricate or service the machine when it is in motion.
- Keep hands, feet and clothes far from moving parts.
- Do not leave the machine unattended if servicing requires the engine running.
- If the machine is to be raised, place boom and arm at an angle **90 °** to **110 °**. Lock machine components which should be raised for maintenance or repair using suitable supporting means.
- Never work under a machine kept raised by the boom.
- Inspect certain component regularly, repair or replace as necessary. Refer to the Chapter MAINTENANCE in this Manual.
- Keep all components in good condition and properly install. Immediately repair any fault.
- Immediately repair any damage. Replace worn or failed components. Remove grease, oil, debris build-ups.
- Disconnect the negative cable from the battery before carry out any work on the electrical system or arc-welding on the machine.



SP0039 38



SP0040 39

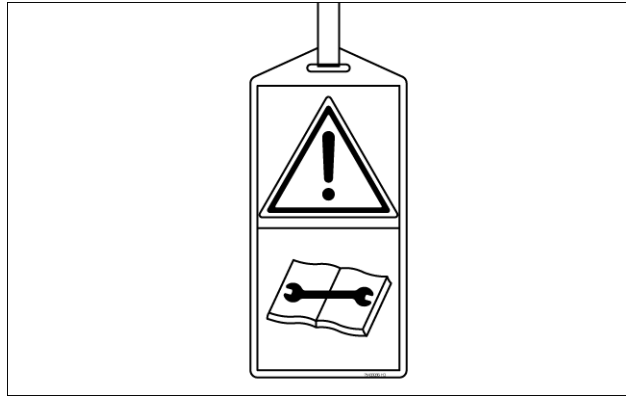


SP0041 40

WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.

- Before performing any work on the machine, attach a maintenance in progress tag (see also SAFETY PLATES in this Chapter) . This tag can be applied to the left-hand control lever, safety lever or cab door.



SP0043 41

SUPPORT MACHINE PROPERLY

Never attempt to work on the machine without securing the machine first.

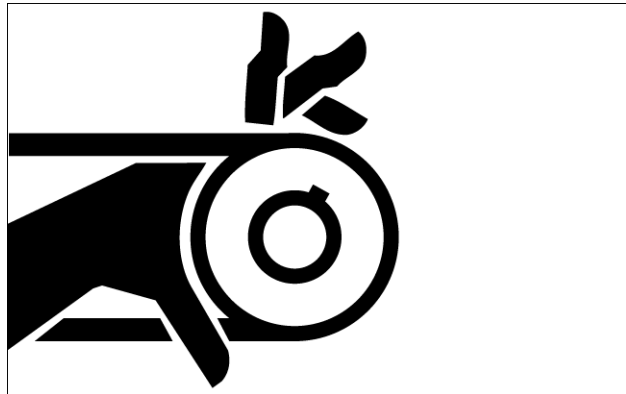
- Always lower the attachment or tool to the ground before working on the machine.
- If you must work on a lifted machine or attachment, securely support the machine or attachment.
- Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load.
- Do not work under a machine that is supported solely by a jack.



SP0040 42

STOP THE ENGINE PRIOR TO PERFORMING MAINTENANCE OPERATIONS

Do not perform any maintenance operation with the engine running. Trapping by moving parts could cause serious injuries. Stop the engine and wait that it cools-off prior to performing maintenance operations. In case it is indispensable to perform maintenance operations with the engine running, have a person co-operating with you sitting in the operator's seat, to cut-off the engine immediately in case of necessity.

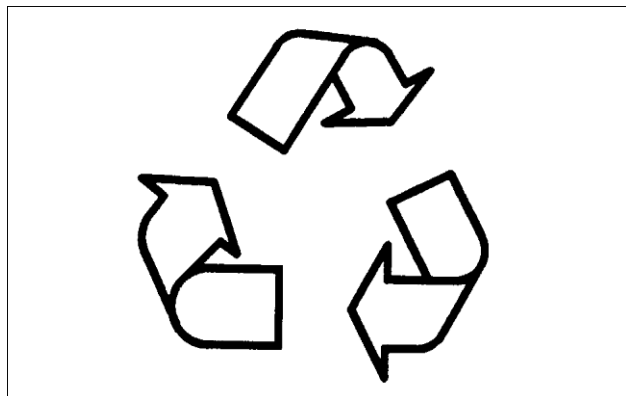


SP0042 43

DISPOSE OF WASTE IN THE APPROPRIATE MANNER

Waste improperly disposed of represents a danger for the environment. Potentially dangerous waste used on the excavators includes lubricants, fuel, coolant, brake fluid, filters and batteries.

- Used sealed containers when discharging fluids. Do not use containers for food or beverages which may induce drinking.
- Do not spill waste over the ground, into drains, or water beds.
- Obtain information about the correct methods to recycle or dispose of waste from local Authorities, collection centres or your Dealer.



SP0044 44

PROPERLY LIGHT THE WORKING AREA

Properly and safely light the working area.

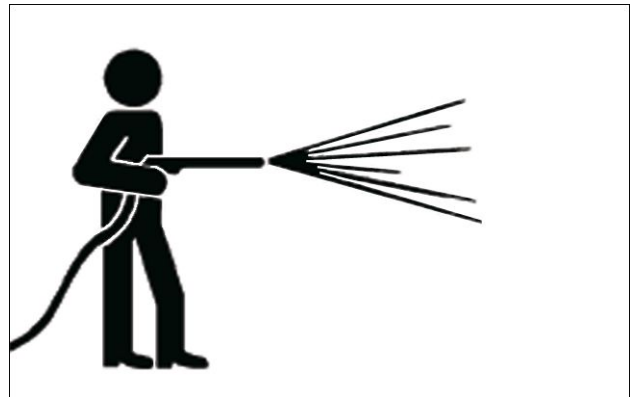
- Use safe portable lamps in order to work inside and under the machine.
- Make sure that the lamp is shielded by a cage; the incandescent filament of a lamp, accidentally broken, can cause fuel or oil fire.



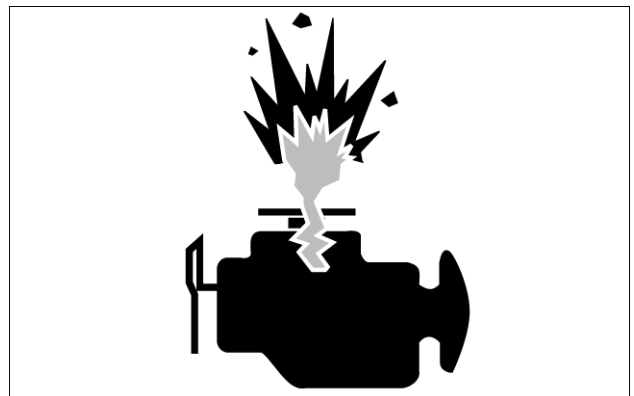
SP0045 45

KEEP CLEAN THE MACHINE

- Keep the machine clean and free of debris, excess or spilled lubricants, fuel and fluids. Use approved solvents, detergents and water to clean the machine and its components on a regular basis.
- Keep clean the engine compartment, radiator, batteries, hydraulic pipes, fuel tank and operator's position. The engine compartment temperature can quickly rise, after stopping the engine. Be careful to possible fires. Open the access doors in order to quicken the engine cooling process and clean the compartment.



SP0053 46



SP0050 47

PREVENT ACID SCALDS

- The sulfuric acid, contained in the battery, is poisonous. It is strong enough to scald the skin, corrode clothes and cause blindness, if it is sprayed into the eyes. To avoid dangers:
- Fill the batteries in airy areas.
- Wear eye protections and rubber gloves.
- Avoid breathing the electrolyte vapors when topping up.
- Avoid spilling or dripping the electrolyte.
- Use proper emergency starting techniques.



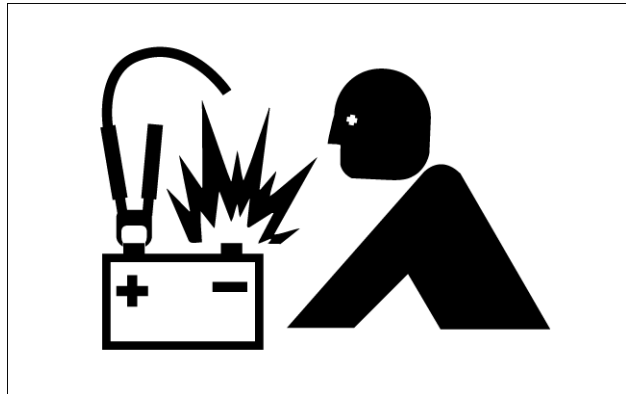
SP0055 48

If you are touched with acid sprays:

- Rinse your skin well with water.
- Put on your skin sodium bicarbonate or clay to help the acid neutralization.
- Rinse your eyes with water for **15 min**
- Immediately see a doctor.

STARTING THE ENGINE WITH BOOSTER BATTERIES

- The operator should be sitting in the driver's seat to keep the machine under control when the engine starts. Starting the engine with booster batteries is a two man operation.
- Do not use batteries that have been stored in the cold for a long time.
- Mistakes in following procedures detailed for starting the engine with slave batteries may cause the batteries to explode or machine to move unexpectedly.

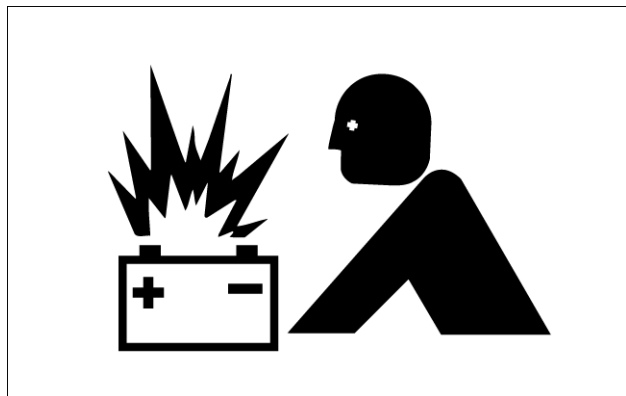


SP0051 49

PREVENT BATTERY EXPLOSIONS

Battery gas can explode.

- Keep sparks, lighted matches, and flames away from the top of battery.
- Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
- Do not charge a frozen battery; it may explode. Warm battery to **16 °C**.
- Battery electrolyte is poisonous. If the battery should explode, battery electrolyte may be splashed into eyes, possibly resulting in blindness. Be sure to wear eye protection.

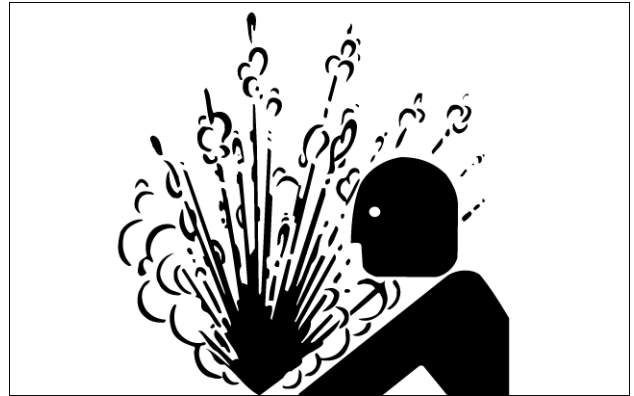


SP0052 50

PREVENT BURNS

After operation, engine coolant is hot and under pressure. Hot water or steam is contained in the engine, radiator and heater lines. Skin contact with escaping hot water or steam can cause severe burns.

- To prevent possible injury from hot spraying water. Do not remove the radiator cap until the engine is cool. When opening, turn the cap slowly to the stop. Allow all pressure to be released before removing the cap.
- The hydraulic oil tank is pressurized. Be sure to release all pressure before removing the cap.
- Engine oil, reduction gear oil and hydraulic oil also become hot during operation. The engine, hoses, lines and other parts become hot as well.
- Wait for the oil and components to cool down before starting any maintenance or inspection work.



SP0048 51



SP0049 52

STORE ATTACHMENTS SAFELY

Stored attachments such as buckets, hydraulic breakers and blades can fall and cause serious injury or death.

- Securely store attachments and implements to prevent falling.
- Keep bystanders away from storage areas.

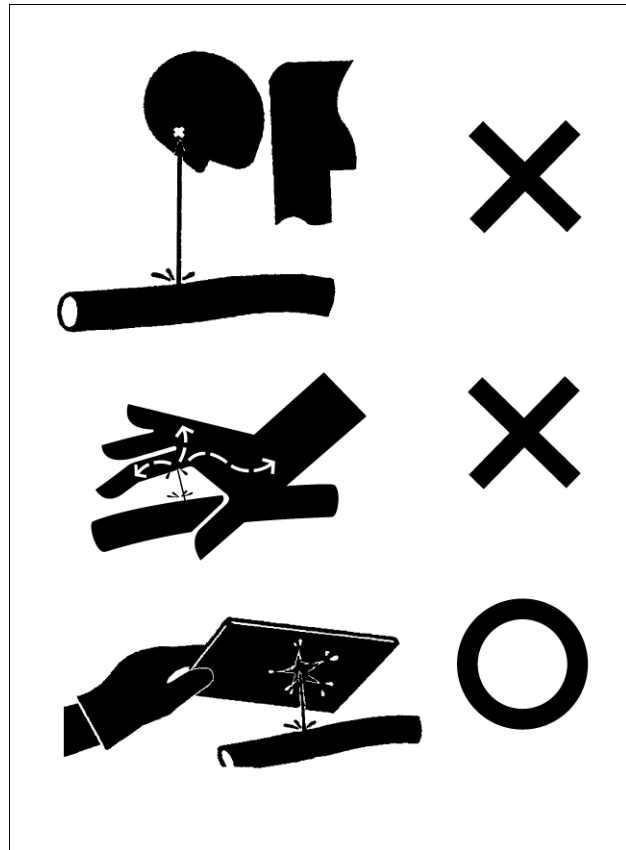


SP0054 53

AVOID HIGH-PRESSURE FLUIDS

Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.

- Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines.
- Tighten all connections before applying pressure.
- Search for leaks with a piece of cardboard; take care to protect hands and body from high-pressure fluids. Wear a face shield or goggles for eye protection.
- In an accident occurs, see a doctor familiar with this type of injury immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

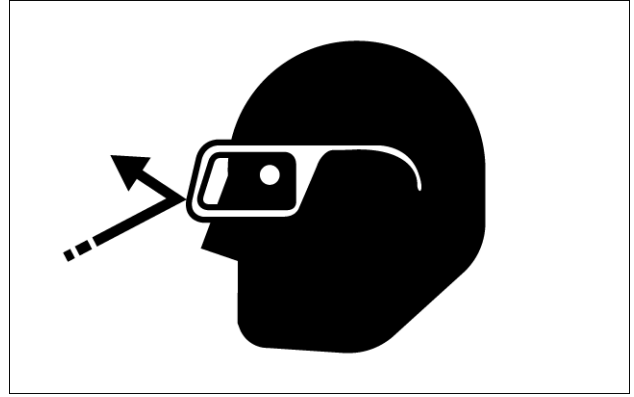


SP0046 54

PROTECT AGAINST FLYING DEBRIS

If flying debris hit eyes or any other part of the body, serious injury may result.

- Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.
- Keep bystanders away from the working area before striking any object.

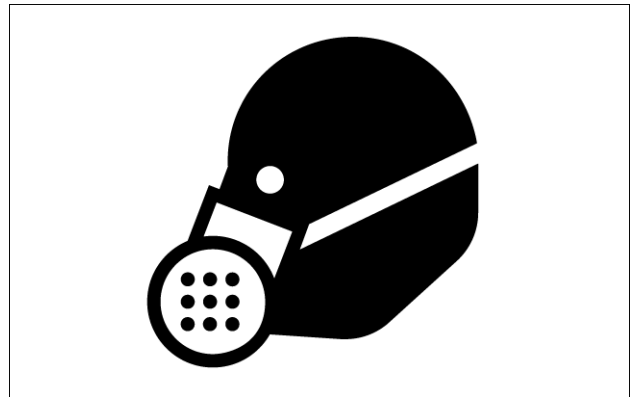


SP0056 55

BEWARE OF EXHAUST FUMES

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

- If you must operate in a building, be sure there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.

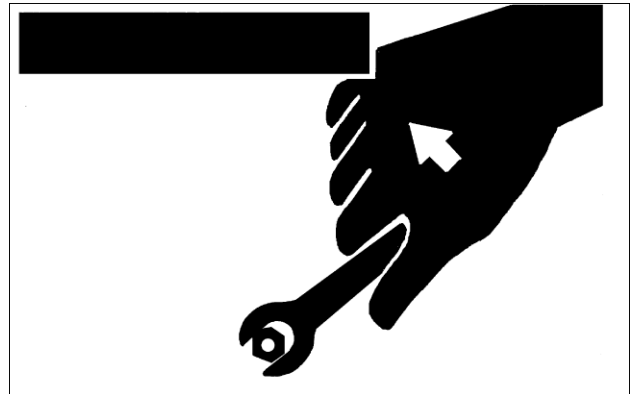


SP0062 56

USE APPROPRIATE TOOLS

Use tools appropriate for the job to be performed.

- Inappropriate tools, parts and procedures might generate dangerous conditions.
- Use tools of correct size to tighten or loosening securing elements, in order to avoid injuries caused by a wrench getting out of control.
- Do not use U.S. Standard or British Standard tools on metric fasteners and vice versa.
- Use only genuine spare parts (please refer to the Spare Parts Catalogue).



SP0063 57

FIRE PREVENTION

Handle fuel with care: it is highly flammable. If fuel ignites, an explosion and/or a fire may occur, possibly resulting in serious injury or death.

- Do not refuel the machine while smoking or when near open flame or sparks.
- Always stop the engine before refuelling the machine.
- Fill the tank outdoors.

All fuels, most lubricants, and some antifreeze fluids are flammable.

- Store flammable fluids well away from fire hazards.
- Do not burn or puncture pressurized containers.
- Do not store oily rags; they can ignite and burn spontaneously.

Check for Oil Leaks:

- Fuel, hydraulic oil and lubricant leaks can lead to fires.
- Check for missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damage to the oil-cooler, and loose oil cooler flange bolts which may cause oil leaks.
- Tighten, repair or replace any missing, loose or damaged clamps, lines, hoses, oil-cooler and oil-cooler flange bolts.
- Do not bend or strike high-pressure lines.
- Never install bent or damaged lines, pipes, or hoses.



SP0057 58



SP0058 59

Check for shorts:

- Short circuits can cause fires.
- Clean and tighten all electrical connections.
- Check before each shift for loose, kinked, hardened or frayed electrical cables and wires.
- Check before each shift for missing or damaged terminal caps.
- Do not operate the machine if cable or wires are loose, kinked, etc.

Clean up flammables:

- Spilled fuel and lubricants, and trash, grease, debris, accumulated coal dust, and other flammables may cause fires.
- Prevent fires by inspecting and cleaning the machine daily and by removing spilled or accumulated flammables immediately.



SP0058 60

EVACUATING IN CASE OF FIRE

If a fire breaks out, evacuate the machine in the following way:

- Stop the engine by turning the ignition key to “0” position.
- Use a fire extinguisher if there is time.
- Exit the machine making use of hand rail and step.



SP0061 61

AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.

- Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
- Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install temporary fire resistant guards to protect hoses or other materials when welding, soldering, etc.



SP0059 62

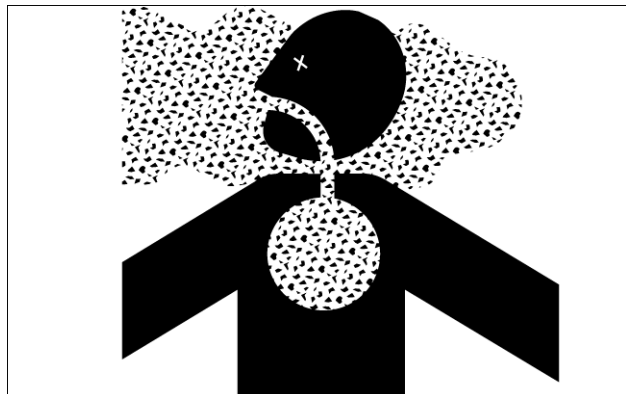
Avoid applying heat to lines containing flammable fluids

- Do not weld or flame cut pipes or tubes that contain flammable fluids.
- Clean them thoroughly with non-flammable solvent before welding or flame cutting them.

REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes can be generated when paints is heated by welding, soldering, or using a torch. If inhaled, these fumes may cause sickness.

- Avoid breathing potentially toxic fumes and dust.
- Do all such work outside or in a well-ventilated area.
- Dispose of paint and solvents properly.
- Remove paint before welding or heating. If you sand or grind paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



SP0060 63

WELDING REPAIR INTERVENTIONS

Welding repair interventions must be performed only by a certified welder with sufficient experience. Also, appropriate safety rules must be implemented by all the personnel involved in the operations. The duration through time of the welding depends upon the quality and the accuracy with which the operation is performed.

- Identify first all the fracture points and the zones in which welding is required.
- Clean accurately the zones involved.
- Remove all paint and inspect the parts with penetrating liquid or a magnetic particle tester.
- Move the starter switch into position "0" and wait for 4 seconds to cut-off electricity from the system.
- Disconnect the negative terminal from the battery.
- Connect the ground cable of the welder at least 1 m from the component to be welded.
- Make sure that the ground cable is not connected to a seal or bearing and that there are no seals or bearings between the ground cable and the part to be welded.
- Avoid welding pieces at low temperature i.e. below **16 °C**. If necessary, warm-up the part involved prior to welding it.
- Remove paints from all surfaces prior to warming-up or welding. Painted surfaces, when warmed-up or when welded, can generate toxic fumes.
- Use appropriate masks or protective glasses.
- Wear gloves and adequate clothing to protect the skin.



SP0064 64

SAFETY DECALS

⚠ WARNING

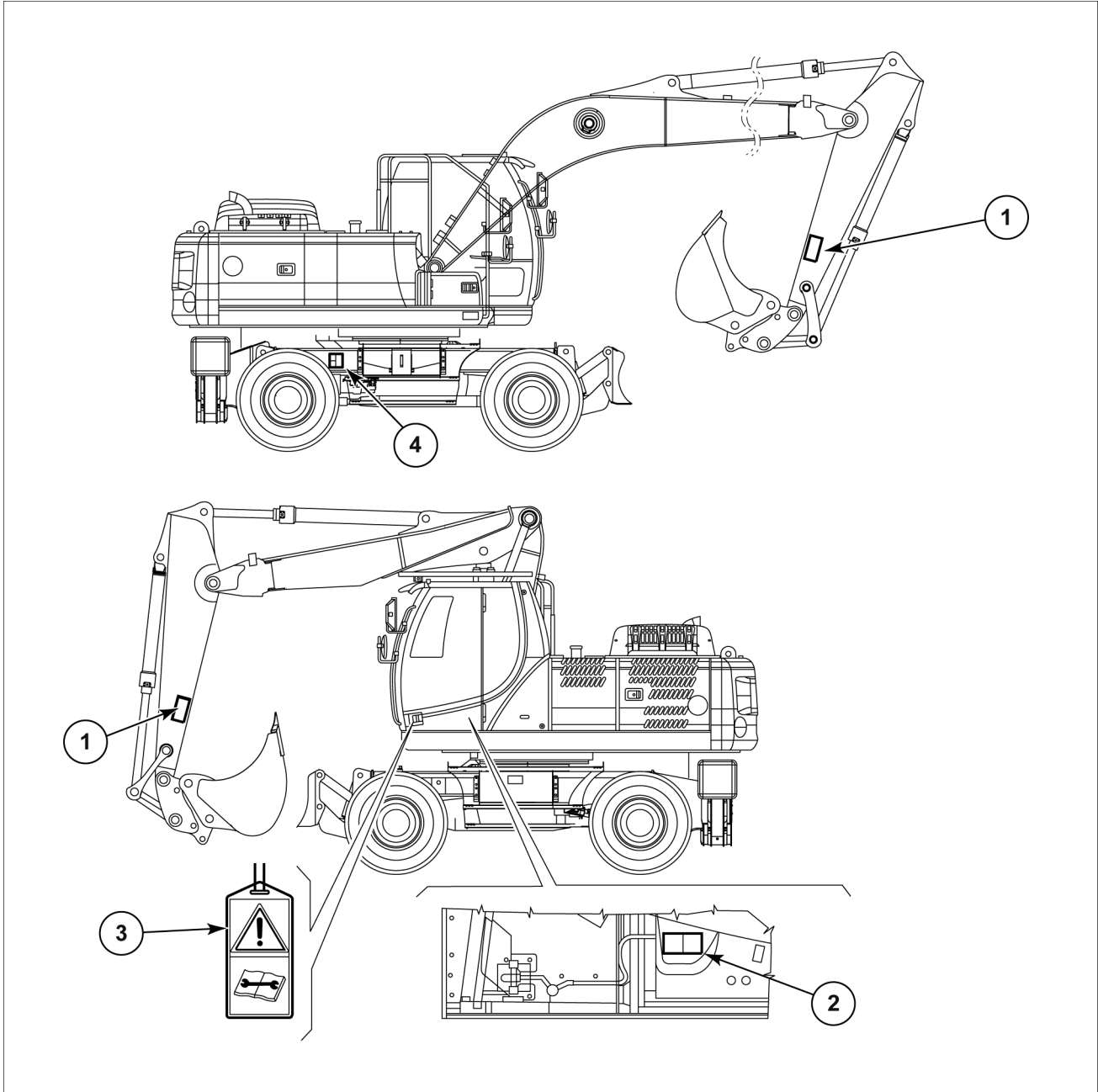
Avoid injury!

Make sure decals are perfectly legible. Clean decals regularly. Replace all damaged, missing, painted over, or illegible decals. See your dealer for replacement decals. When replacing parts bearing decals, be sure to put new decals on each new part.

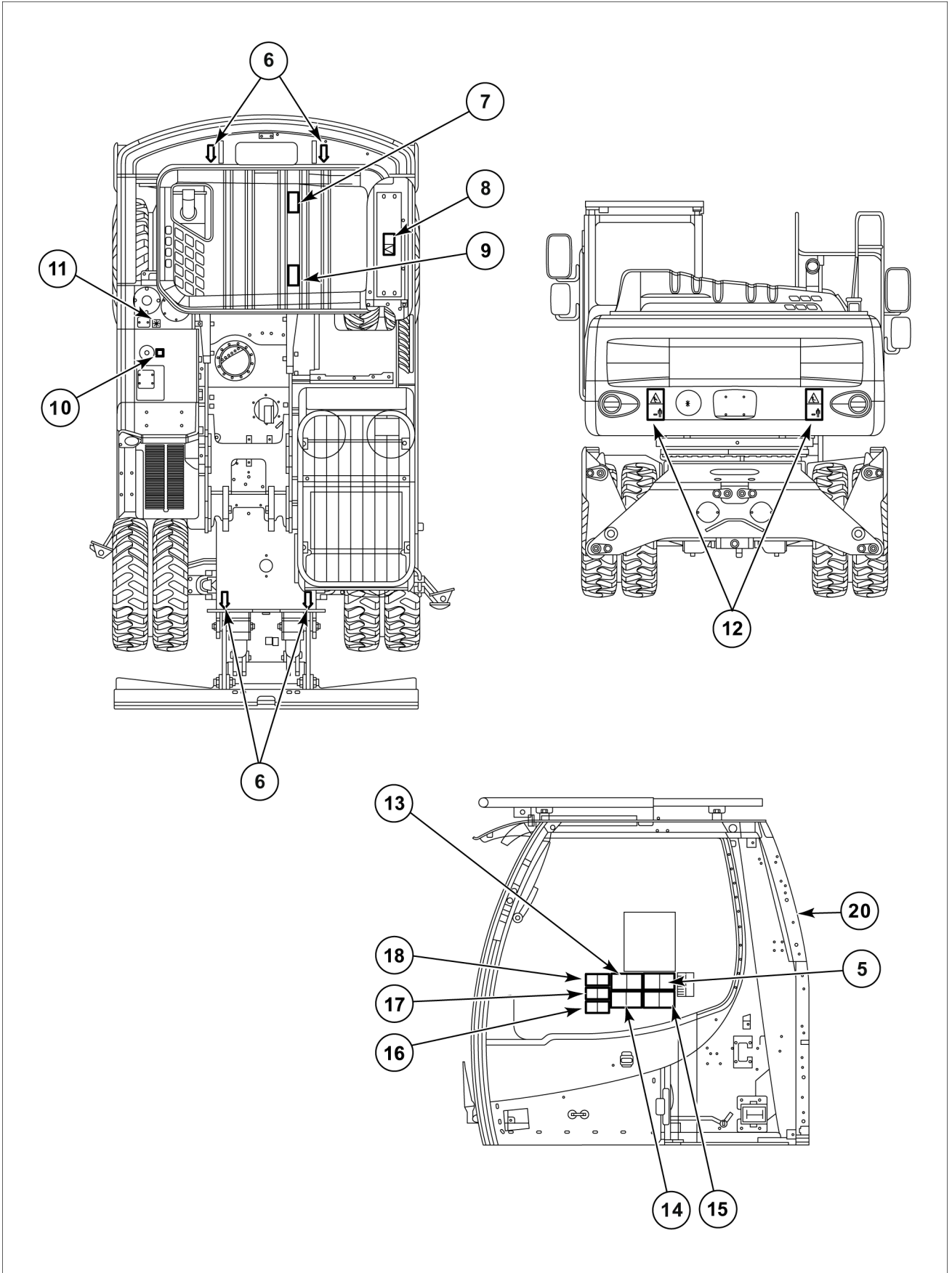
Failure to comply could result in death or serious injury.

W0229A

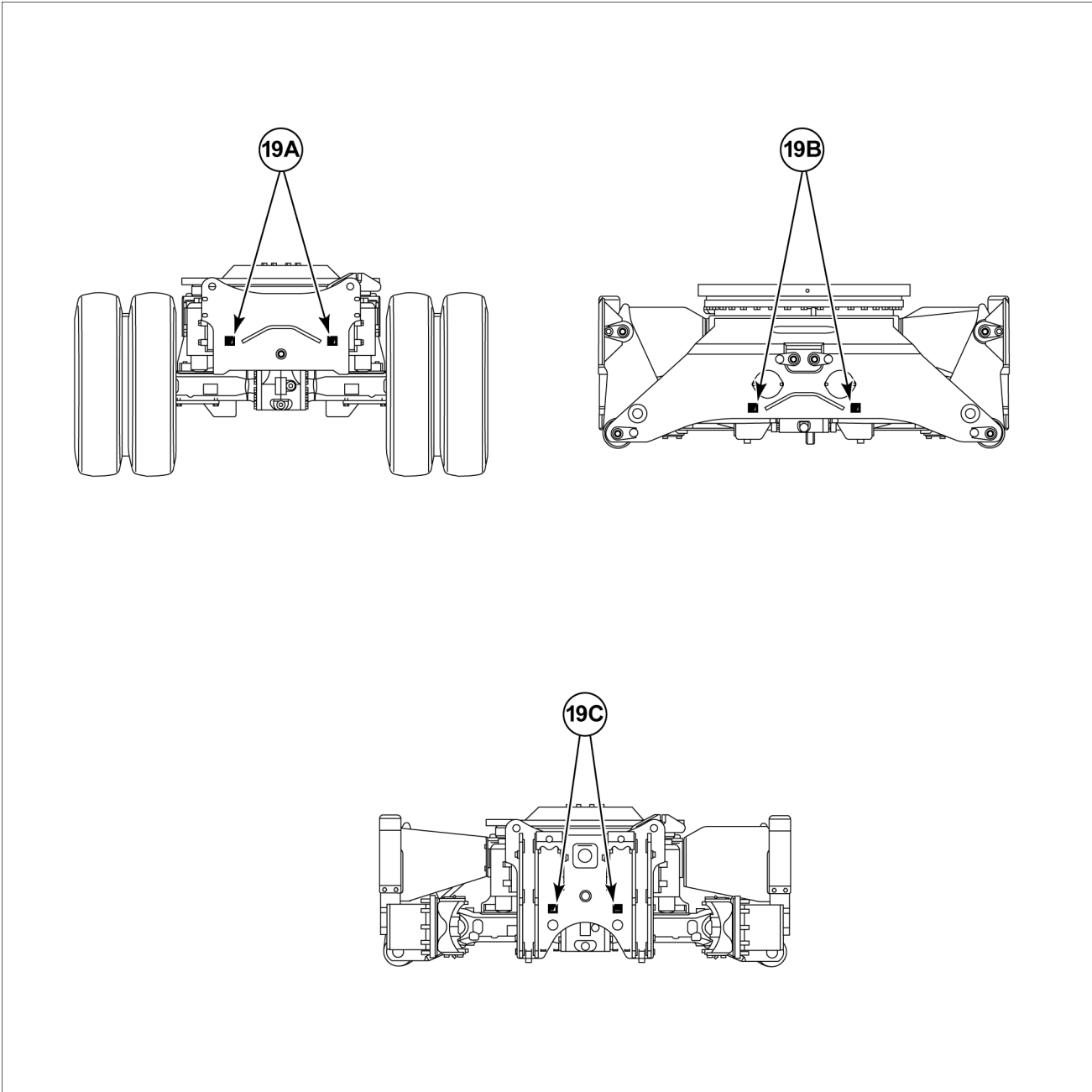
Position of decals



F00045N5 1



F00046N5 2



F00048N3 3

1 - Attachment operating range decal

Ensure that any person near the working site is outside the machine operating range before starting the machine or operating the attachments. Sound the horn before starting the machine.

Failure to comply could result in death or serious injury.

Quantity: 2

Decal No. 71433122



SP0072 4

2 - Do not use control lever to climb up decal

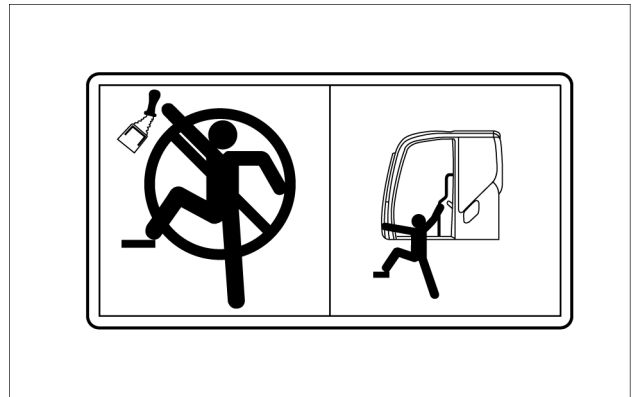
This decal indicates that the operator should not use the control lever to climb up.

Use only the steps and grab handles provided for entering and leaving the cab.

Failure to comply could result in death or serious injury.

Quantity: 1

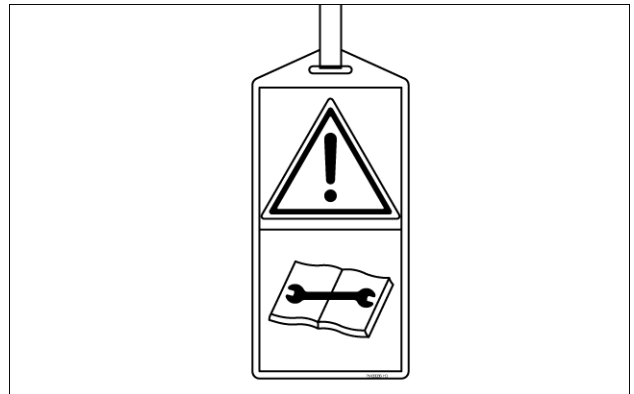
Decal No. 84517348



F00051N 5

3 - Maintenance in progress tag

Maintenance staff is obliged to apply the tag that indicates that the machine is not fully efficient and warns about maintenance staff being located in not visible positions. This tag should be applied to the left-hand control lever, safety lever or cab door.



SP0043 6

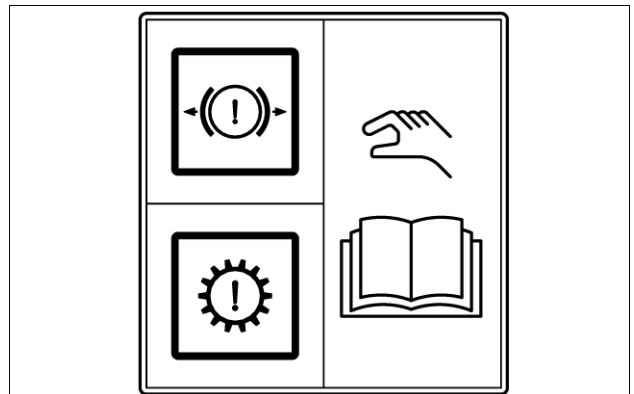
4 - Emergency operation for brakes decal

Refer to the Operator's Manual in case of emergency to release the slewing and the parking brake.

Failure to comply could result in death or serious injury.

Quantity: 1

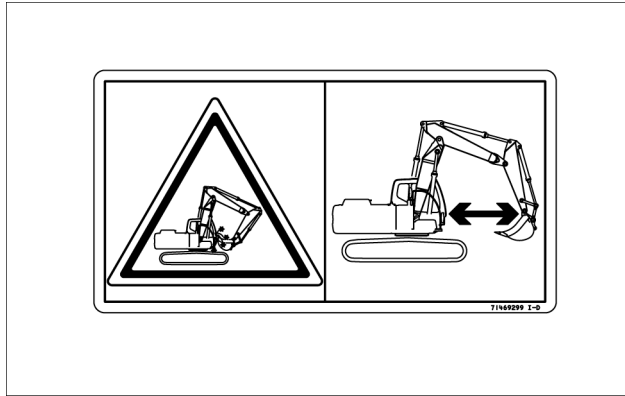
Decal No. 3015603



F33987 7

5 - Working equipment movement decal

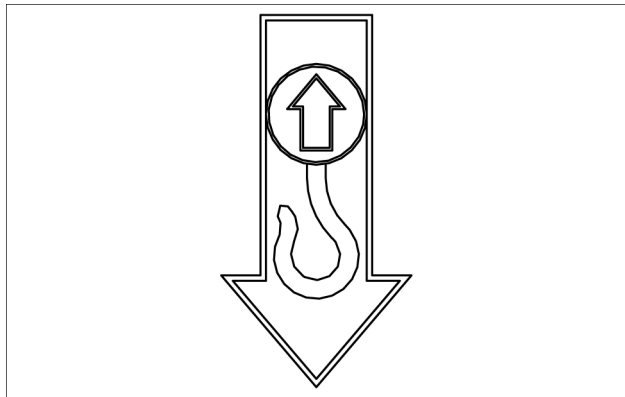
This decal indicates that the operator must be careful while moving the working attachment. Failure to comply could result in death or serious injury.
 Quantity: 1
 Decal No. 71469299



F20001N 8

6 - Lifting point decal

These decals indicate the points of the machine where to attach the lifting devices when parts of the machine are to be removed. Do not use other points. Failure to comply could result in death or serious injury.
 Quantity: 4
 Decal No. 71433093



NHC0216 9

7 - Engine hood decal

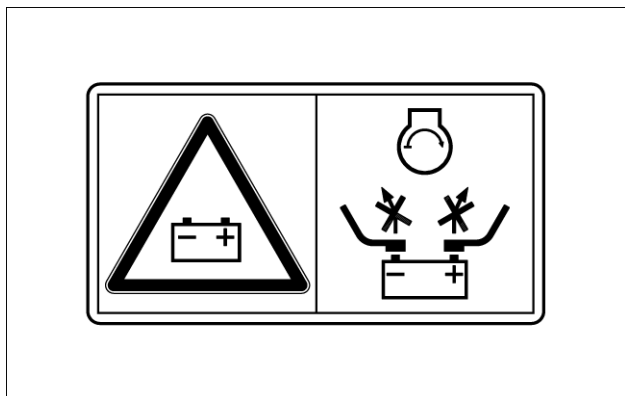
Stop the engine before opening the engine hood. Do not attempt any maintenance with engine running. Danger of severe injuries following the presence of rotating parts such as fan, pulleys and belts. Failure to comply could result in death or serious injury.
 Quantity: 1
 Decal No. 71433096



SP0080 10

8 - Battery decal

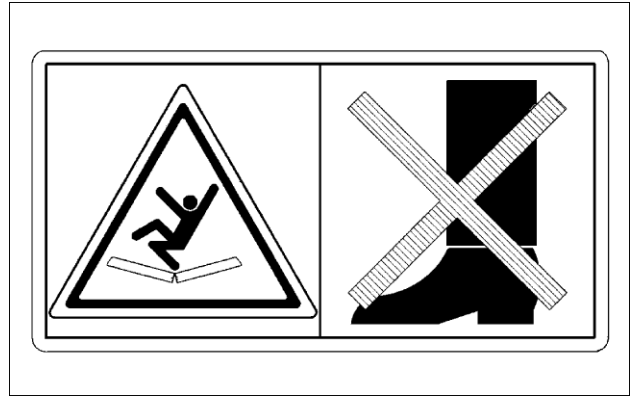
This decal shows that you have to refer to the Operator's Manual. Shut off the engine before disconnecting the battery. Failure to comply could result in death or serious injury.
 Quantity: 1
 Decal No. 3015602



F33979 11

9 - No stepping warning decal

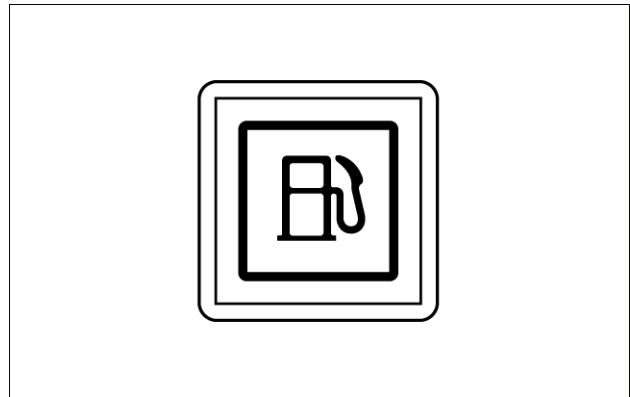
It instructs not to step on the zone where this decal is attached.
 Failure to comply could result in death or serious injury.
 Quantity: 1
 Decal No. 71437694



SP0083 12

10 - Fuel tank decal

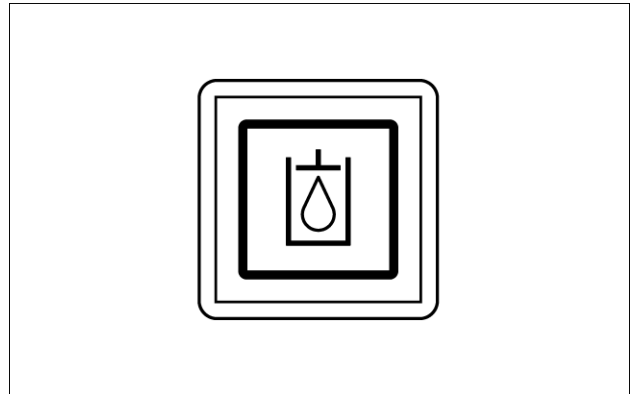
This decal indicates the fuel tank. Make sure that the tank carrying this decal contains fuel.
 Quantity: 1
 Decal No. 3016647



F33980N 13

11 - Hydraulic oil tank decal

This decal indicates the hydraulic oil tank. Make sure that the tank indicated by this decal contains exclusively hydraulic oil.
 Quantity: 1



F33980 14

12 - Counterweight operating range decal

Ensure that any person near the working site is outside the swing area before starting or operating the machine.
 Sound the horn before beginning swing operation.
 Failure to comply could result in death or serious injury.
 Quantity: 2
 Decal No. 71433121



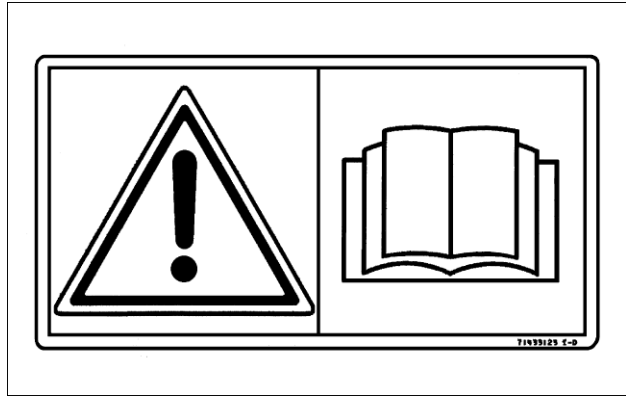
SP0079 15

13 - Read the operator's manual decal

Carefully read the operator's manual prior to starting, operating, servicing, refuelling or carrying out any other work on the machine. Pay special attention to the instructions regarding safety, operation and maintenance to prevent risks or injury during usage or when carrying out maintenance operations on the machine.

Quantity: 1

Decal No. 71433123



SP0077 16

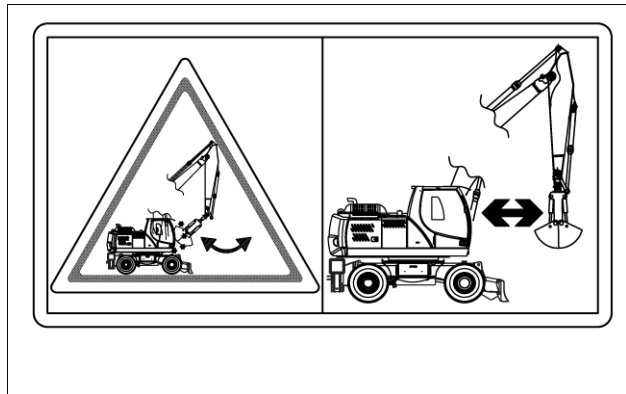
14 - Special equipment movement decal

It shows the danger represented by the special equipment hitting the cab. Pay special attention as no stops are provided to prevent this problem.

Failure to comply could result in death or serious injury.

Quantity: 1

Decal No. 84575896



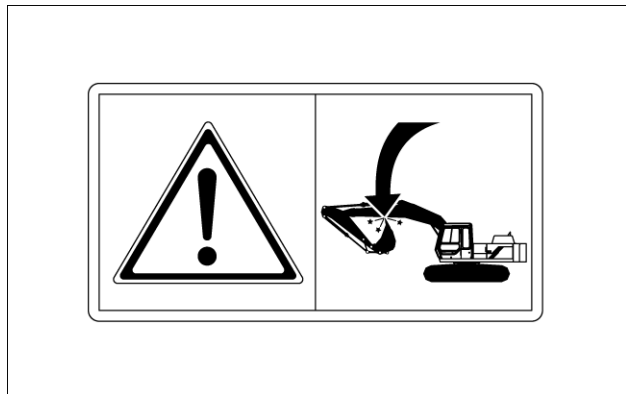
F20002N 17

15 - Working equipment movement decal

This decal indicates that the operator must be careful while moving the working attachment. Failure to comply could result in death or serious injury.

Quantity: 1

Decal No. 71433089



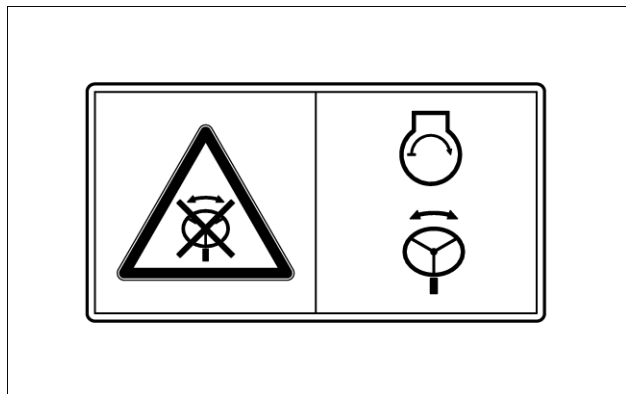
F42704 18

16 - Steering risk decal

This decal refers only to the use of the steering. The steering works only when the engine is running, refer to the Operator's Manual.

Quantity: 1

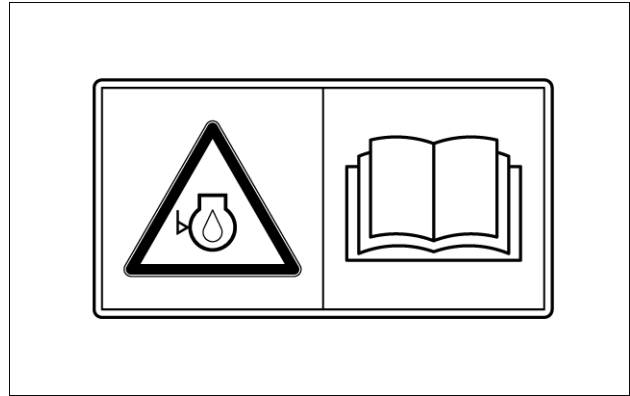
Decal No. 3015604



F33983 19

17 - Oil level decal

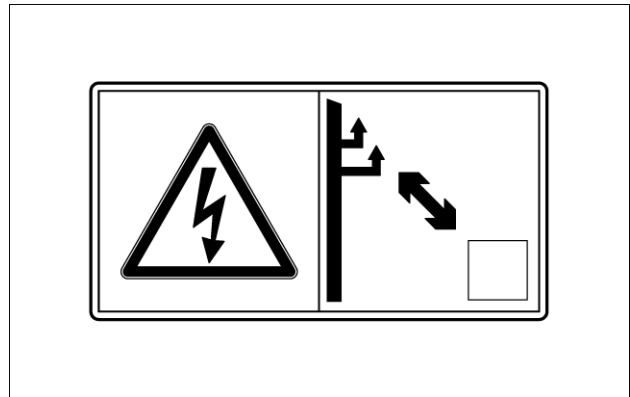
Check the oil level in the engine before setting the machine into operation.
 Quantity: 1
 Decal No. 3015600



F33984 20

18 - Danger electric current decal

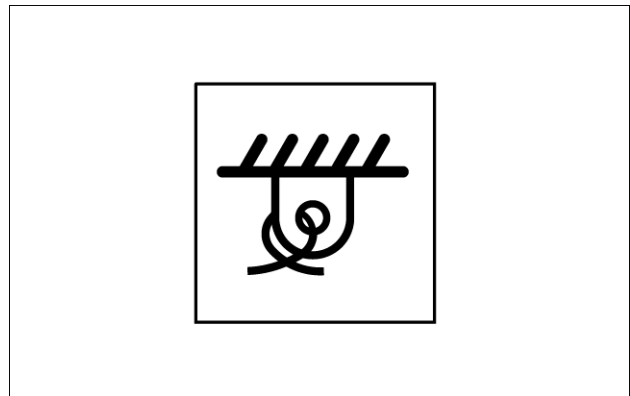
Danger electric current
 Risk of injury from electric current. Keep the following distances from live wires:
 up to **1000 V = 1 m (3.3 ft)**,
 from **1000 - 110000 V = 3 m (9.8 ft)**,
 from **110000 - 220000 V = 4 m (13.1 ft)**,
 from **220000 - 380000 V = 5 m (16.4 ft)**,
 unknown voltage = **5 m (16.4 ft)**.
 Quantity: 1
 Decal No. 3016649



F33982 21

19 - Lashing point decal

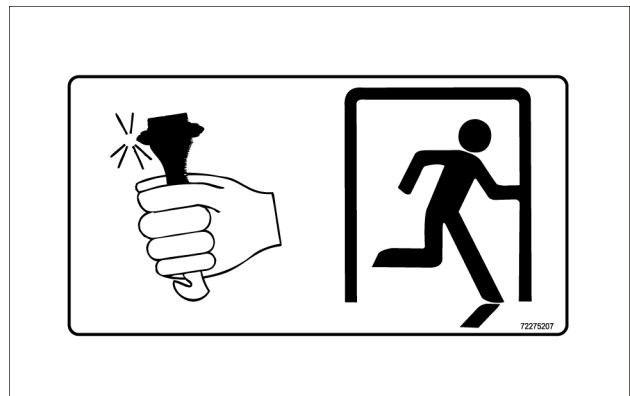
Fastening means must be attached here when the machine is to be transported.
 A = Without blade and stabilizer
 B = With stabilizer
 C = With blade
 Quantity: 4
 Decal No. 1288789



F30704 22

20 - Break the glass to exit

In case of emergency with the cab door locked, break the glass to exit.
 Located on rear window.
 Quantity: 1
 Decal No. 72275207



F47086 23

Rear view mirror ENSURING VISIBILITY

⚠ WARNING

**Avoid injury and/or machine damage!
Keep the mirrors clean and properly adjusted.
Failure to comply could result in death or serious injury.**

W1078A

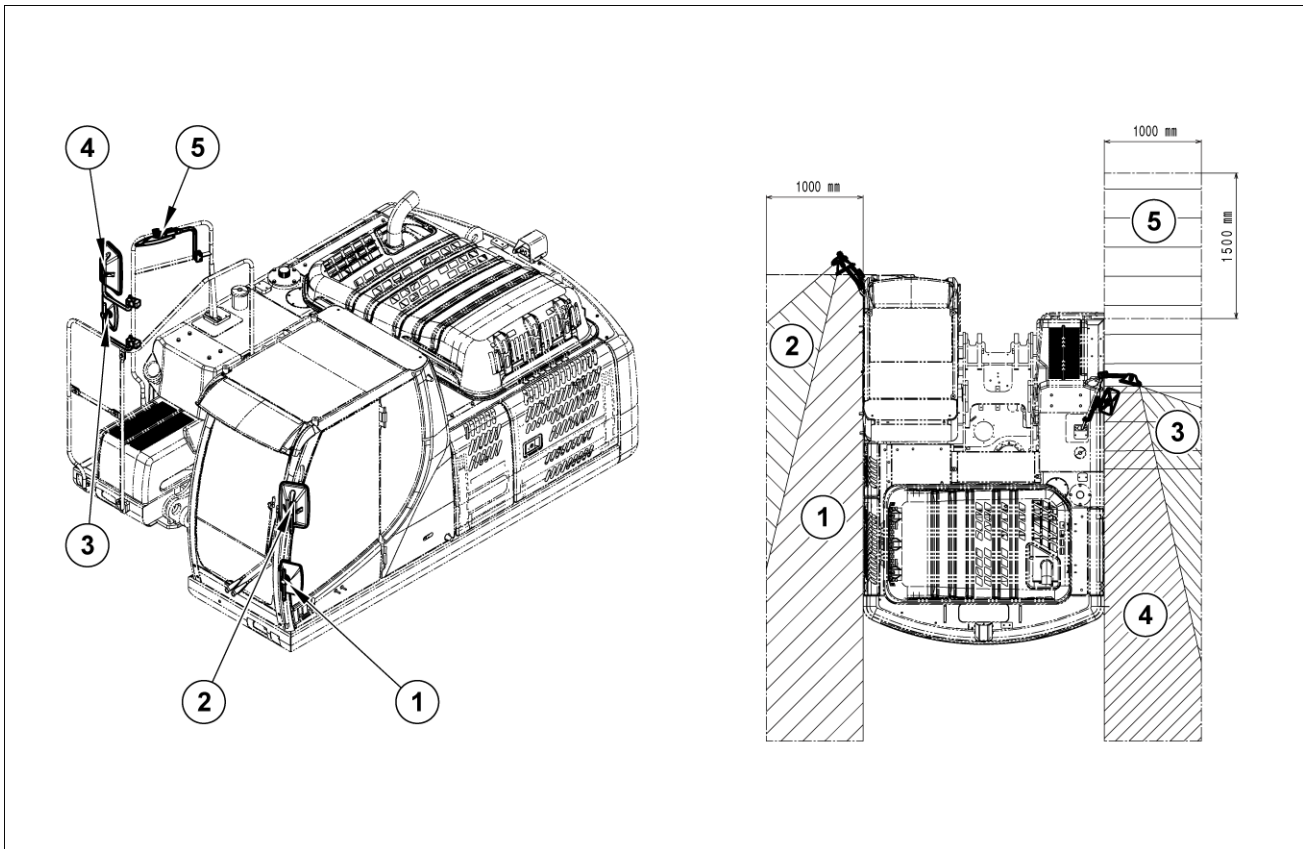
This machine is equipped with mirror and so on to ensure sufficient visibility, but there are areas where are outside the field of vision from the operator. Pay special attention to the invisible area and operate the machine. When traveling and working in poor visibility area, there is a possibility of injuries and accidents resulting in death because it is hard for operator to see the conditions of obstructions and the work area around the machine.

Follow the followings when travelling and working in poor visibility area.

- When right visibility is poor due to attachment, raise the attachment to ensure visibility.

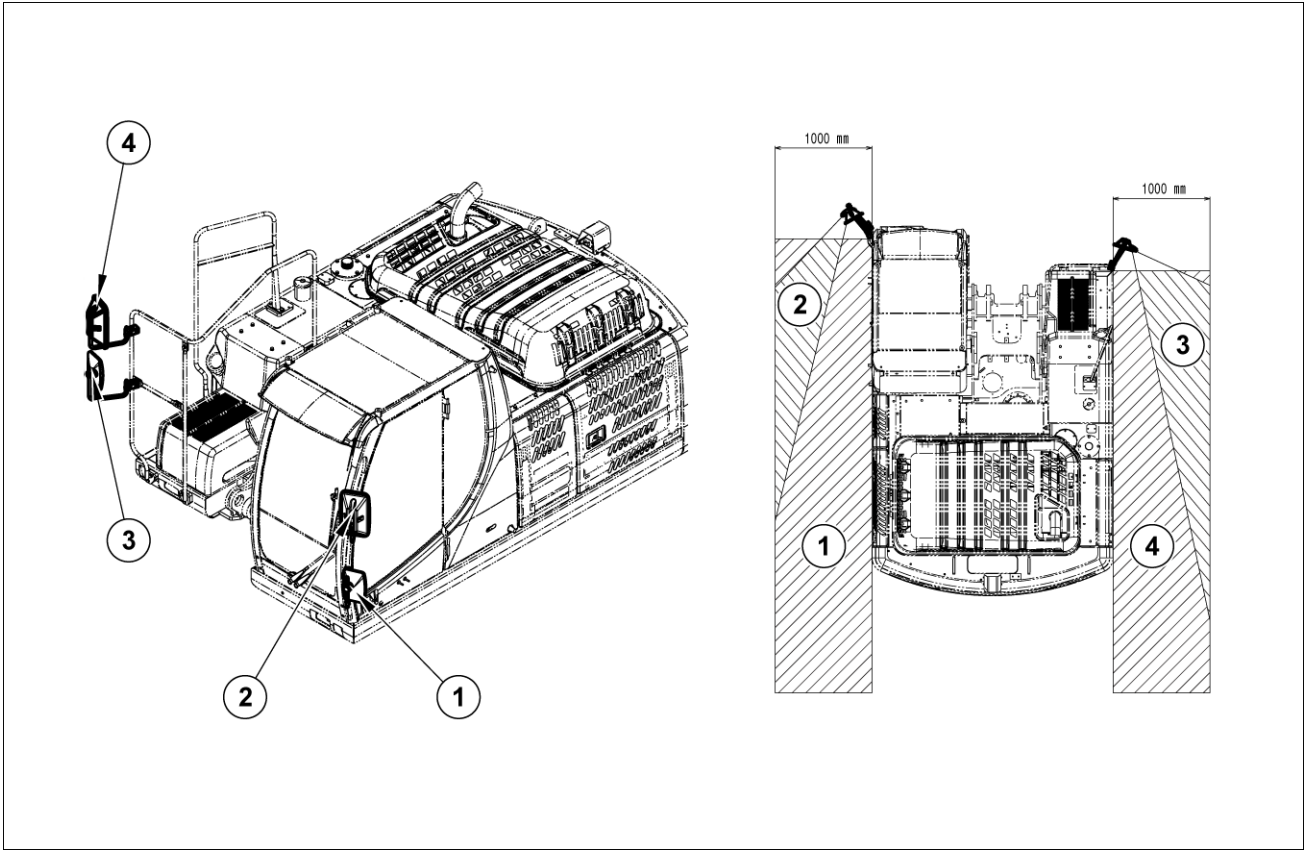
- Clean and adjust mirror at the pre-start inspection to ensure the visibility.
- When rearward visibility monitoring camera (where fitted) is equipped with, clean the lens for clear vision.
- When the visibility can not be ensured sufficiently, provide a flagman in the working areas. Follow the instructions of flagman and pay attention to the signal.
- The signal shall be given by one flagman.
- When working in dark places, turn on the work light. And if required, provide additional lighting facilities to ensure good visibility.
- Stop working when it is impossible to ensure the visual field due to fog, snow or rain.

NOTE: In the following illustrations are shown the mirrors of the machins and their relevant zones of visibility. Check and adjust the mirrors when necessary.



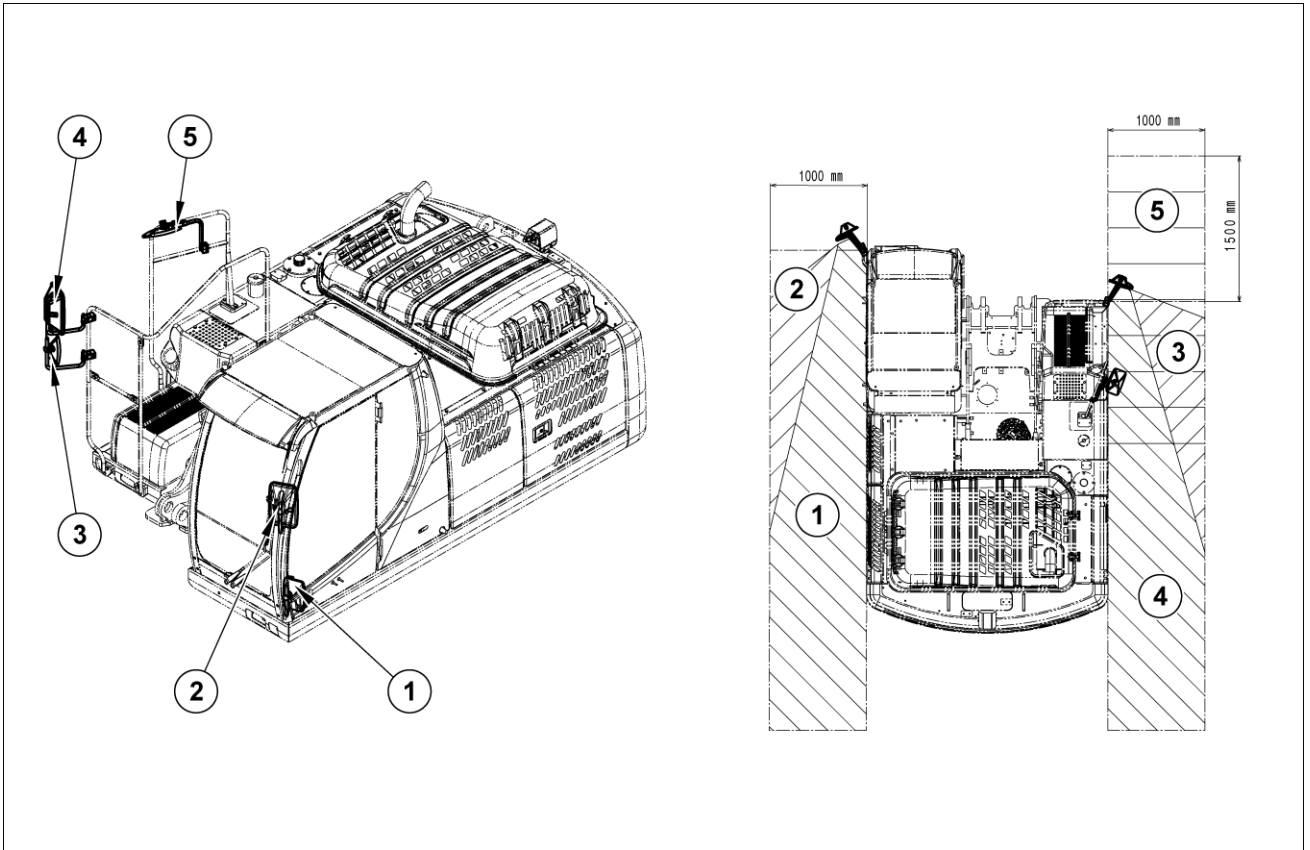
N00909_1 1

WX168 Monoboom Version



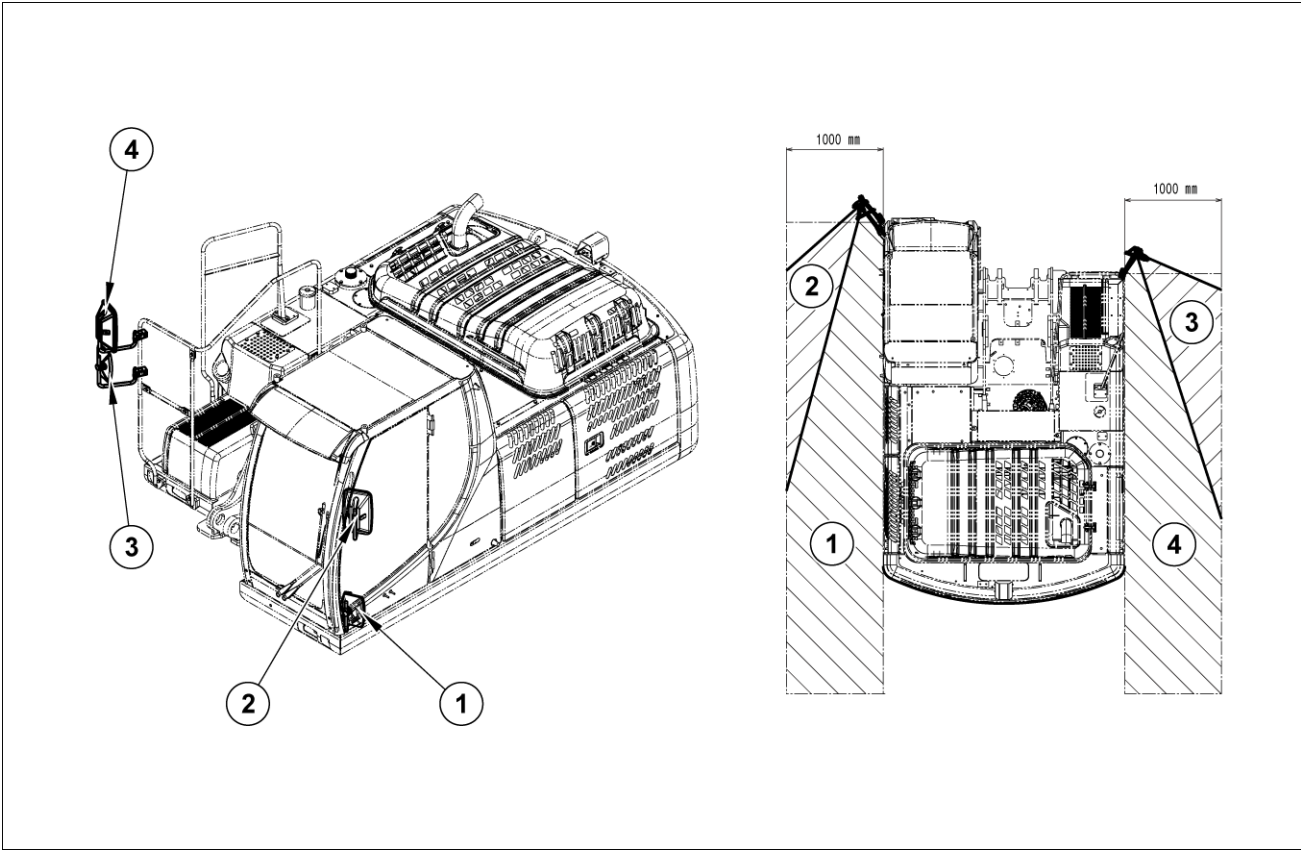
N00911_1 2

WX168 Triple Articulation Version



N00908_1 3

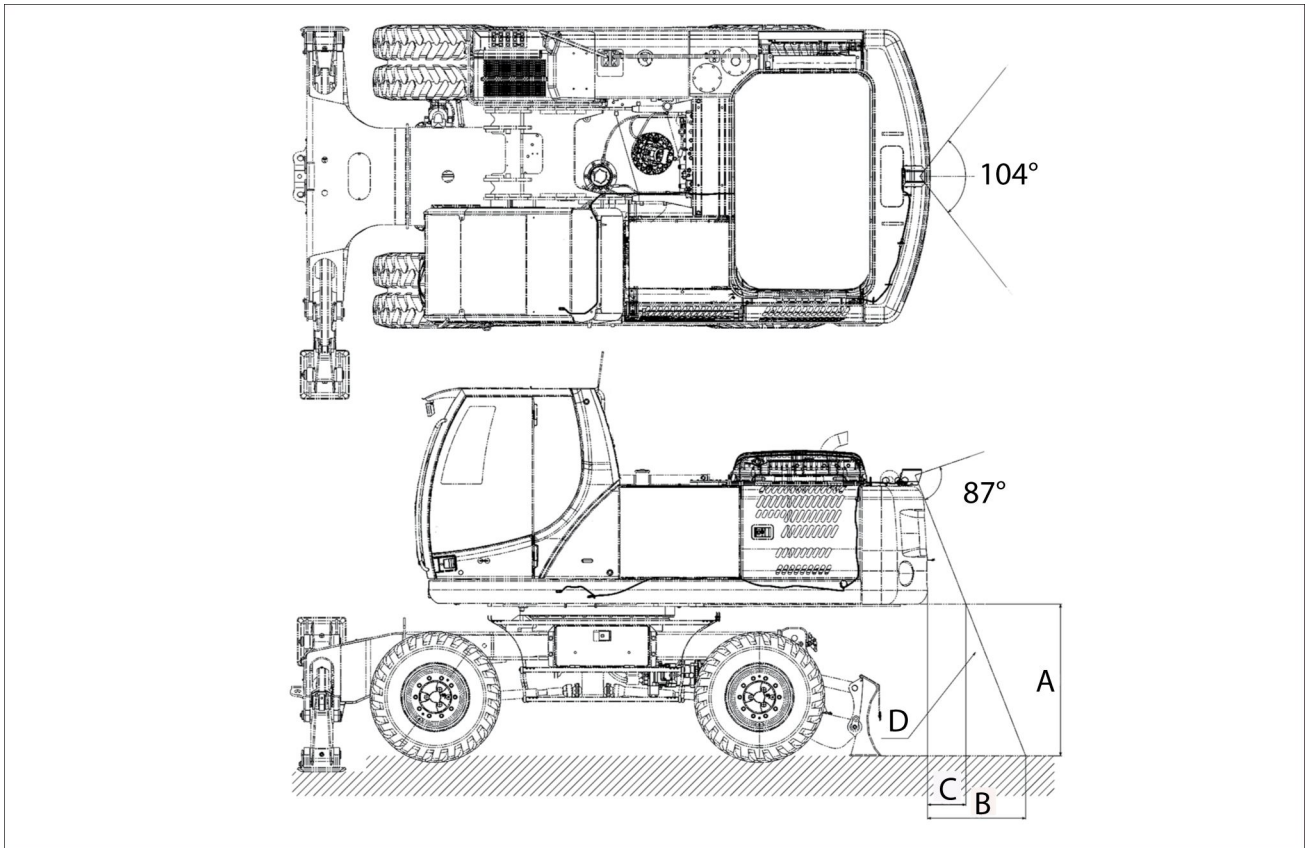
WX188 Monoboom Version



N00910_1 4

WX188Triple Articulation Version

Camera - Personal safety



F00370N_1 1

ATTENTION: do not disassemble and modify the rear view camera. Do not wash the rear view camera with high pressure water.

In order to avoid collisions with other workers or neighboring equipment not visible from the operator's seat, a rear view camera is installed on the counterweight. The rear view appears on the upper area of the instrument cluster screen.

VIEW ANGLES:

Horizontal view angle: **104 °**.

Vertical view angle: **87 °**.

The operator cannot monitor the entire area of the machine rear side with the rear view camera. There is a blind area due to the angle view of the camera.

VIEWING DIMENSIONS OF BLIND AREA (D)

(A) 1287 mm

(B) 833 mm

(C) 327 mm

3 - CONTROLS/INSTRUMENTS

ACCESS TO OPERATOR'S PLATFORM

Cab

CAB

▲ WARNING

Fall hazard!
Clean the steps and access handles to remove all traces of grease, oil, mud, and ice (in winter).
Failure to comply could result in death or serious injury.

W0139A

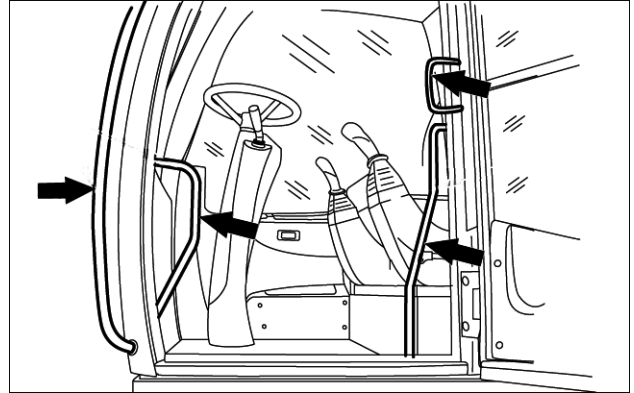
▲ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

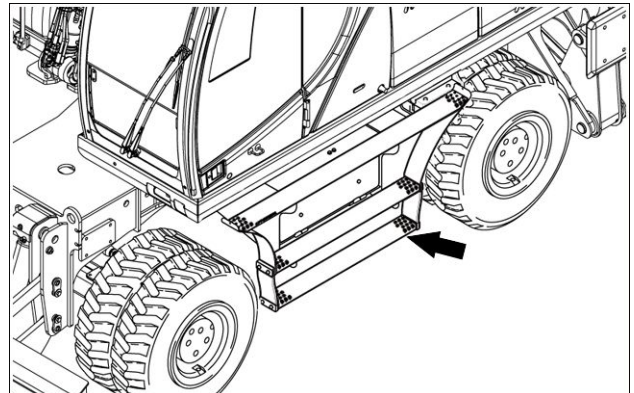
W0141A

Before getting on the machine:

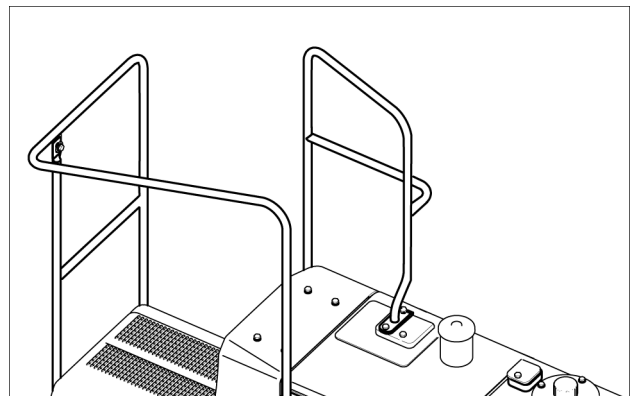
- Keep the access to the machine clear of foreign objects and clean. Remove grease or mud from steps and handrails to minimize the risk of slipping.
- Check that the fasteners of steps and handrails are tightened and undamaged.
- Always face the machine and maintain a three point contact with the steps and handrails.



F44029N1 1



F00800N 2

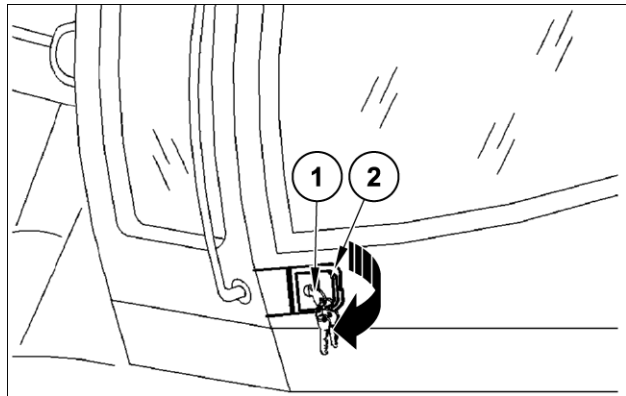


N00399_1 3

DOOR OPENING

1. OPENING THE DOOR FROM OUTSIDE

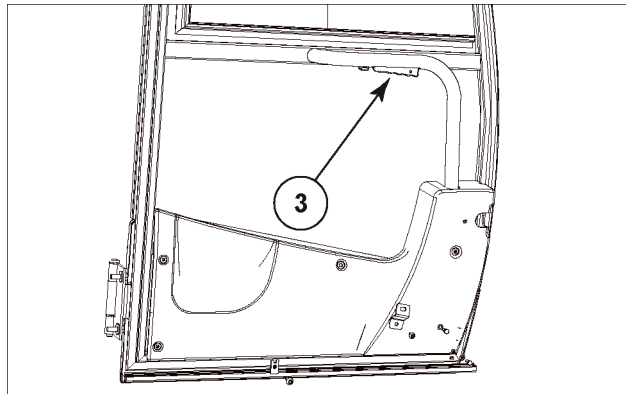
Unlock the door with key (1).
Withdraw the flap (2) on the door lock.
The door can now be opened.
Fully opened, the door can be locked into place.



F34029_1 4

2. OPENING THE DOOR FROM INSIDE

To open the door from inside, push lever (3) by the hand.



F00210N3 5

DOOR CLOSING

Unlock the opened, locked-in door by pushing down the lever (1). Grab the handle (2) on the upper side of the door frame and close the door.

⚠ CAUTION

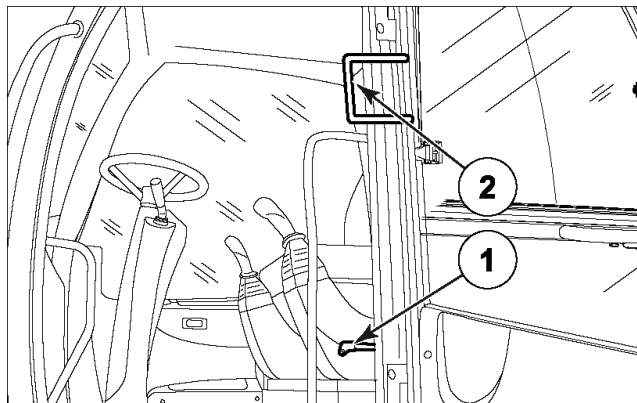
Pinch hazard!
Be careful not to get your hand, clothes, etc. caught in the door when closing it.
Failure to comply could result in minor or moderate injury.

C0046A

⚠ WARNING

Fall hazard!
Always lock the cab doors in the full open or full closed position before using the handrails on the doors.
Failure to comply could result in death or serious injury.

W0133A



F44045N3 6

⚠ WARNING

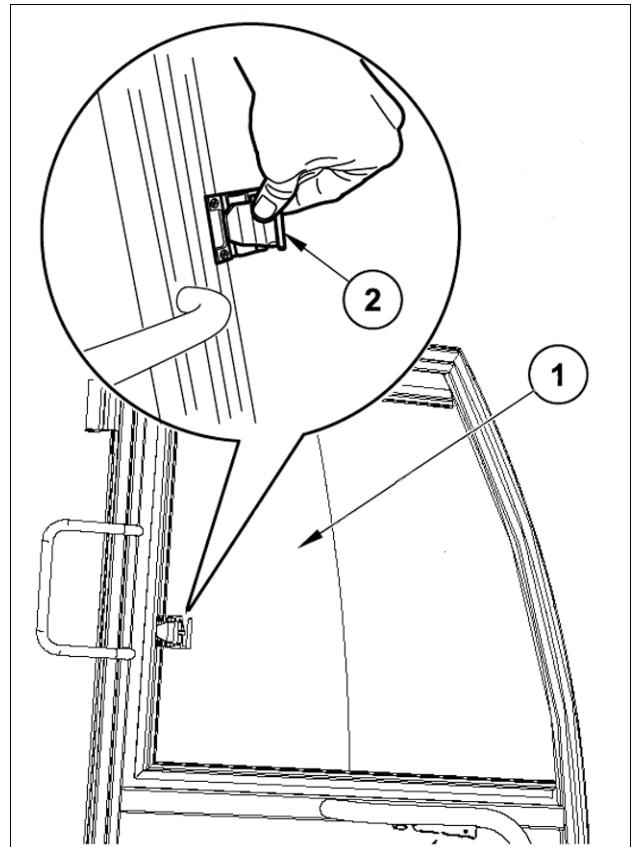
Moving parts!
Make sure all entry and mechanical access doors are properly closed before operating the machine.
Failure to comply could result in death or serious injury.

W0238A

SIDE WINDOW

Loosen the locking device (2) and move the glass (1) forward.

To close the glass (1), pull it backward until the locking device locks.



F00211N2 7

FRONT WINDOW

The front window can slide in the back of the cabin under the roof.

Roll up the sun blind.

Bring the windscreen wiper to basic position (fully to the left). Grab both handles (2) at the front window (left and right side) and push lock levers (1) forwards.

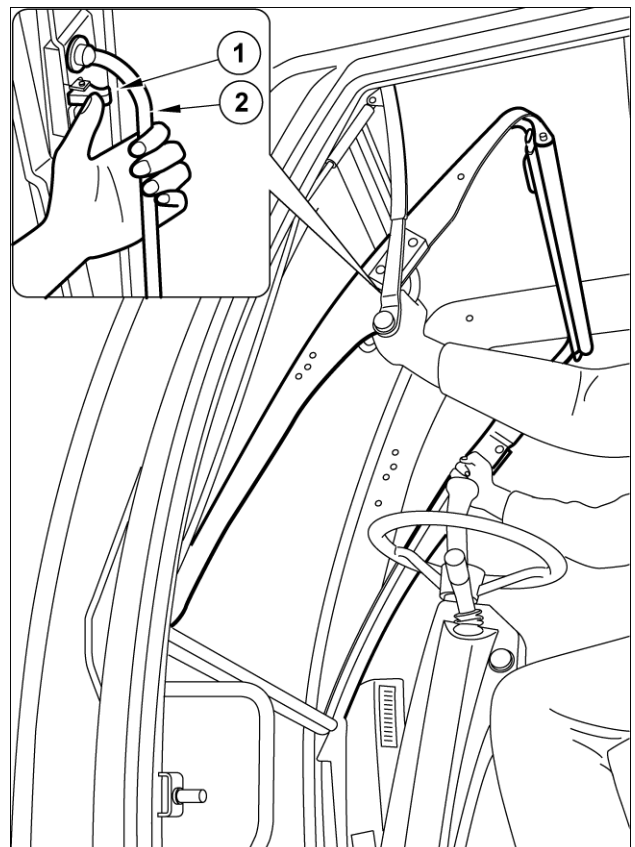
Tilt front window inwards and slide back upwards to the stop.

Release the locks (1). They lock the window.

Make sure that both locks are properly engaged.

To close the front window, grab both handles (2) and pull forward the front window until the locking levers (1) locks it.

The lower segment of the front window, can be removed when necessary.



F00903N 8

THE LOWER SEGMENT OF THE FRONT WINDOW

NOTE: The lower segment of the front window can be removed or mounted only with front window in open position, under the roof.

The lower segment of the front window can be removed in the following manner:

Open the front window as described.

Remove the glass upward.

Close the front window.

Store the glass in the clamps (1) located on the front window and lock it by means of the brackets (2).

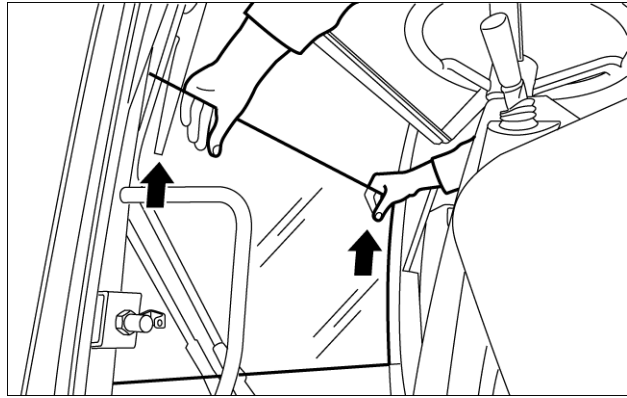
Installation of lower window.

Move the brackets (2) and remove the glass from the clamps (1)

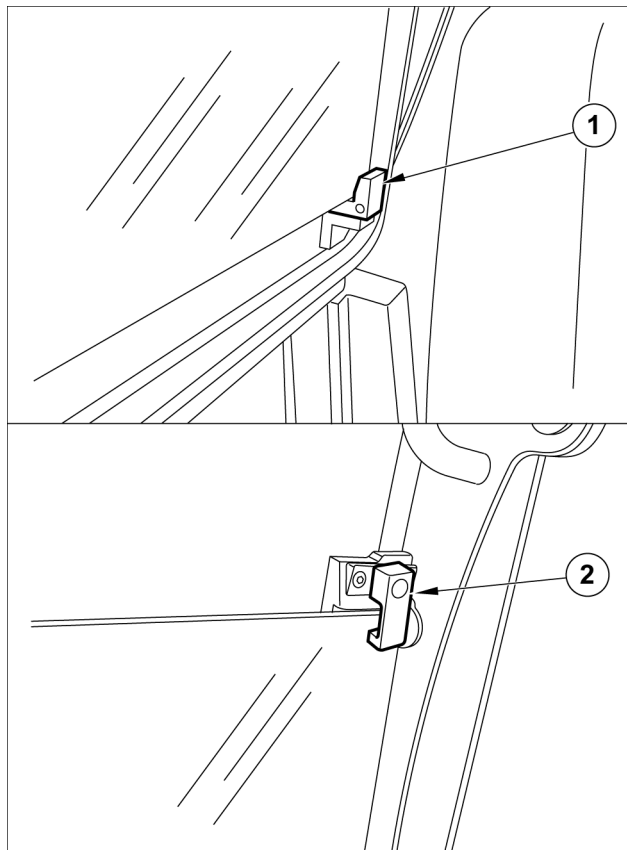
Open the front window as described.

Insert the glass in its seat.

Close the front window.



F00904N 9



F00905N 10

SUN BLIND

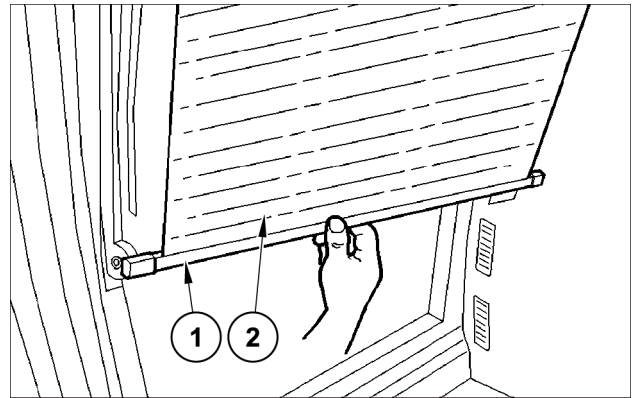
The sun blind is fitted in a holder above the front window. It can be placed in front of the front window or in front of the roof window.

Rolling out the sun blind

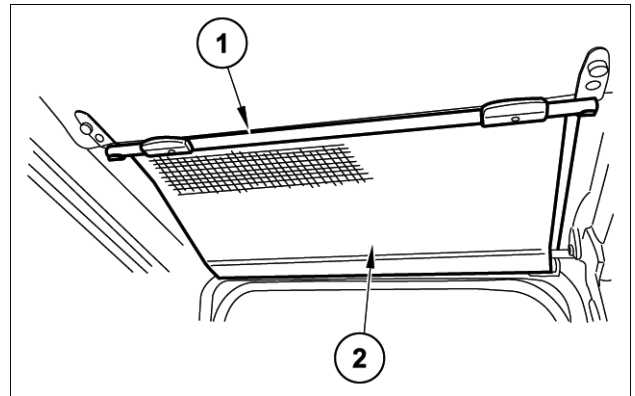
Grab the end of the sun blind (1), roll out against spring action (2) and engage in the holders.

Rolling in the sun blind

Take the end of the blind (1), detach from holders (3) and let it be pulled in (2) slowly by the spring. Do not let go the unrolled sun blind (2), but take it its closed position. Otherwise, the device could be damaged.



F34041N 11



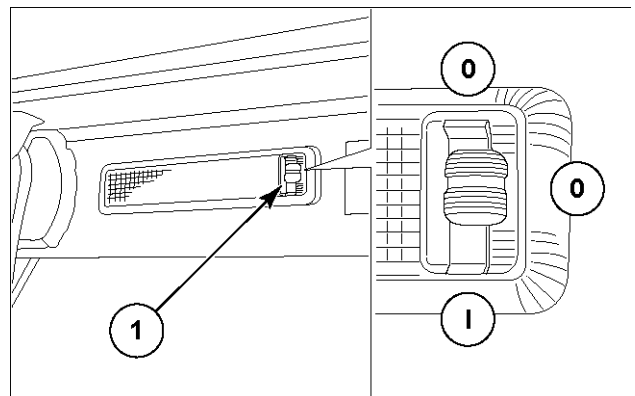
F34042N 12

CAB LIGHTING

The cab interior lighting is switched on and off with the switch (1).

The lighting can be switched on only if the starter switch key has been pulled into the cylinder in I or ON positions.

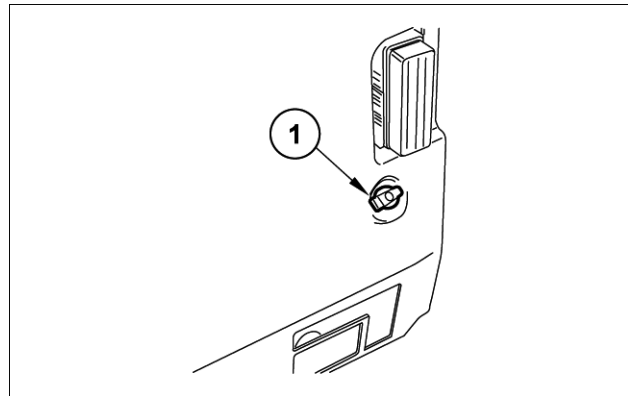
- 0 = Off position
- I = On position



F00338N1 13

AUXILIARY SOCKET

A socket outlet (1) is installed in the panelling on the right behind the operator's seat. This provides the output voltage transformer (12 V) for connection of the cool-box (option). Other electrical consumers can also be connected as long as the maximum output is of 90 W.

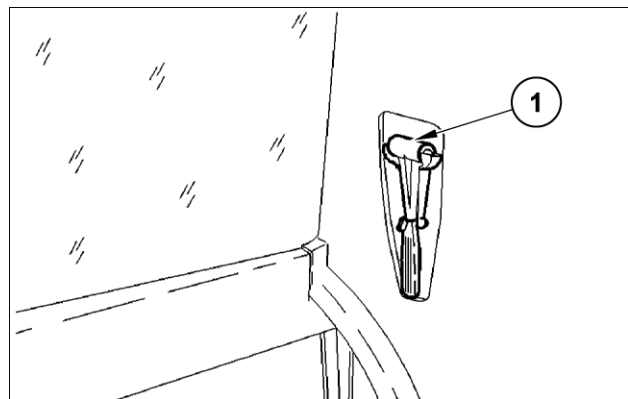


F34044N 14

EMERGENCY EXIT

Use the rear window as an emergency exit, if the cab door cannot be opened after it has been damaged (e.g. in case of an accident).

To break the glass panes in case of danger, use the little hammer (1) on the rear wall behind the operator's seat on the left.

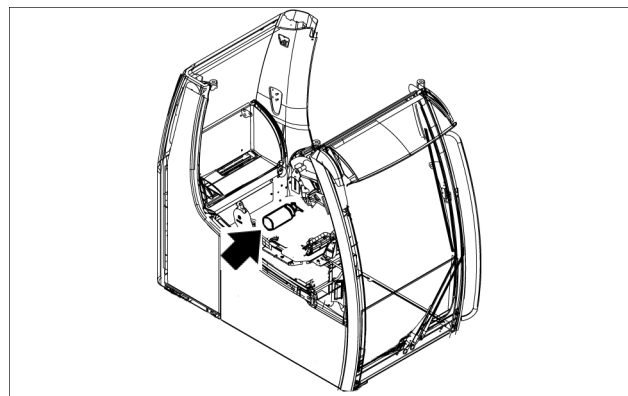


F34033_1 15

Fire extinguisher (option)

The fire extinguisher (3 kg powder extinguisher) can be mounted inside the cab, behind the operator's seat. It is intended to enable the operator to safely leave the cab in the event of a fire.

Have the fire extinguisher checked at the specified times by an authorized workshop.



F00500N 16

OPERATOR'S SEAT

Operator's seat

OPERATOR'S SEAT

To operate the machine correctly with maximum efficiency and comfort, the seat should be correctly adjusted to suit the weight and height of the operator.

⚠ WARNING

Loss of control hazard!

DO NOT make seat adjustments while the machine is in motion. All seat adjustment should be made with the machine stationary and the parking brake applied.

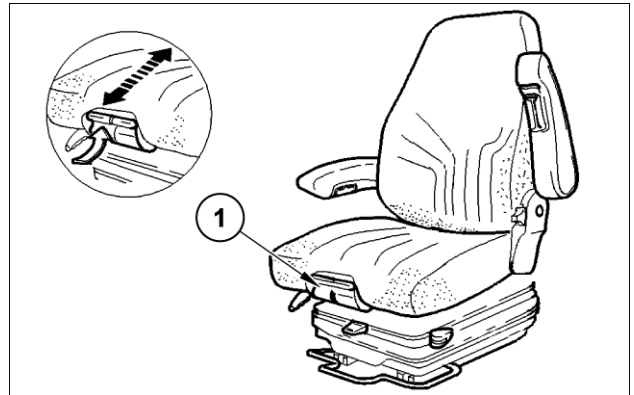
Failure to comply could result in death or serious injury.

W0293A

OPERATOR'S SEAT WITH PNEUMATIC SUSPENSION

ADJUSTING THE SEAT CUSHION HEIGHT

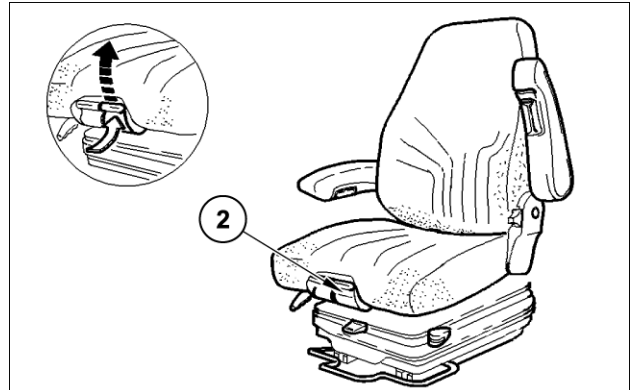
Pull handle (1) at front edge of seat upwards, adjust seat cushion, engage handle (1). Adjustment 4 steps of 15 mm (0.6 in).



F44035 1

ADJUSTING THE SEAT CUSHION ANGLE

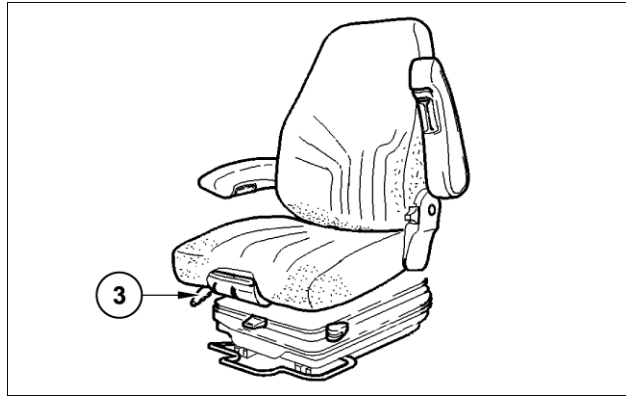
Pull handle (2) at front edge of seat upwards, adjust seat cushion, engage handle (2). Adjustment range -3 ° / +5 ° (increments of 2.5 °).



F44034 2

FORE-AND-AFT ADJUSTMENT OF SEAT WITHOUT CONSOLES

Pull locking lever **(3)** upwards, shift seat to required position and release locking lever.



F34058 3

ADJUSTING THE SUSPENSION/SEAT HEIGHT (only with key switch in "I" position)

1. Suspension
The operator's weight should be adjusted upwards with the machine stationary and the seat loaded by brief actuation of the handle **(4)**. The suspension is adapted automatically to the operator's body weight.
2. Seat height
Pull handle **(4)** upwards or downwards until the seat **(6)** has reached the required height. Release the handle **(4)**.



F34059 4

FORE-AND-AFT ADJUSTMENT OF SEAT WITH CONSOLES

Pull bracket **(5)** upwards, shift seat and engage bracket.



F34060 5

FOLD-BACK ARMRESTS

The armrests **(7)** can be folded upwards for entering and leaving the seat.

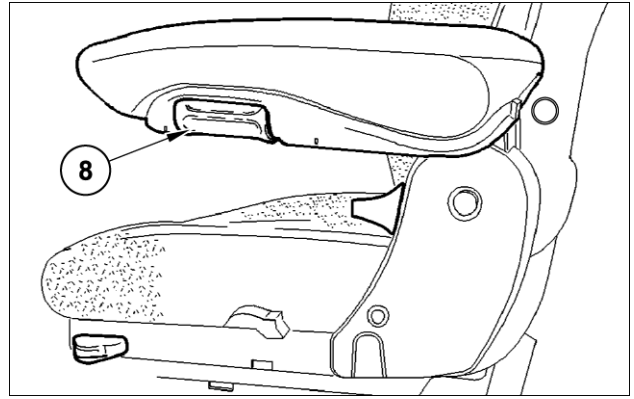


F34061 6

ARMRESTS ANGLE

The angle of the slope can be changed in the lowest position irrespective of the backrest angle, using the integrated hand wheel (9).

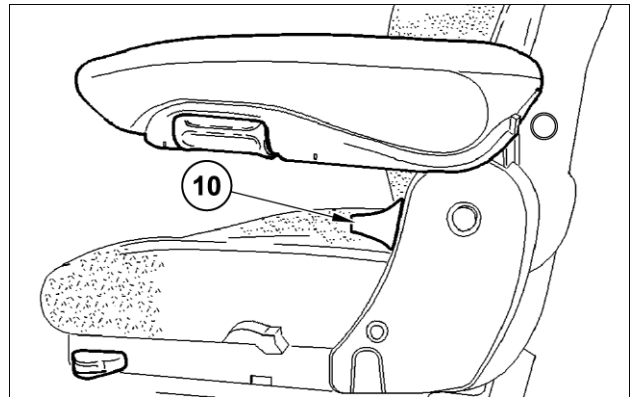
Adjustment range **+10 ° / -30 °**.



F44036 7

BACKREST ADJUSTMENT

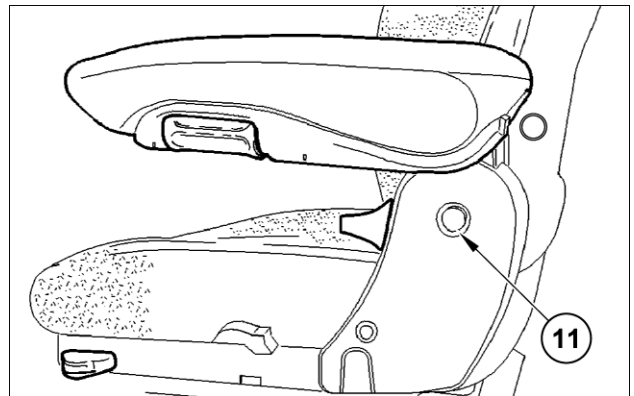
Sit down on seat and lean lightly against the backrest. Pull locking lever (10) upwards. Bring backrest to required position by pressing back or leaning forward, release locking lever. Release the locking lever.



F44038 8

ADJUSTING THE ARMREST HEIGHT

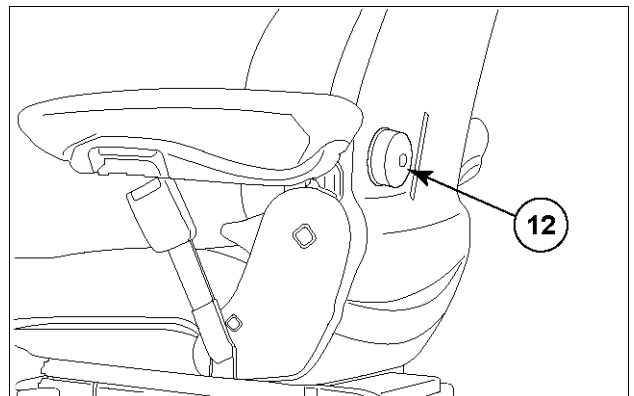
Remove plastic cap (11), slacken nut (size 13 mm (0.5 in)), adjust to required height, tighten nut, fit plastic cap.



F44039 9

ADJUSTING THE MECHANICAL LUMBAR SUPPORT

Adjusting the mechanical lumbar support with the hand wheel (12).



F44040N2 10

SEAT HEATING

Two electric heating elements (seat and backrest) are installed in the operator's seat.

The maximum heating capacity is preset. The temperature is thermostat-controlled.

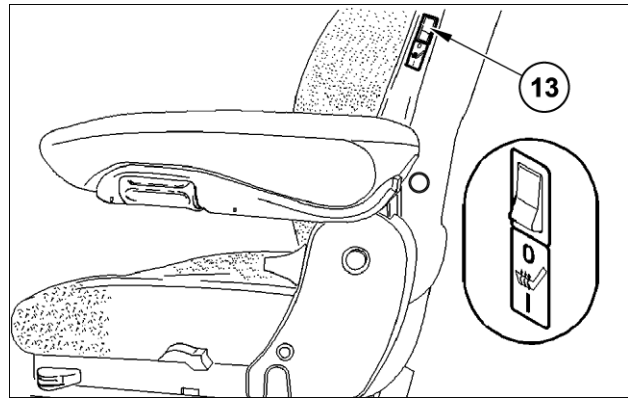
Switching on and off

By means of a switch (13).

"0": heating OFF

"I": heating ON

The seat heating can be switched on only if the starter switch key is set to position "I" (Ignition ON).



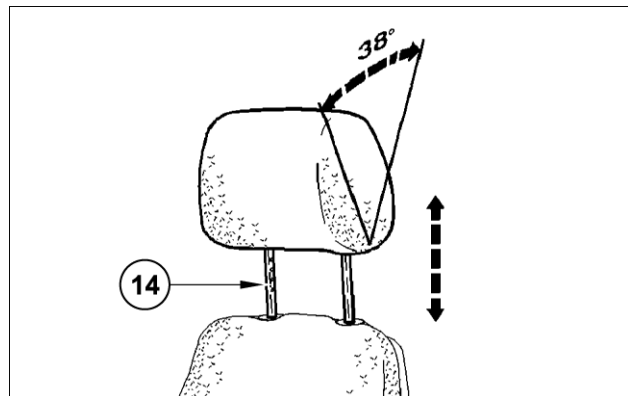
F44041 11

BACKREST EXTENSION (OPTIONAL) (HEAD SUPPORT)

The backrest extension can be suited individually in height, by pulling the same out (14) up to stroke end by means of a toothed rod.

Adjustment range: 100 mm (3.94 in) in 7 places.

To remove the backrest extension, override the resistance of the stroke end with a light pull.



F34068 12

Seat belt

⚠ WARNING

Roll-over hazard!

Securely fasten the seat belt. Your machine is equipped with a Roll-Over Protective Structure (ROPS) cab for your protection. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Failure to comply could result in death or serious injury.

W0376A

Check periodically the seat belt and all its securing elements. If you notice that the seat belt and its securing elements are damaged or some of them missing, perform immediately repair or replacement of parts. Seat belts damaged or worn because of an accident, they have to be replaced.

The seat belt buckle must not be clogged, for instance from paper or other objects, otherwise the hooking tongue does not lock. Never fasten your seat belt over hard or fragile objects, such as bunches of keys or glasses inside your pockets. In this way your body could get injured in case of accident. The operator's seat is fitted with a lap-type seat belt. The belt tensioning roller is incorporated on the left side of the seat.

FASTEN SEAT BELT

Insert the hooking tongue (2) in the buckle (1). Pull the tongue against the buckle to check if the seat belt is well secured.

The belt should not be entangled or rolled.

RELEASE SEAT BELT

Press the lock (3) of the buckle (1) and take out the hooking tongue.

The belt rolls in automatically.

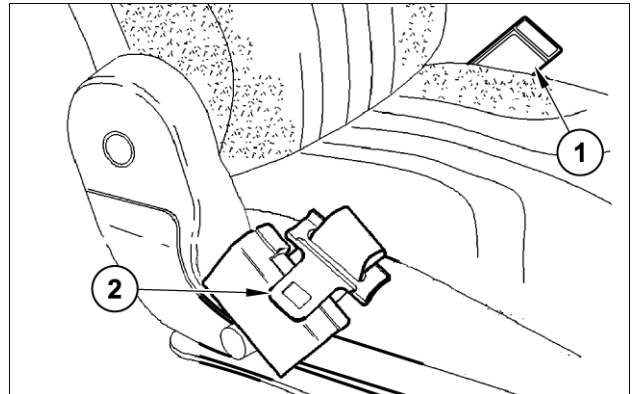
⚠ WARNING

Equipment failure could cause accident or injury!

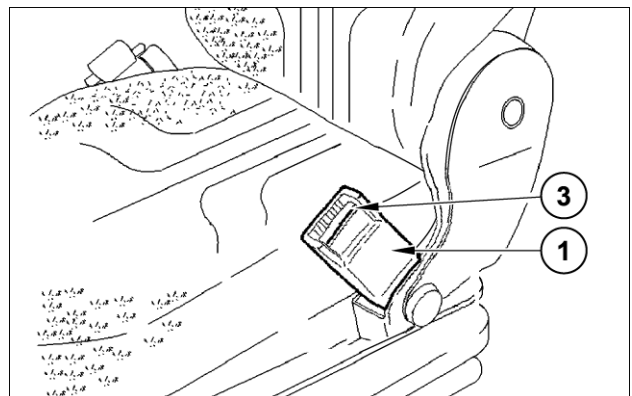
Always fasten seat belt securely before operating the machine. Inspect seat belt parts for wear and/or damage. To ensure operator safety, replace any and all damaged parts of the seat belt prior to operation.

Failure to comply could result in death or serious injury.

W0046A



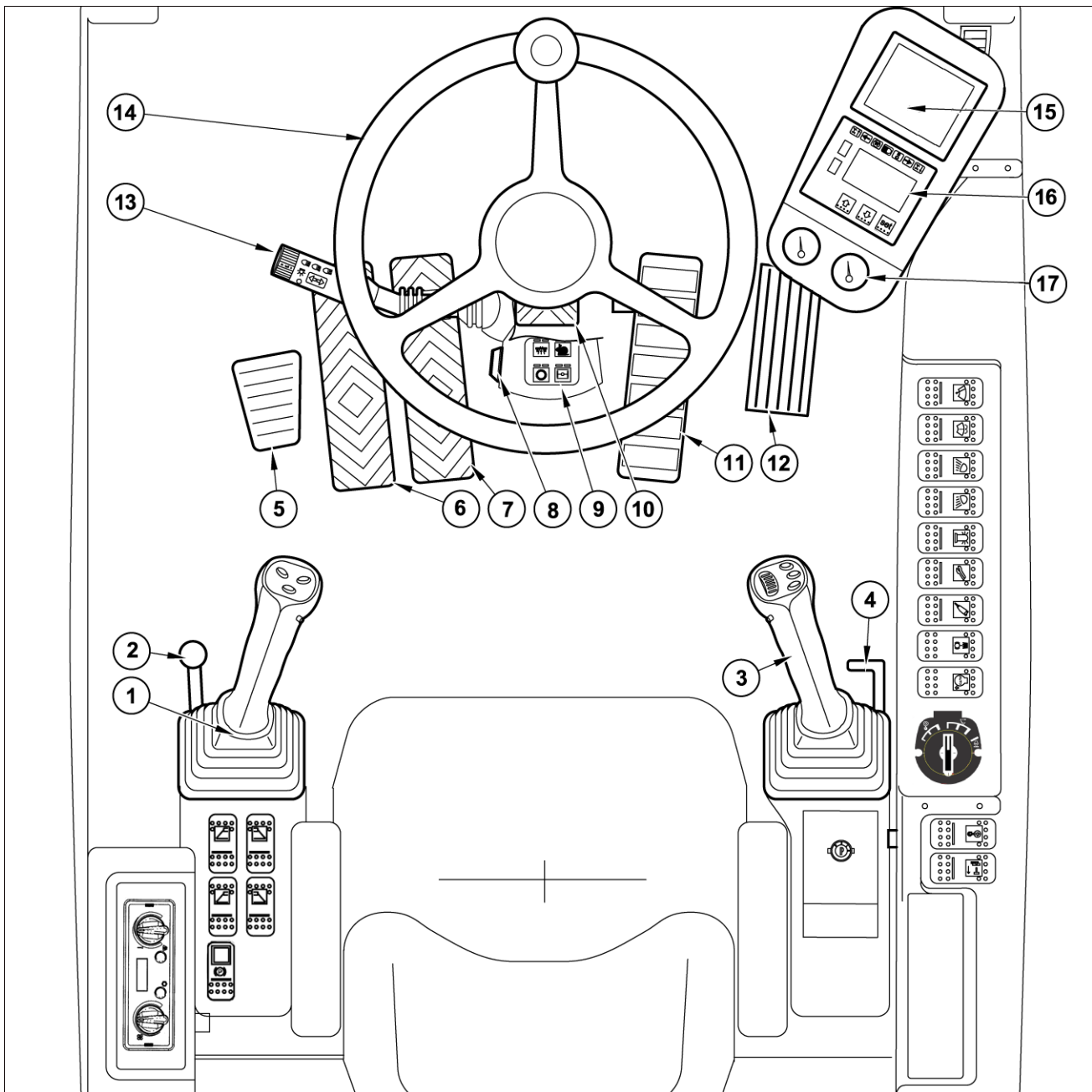
F44042 1



F44043 2

FORWARD CONTROLS

Console Front console - Localisation overview



F00204N3 1

- | | |
|--|--|
| 1. Left control lever | 10. Adjusting tilt steering column |
| 2. Safety lever | 11. Service brake pedal |
| 3. Right control lever | 12. Travel pedal |
| 4. Upper structure holding lock | 13. Turn lever, horn and Travel light switch |
| 5. Footrest | 14. Steering wheel |
| 6. Additional pedal | 15. CCTV Monitor |
| 7. Pedal extension/retraction adjusting cylinder | 16. Multi function display |
| 8. Warning light push button | 17. Analogue gauges |
| 9. Key pad module | |

Left control lever

NOTE: When the control lever is released, it returns automatically to the neutral position and the associated work function stops

The left control lever activates the following operations:

1. Swing right
2. Swing left
3. Arm roll-out
4. Arm roll-in

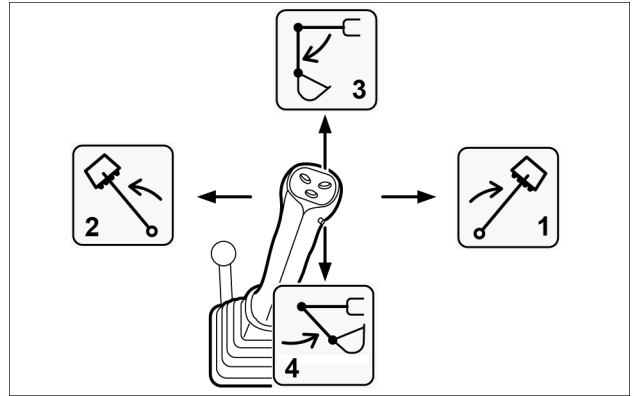
Three buttons are located on top of the left control lever handle.

Two buttons are located behind of the left control lever handle.

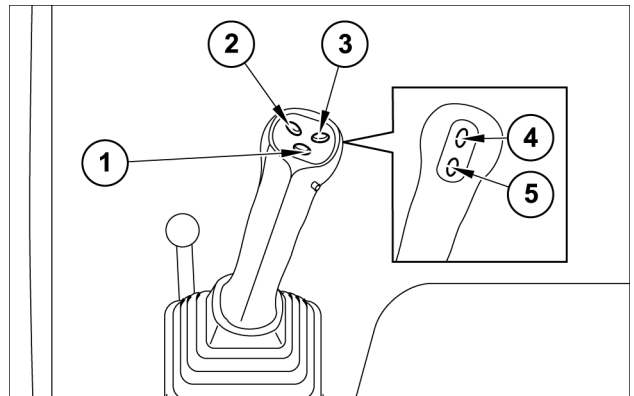
One slider is located on top of the left control lever handle when the machine is provided with Low flow system.

These buttons activate the following operations:

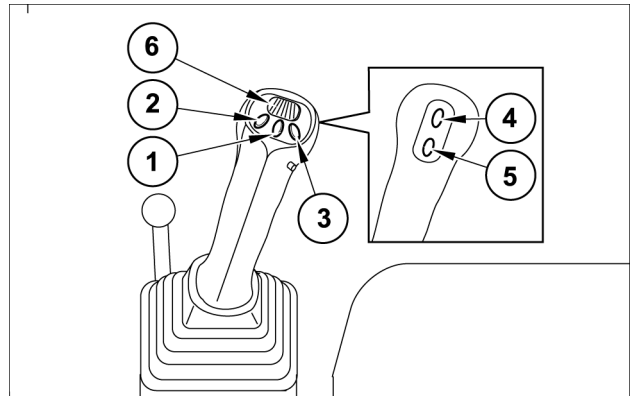
1. Horn
2. No function
3. Leveling
4. Clamshell rotation attachment - rotation left (opt.)
5. Hydraulic hammer (opt.)
6. Slider - Low flow system (opt.)



F00805N1 2



F00090N 3

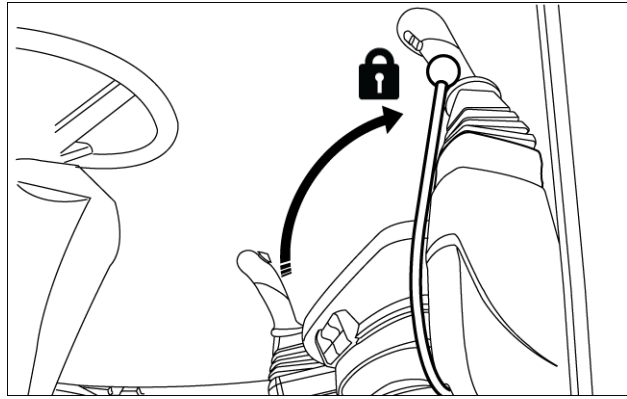


F44209N 4

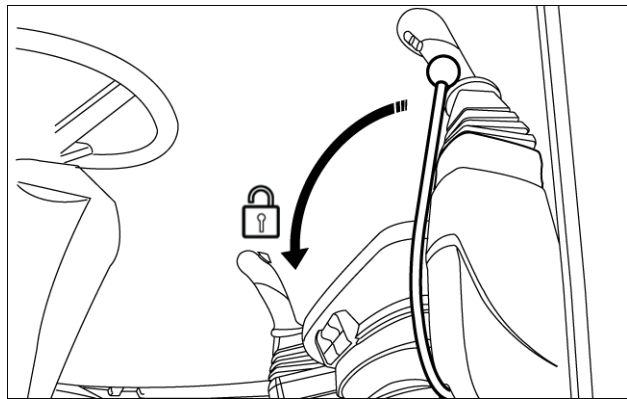
Safety lever

The safety lever is used to disable travel and swing controls and the attachment movements. It has two positions:

- **LOCK**: with the machine stationary and the engine running or stopped, it prevents the possibility of machine unexpected movements if the control levers/pedals are accidentally moved
- **UNLOCK**: the safety lever enables the operation of all controls. Therefore, to control and operate the machine, the lever should be moved to this position



F44061_1 5



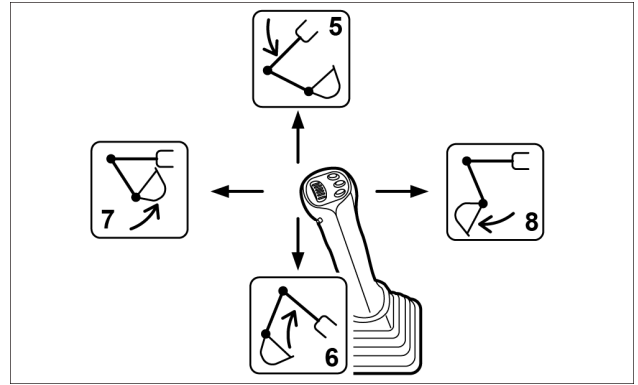
F44059_1 6

Right control lever

NOTE: When the control lever is released, it returns automatically to the neutral position and the associated work function stops

The right control lever activates the following operations:

5. Boom Lower
6. Boom Raise
7. Bucket Roll-In
8. Bucket Roll-Out



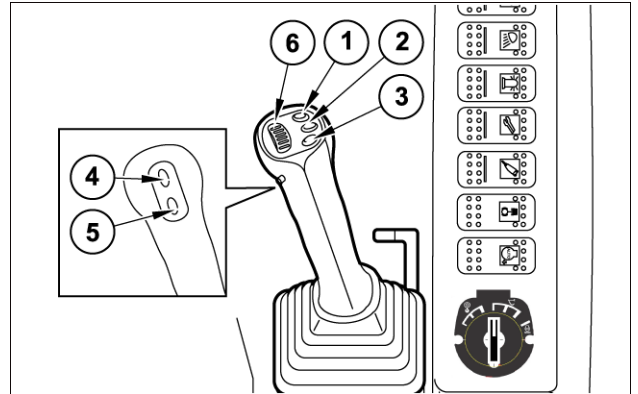
F00806N1 7

Three buttons and one slider are located on top of the right control lever handle.

Two buttons are located behind of the right control lever handle.

These buttons activate the following operations:

1. Travel direction - Forward
2. Travel direction - Neutral
3. Travel direction - Reverse
4. Clamshell rotation attachment - rotation right (opt.)
5. Blade or stabilizers control



F00055N 8

The slider activates following operation:

6. Blade or stabilizers activate

NOTE: The stabilizer and/or blade is raised by pulling in the right control lever towards the bottom and lowered by pushing the slider to the top.

Upper structure holding lock

The Upper structure holding lock is a mechanical lock and has two positions:

- **LOCK** (with padlock icon): it prevents the possibility of the upper structure of machine unexpected swinging if the left control levers is accidentally moved
- **UNLOCK** (with open padlock icon): the upper structure of machine can to swing if the left control lever is moved

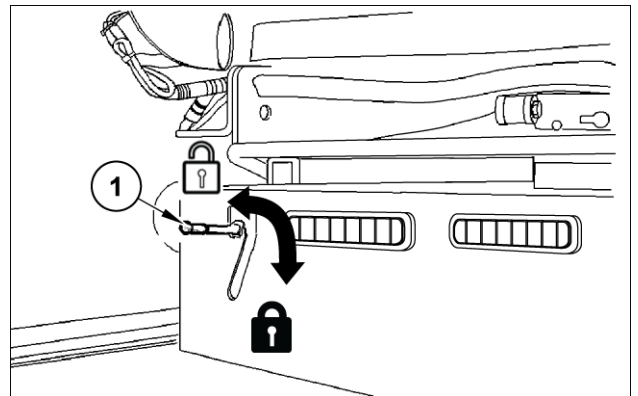
OPERATION

Return the machine to basic position for travel, (see "TRAVEL OFF ROAD AND ON ROAD"), so that the holding pin (2) in the upper structure is set right above the holding bracket (3) on the undercarriage.

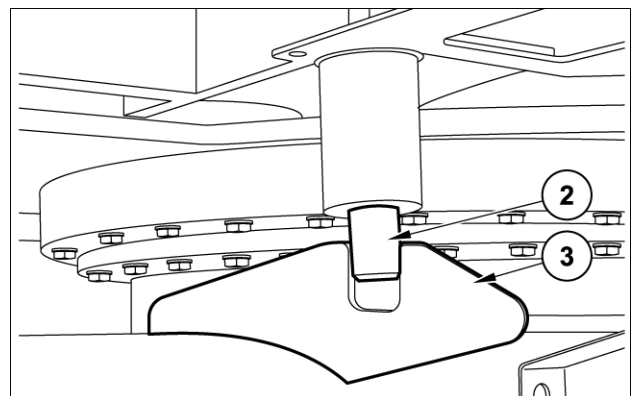
The holding pin (2) is set right above the opening of the undercarriage.

Lift the lever (1) of the pin (2) and move it in down position. The locking pin engages in the opening of the carriage.

If the locking pin cannot be turned at all or only with difficulty, slew the upper structure slowly to the left or to the right. Meanwhile push the locking pin downwards.



F44062_1 9



F44138_1 10

Additional pedal

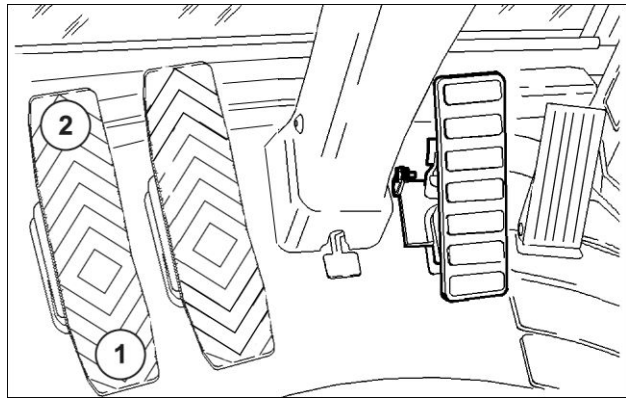
The Additional pedal is used only when there are some optional functions.

Additional pedal is used to control optional equipment such as hydraulic shears or hydraulic hammer.

OPERATION

Hydraulic Shears

- Select the Hydraulic Shears function by depressing switch that show the shears.
To close the shears: press pedal forward **(2)**
- To open the shears: press pedal backward **(1)**



Hydraulic Hammer

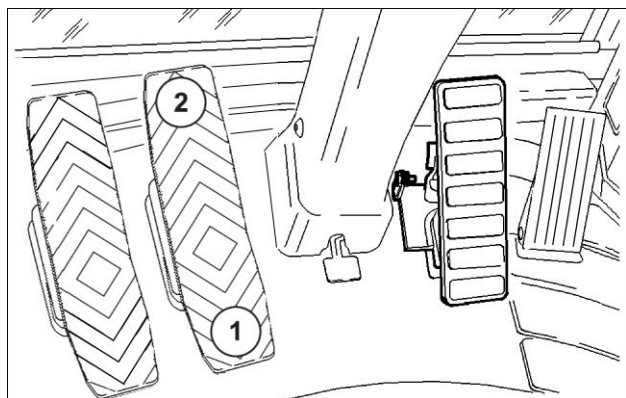
- Select the Hydraulic Hammer function by depressing switch that show the hammer. To operate with hammer: press pedal backward **(1)**

Pedal for extension/retraction of adjusting cylinder

The pedal is used to extend and to retract the adjusting cylinder (triple articulation version).

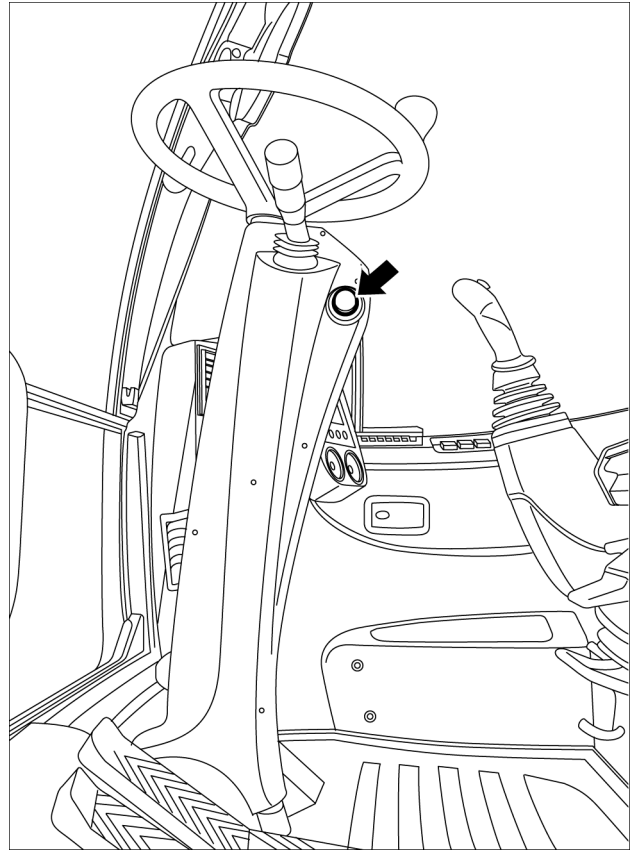
OPERATION

- To extend the adjusting boom: press pedal forward **(2)**
- To retract the adjusting boom: press pedal backward **(1)**



Warning light push button





This button is used to indicate the presence of the machine under specific conditions. When this button is pressed the indicator light button's and the turn signal lights will blink together.

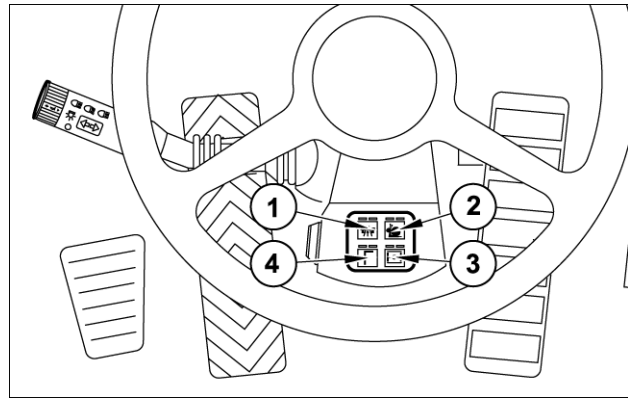


F00906N 13

Key pad module

This key pad module is equipped with 4 buttons:

1.  Road travel push button - By pressing the symbol the right lamp lights up and the road travel mode is engaged.
By pressing the symbol again the right lamp turns off and the road travel mode disengaged. Ensure that the safety lever is placed to lock position and the machine is in standstill.
2.  Creep speed push button - By pressing the symbol (the lamp turns on) the creep speed engages.
By pressing the symbol again (the lamp turns off) the creep speed disengages.
3.  Floating axle blocking push button -
Push-button with two lamps. Both leds indicate the status of the operation mode (manual blocking or automatic)
- Manual blocking mode: both leds are on and the symbol is shown in the display.
- Automatic mode: both leds are off.
4.  Gear shifting push button -
Push-button with two lamps.
- Left lamp light on (**LED1**) shows the first gear engaged in fixed mode
- Right lamp light on (**LED2**) shows the second gear engaged in fixed mode
- Left and right lamp light off show the automatic gearshift engaged;



F44263_2 14

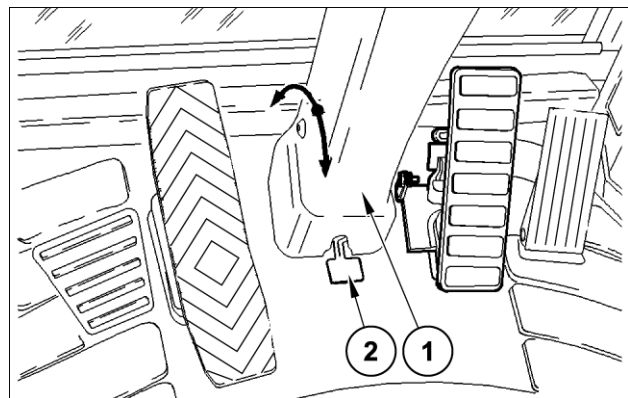
Adjusting tilt steering column

Do not adjust the steering column during travel or while working. Before adjusting the steering column:

- stop the machine;
- position the button of travel direction to neutral;
- activate the parking brake.

The angle of the steering column can be adjusted to suit the height and the posture of the operator. For this operation proceed as follows:

- with the shoe tip, press the lever **(2)** downwards and keep it pressed, to unlock the steering column;
- tilt the steering column **(1)** to the desired position;
- release lever **(2)** to lock the steering column **(1)**;
- check that the steering column is locked.



F34045 15

Service brake pedal

The pedal is used to brake the machine.
When travelling, the machine decelerates when the brake pedal is pressed.

The brake lights on the rear of the machine are activated when the stroke of the pedal is more than 5%.

When not in Road-Travel Mode, the activated brake lights are deactivated after 1 minute, even if the brake pedal is pressed for a longer time.

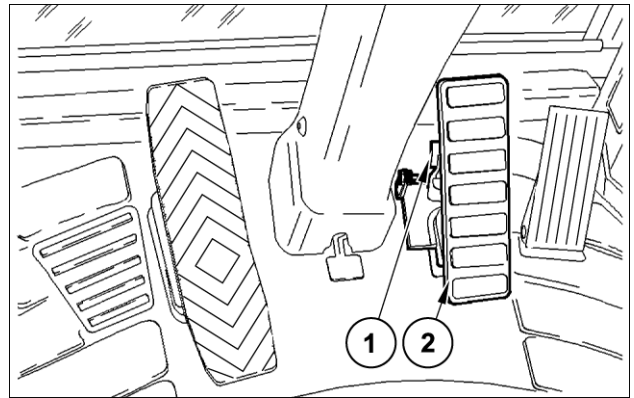
When in Road-Travel Mode, the brake lights are activated as long as the brake pedal is pressed.

The lock lever **(1)** has two positions.

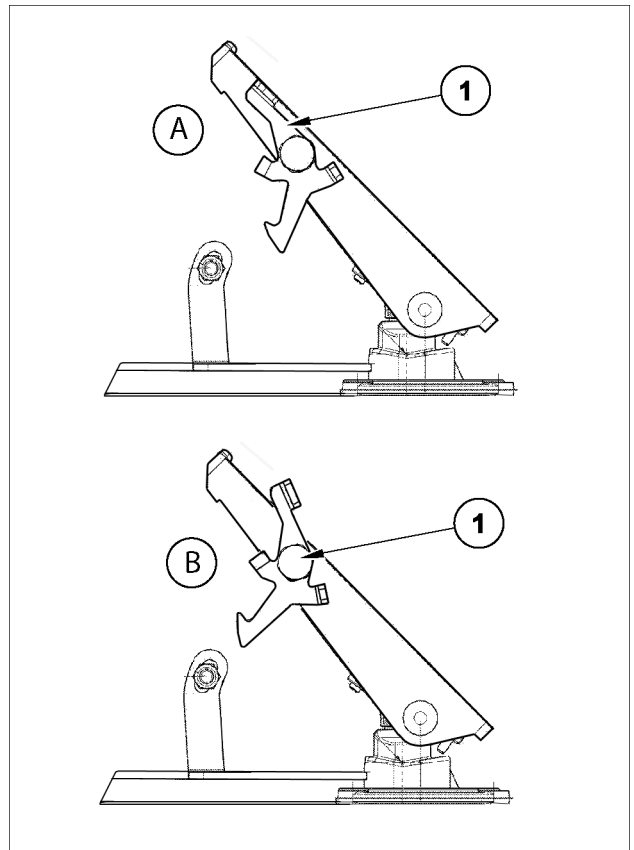
(A): travel mode position. The brake pedal cannot be locked in its lower position.

(B): work mode position. The brake pedal can be locked in its lower position.

To release the service brake, press the lock lever **(1)** on the left side of the pedal **(2)**; in this way the pedal is unlocked and the brake released.



F34053N 16

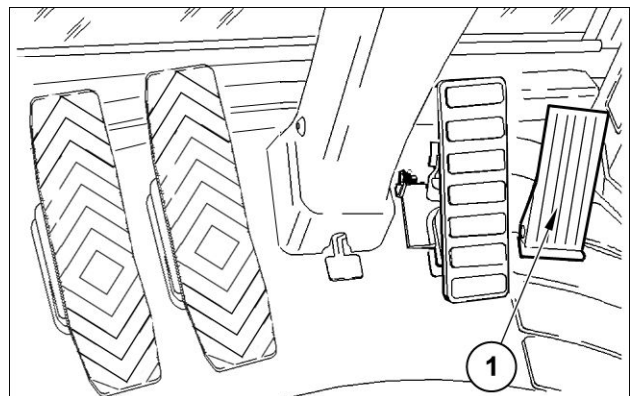


WE0009N 17

Travel pedal

The pedal is used to move the machine.
Press the pedal **(1)** the machine starts travelling.
Adjust the speed with the pedal.

NOTE: The machine starts travelling only if the travel direction buttons (forward or reverse directions) are activated and if service brake pedal and/or parking brake are disengaged.

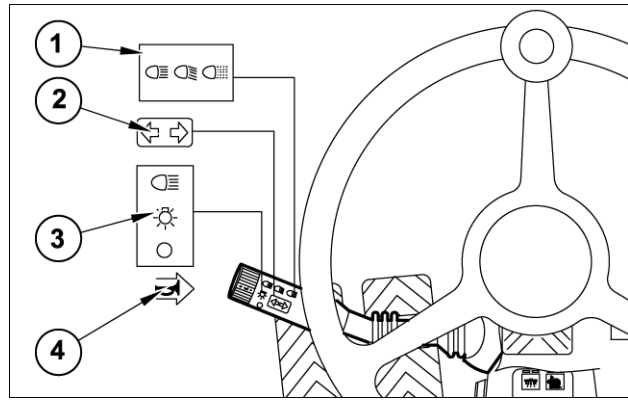


F34053_4 18

Turn lever, horn and Travel light switch

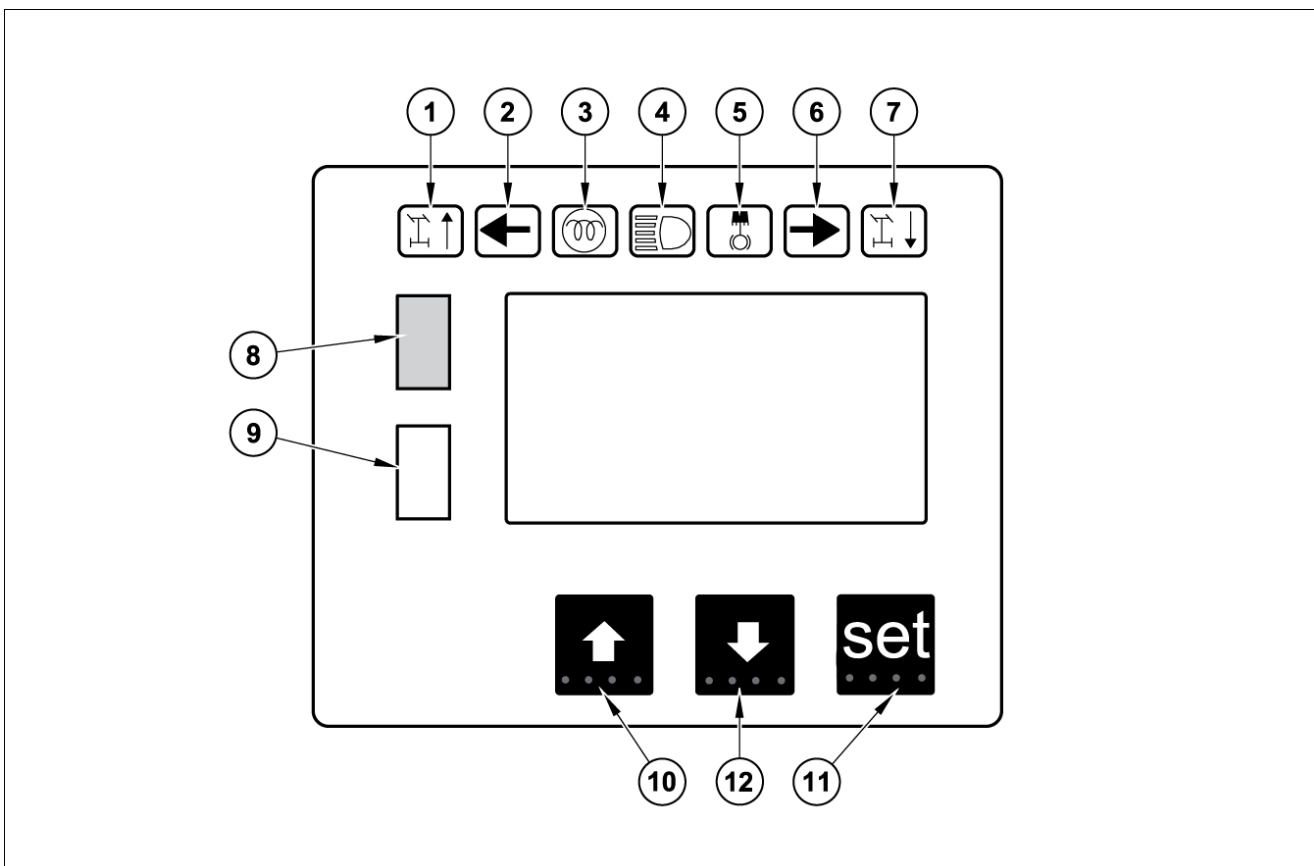
The lever is on the left of steering column.

1. Selection of lights type
 Upper beams: by pushing the lever downwards.
 Low beams: lever in middle position.
 Flash lamp: by pushing the lever upwards.
2. Selection of turn signal lights
 Turn left: by pushing the lever downwards.
 Turn lever in middle position.
 Turn right: by pushing the lever forwards.
3. Lights switch
 It is a three position ring:
 - Low Beams ON
 - Parking lights ON
 - Lights OFF
4. Horn
 The horn switch is located on top of the lever.
 Press for play the horn.








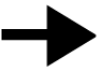





F00057N 19

Multi function display - Lamp & push-button

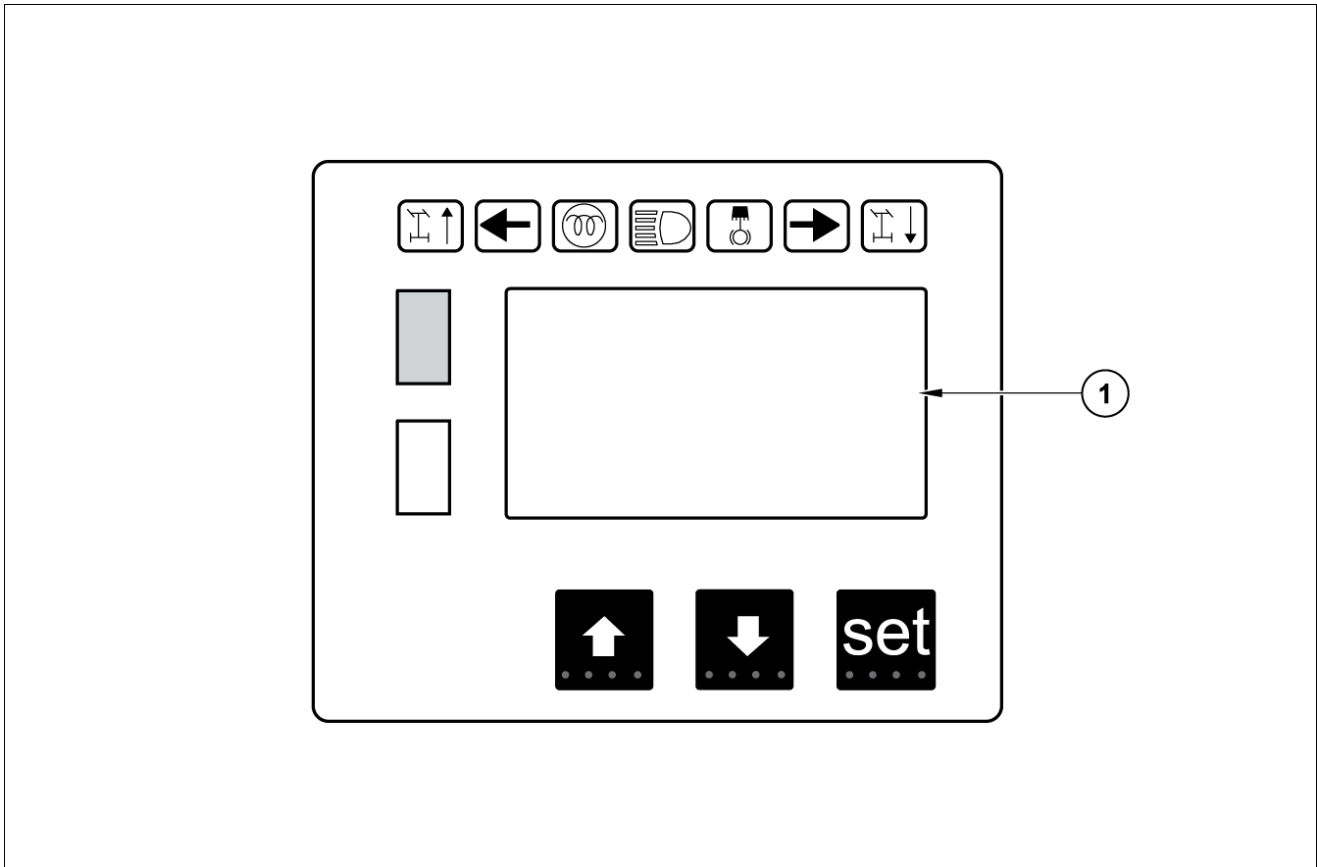


F34002N1 20

3 - CONTROLS/INSTRUMENTS


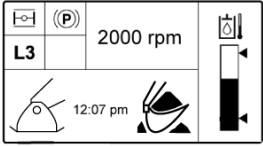
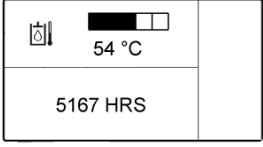
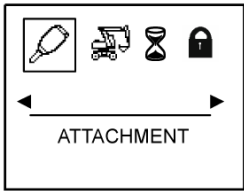
Ref.	Description		Operation	Symbol
1	Lamp	Travel direction	This light turns on when the forward travel is engaged.	
2	Lamp	Turn signal light	It flashes when the left turn signal is activated.	
3	Lamp	Pre-heating	It turns on during pre-heating.	
4	Lamp	Upper beams	It turns on blue, when the upper beams are activated.	
5	Lamp	Upper structure holding lock (swing brake)	This light turns on when the holding lock is engaged.	
6	Lamp	Turn signal light	It turns on when the right turn signal is activated.	
7	Lamp	Travel direction	It turns on when the reverse travel is activated.	
8	Lamp	Fault message	Serious faults: red lamp light on with a continuous sound. The person's safety and/or the operation of the machine's main assemblies are endangered. Put the machine in parking position and stop the engine immediately. Call the Service Assistance or your Dealer.	
9	Lamp	Fault message	Fault insignificant for the safety of persons and for machine operation: yellow lamp light on with a single sound by first activation of the error. These faults have to be cleared as soon as possible, contacting the service. In the majority of cases though, the full machine functionality remains unchanged. Faults can be recalled by pressing the "set" button. If several yellow faults have occurred, they are displayed one after another at certain intervals.	
10	Scroll-up Push-button	Push-button with upward arrow	Push-button for selection and scroll-up or cancel button in function and navigation menus.	
11	Push-button	"set" button	Push-button for selection and confirmation of items in function and navigation menus.	
12	Scroll-down Push-button	Push-button with downward arrow	Push-button for selection and scroll-down in function and navigation menus.	

Multi function display - Display navigation

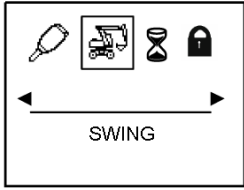
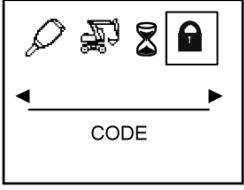

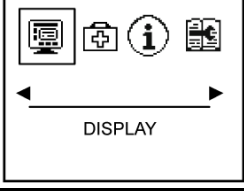
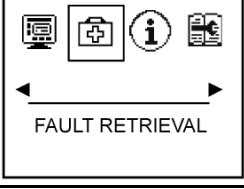
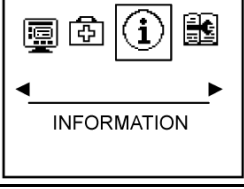
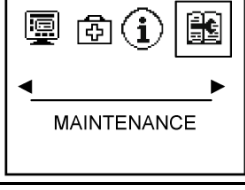


F00105N1 21

1. Multifunction display

Description	Operation	Symbol
Display with Engine OFF	The following information are displayed: - Engine hours - The clock - Hydraulic oil temperature - Temporary functions - Work mode	
Display with Engine ON	The following information are displayed: - Engine speed - The clock - Hydraulic oil temperature - Temporary functions - Work mode	
Temperature screen - With Engine ON by pressing scroll-down push-button.	The following information are displayed: - Hydraulic oil temperature - Engine hours Note: By pressing scroll-up push-button when in this temperature screen, the display screen changes back to main screen.	
Setting attachment	Setting of hydraulic oil pressure and of volumetric flow for the following attachments: - 4 different hydraulic hammers; - 4 different hydraulic shears. Further options can be activated by the dealer for use by the operator: - Clamshell - Lowflow	

3 - CONTROLS/INSTRUMENTS

Description	Operation	Symbol
Setting machine (Swing)	In this menu is possible to set the swing deceleration behavior and the swing power.	
Start-up immobilizer	In this menu is possible to activate the electronic immobilizer.	
Operating HRS	Display of service hours, according to: - Total hours; - Partial time; - Days count.	
Setting of display	In this menu is possible to set: - Contrast - brightness - Clock - Language - Units of measurement	
Fault's retrieval	This menu is reserved for Service (disabled in normal machine operation password protected).	
Information	Displays operating data of the machine and the control system.	
Maintenance	Display of maintenance intervals (disabled in normal machine operation).	

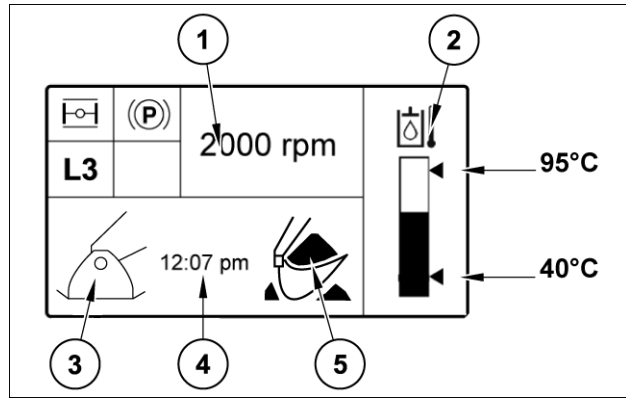
DISPLAY DURING WORKING / TRAVELLING

During operation and travelling, the operator is provided with information on machine performance, machine operating modes etc. In this mode, fields (1), (2), (3), (4) and (5) give the following information.

The general information field (1) displays the following information depending on the mode of operation:

- Operating hours;
- Engine speed;
- Travelling speed

Field (2) shows the hydraulic oil temperature.
 Field (3) shows the temporary options selected.
 Observe the priority of the temporary symbols as per table shown. Field (4) displays the gear during travel and the clock during working.
 Field (5) displays graphic information on the work mode or travel mode selected.



F34008N 22

DISPLAY SETTING / INFORMATION

Pressing an arrow button the information / setting menu appears.

The arrow keys equally permit access to the various sub-menus:

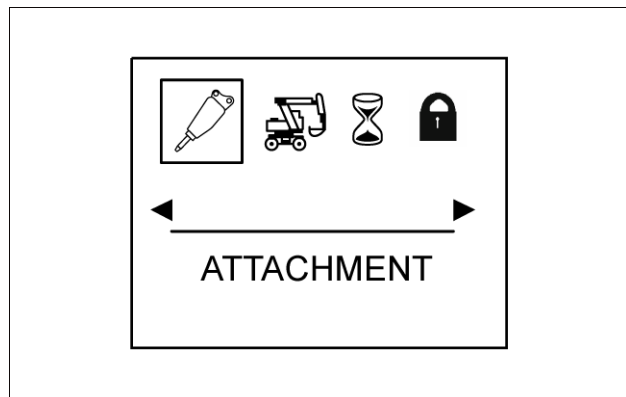
- attachment;
- swing;
- operation hours;
- CODE;
- display setting;
- fault retrieval;
- information;
- Service.

In this mode, the display is divided into two fields. The symbols are displayed in the upper field while the corresponding menu text appears in the lower one.

The **set** button gives access to the sub-menus for recalling information or for changing machine settings.

Wedges under the symbols indicate that further menus are available in the respective direction.

The Faults Retrieval and Service functions menus are reserved for our Service Department and disabled in normal machine operation.



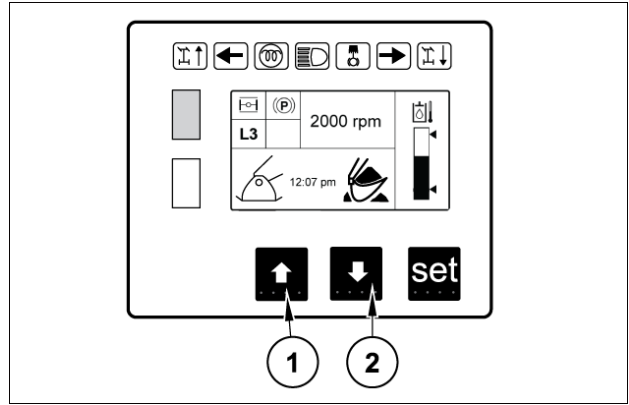
F34009N 23

DISPLAY SETTING

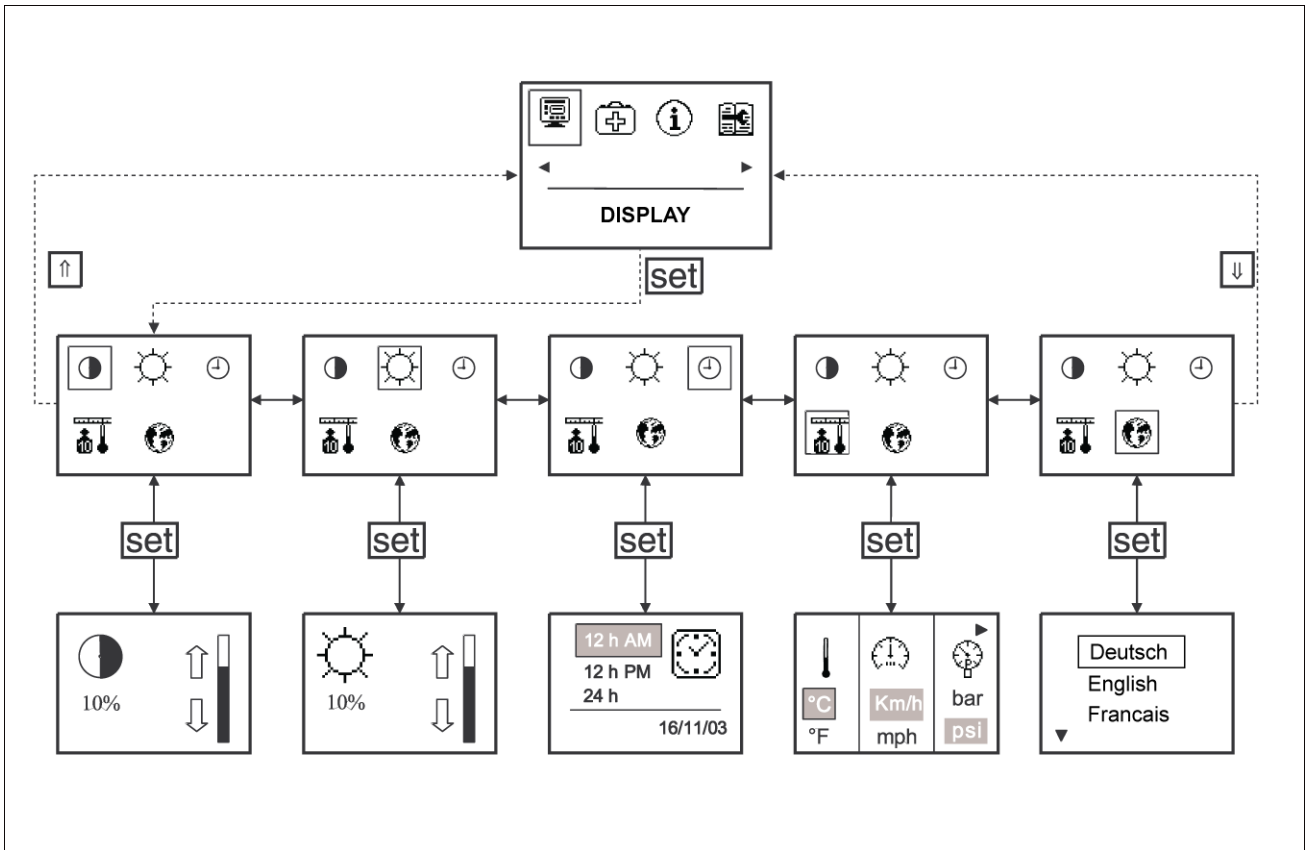
By depressing the button with the upward arrow (1) you return to main menu.

With downward arrow button (2) you can recall following sub-menus:

- contrast;
- brightness;
- time;
- units;
- language.



F44026N1 24



F44027N 25

CONTRAST

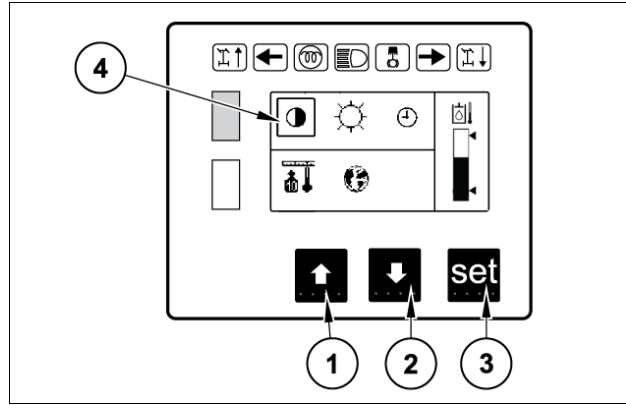
Under poor light conditions, strong solar light or extreme cold, the display contrast may need to be modified. In this way the readability of the information displayed is ensured.

Depress repeatedly button with downward arrow **(2)**, until the contrast symbol appears on grey background **(4)**.

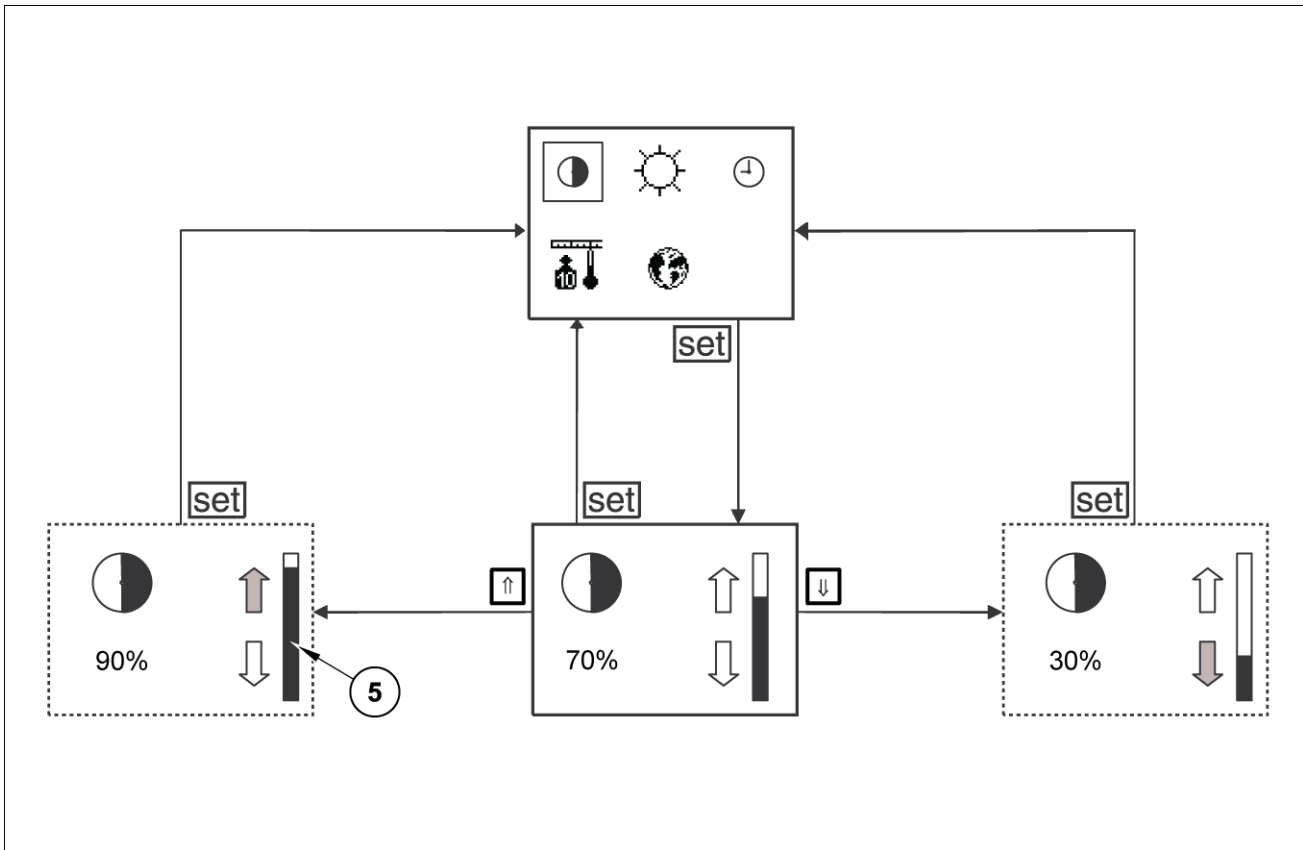
Confirm the selection with **set** button **(3)**.

By depressing the button with upward arrow **(1)**, the contrast increases, by depressing the button with downward arrow **(2)** the contrast decreases at little steps. The contrast setting is graphically displayed like a column **(5)**.

With **set** button **(3)** you exit the sub-menu "Contrast" and return to main menu "Display". Concurrently the contrast settings are memorized.



F34013N1 26



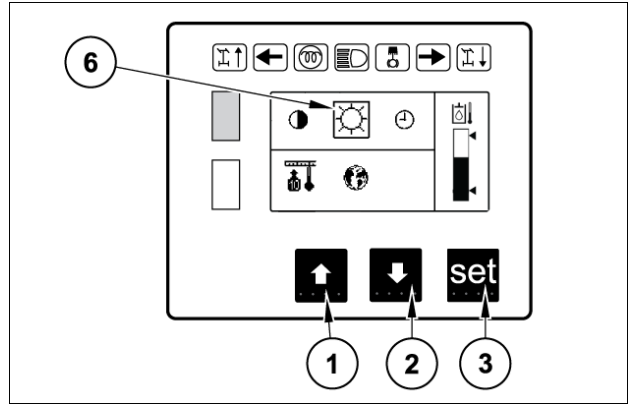
F44025N 27

BRIGHTNESS

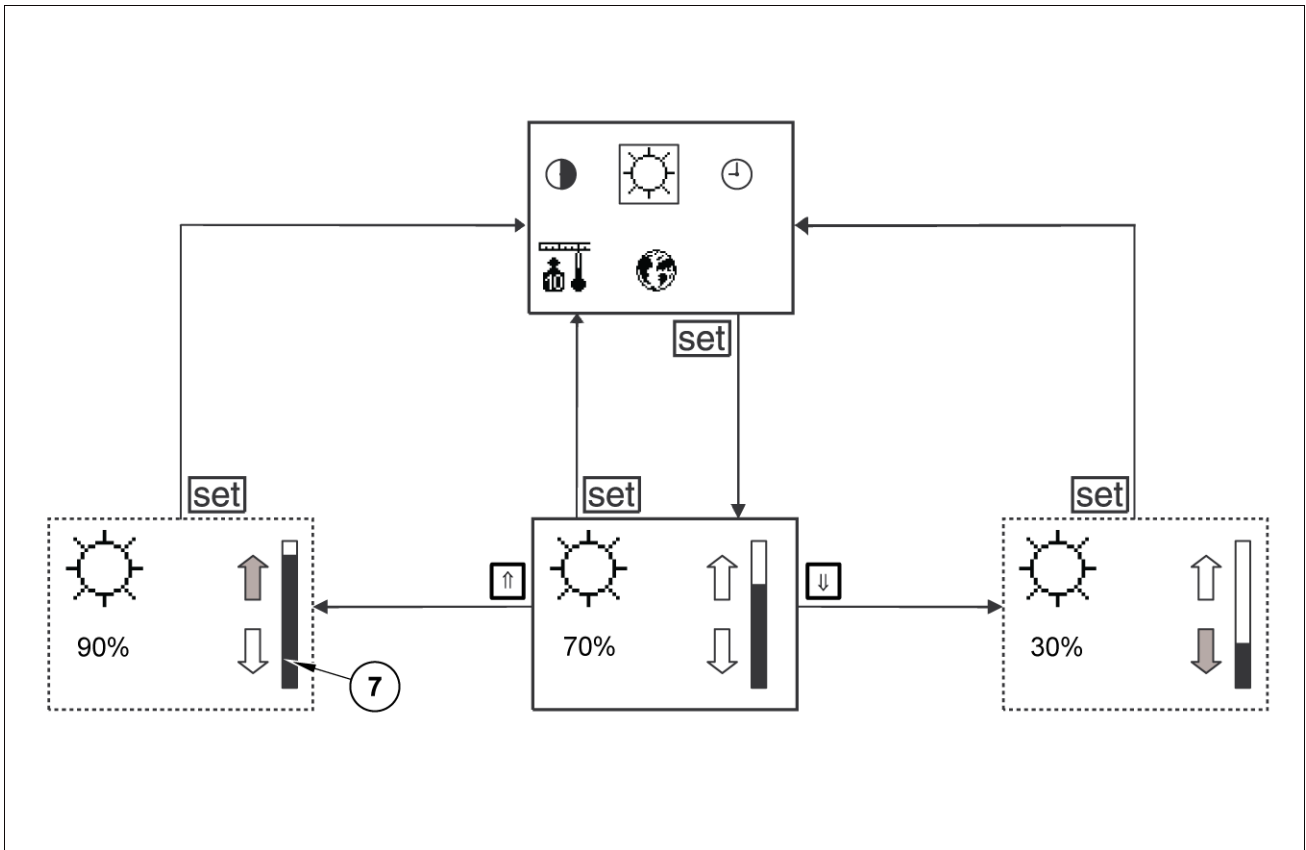
Under poor light conditions, strong solar light or extreme cold, the display contrast may need to be modified. In this way the readability of the information displayed is ensured.

Depress repeatedly button with downward arrow (2), until the brightness symbol appears on grey background (6). Confirm the setting with **set** button (3).

By depressing the button with upward arrow (1), the brightness increases, by depressing the button with downward arrow (2) the brightness decreases at little steps. The brightness setting is graphically displayed like a column (7). With **set** button (3) you exit the sub-menu "Brightness" and return to main menu "Display". Concurrently the brightness settings are memorized.



F34015N1 28



F44028N 29

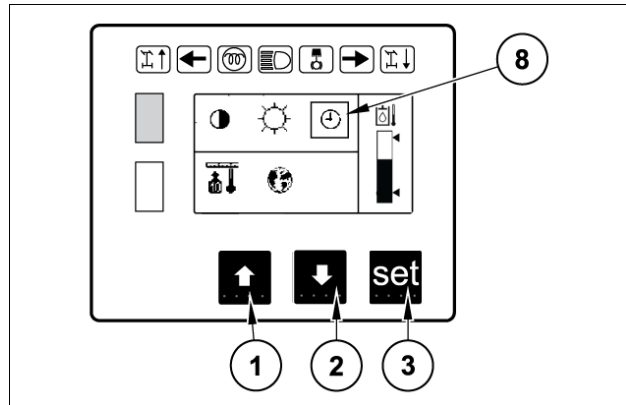
TIME

For different reasons time may need to be set in the electronic control unit and visualized on the display. Depress repeatedly button with downward arrow (2), until the time symbol (9) appears on grey background (8). Confirm the setting with set button (3).

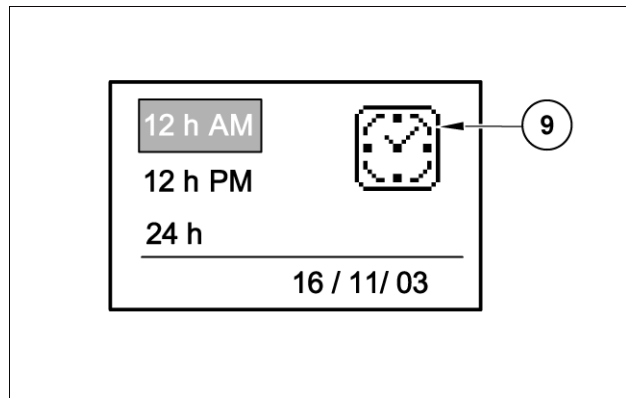
On the display right appears now the symbol of a clock and left the selection of:

- the indication of the 12 hours;
- the indication of the 24 hours;
- the date setting.

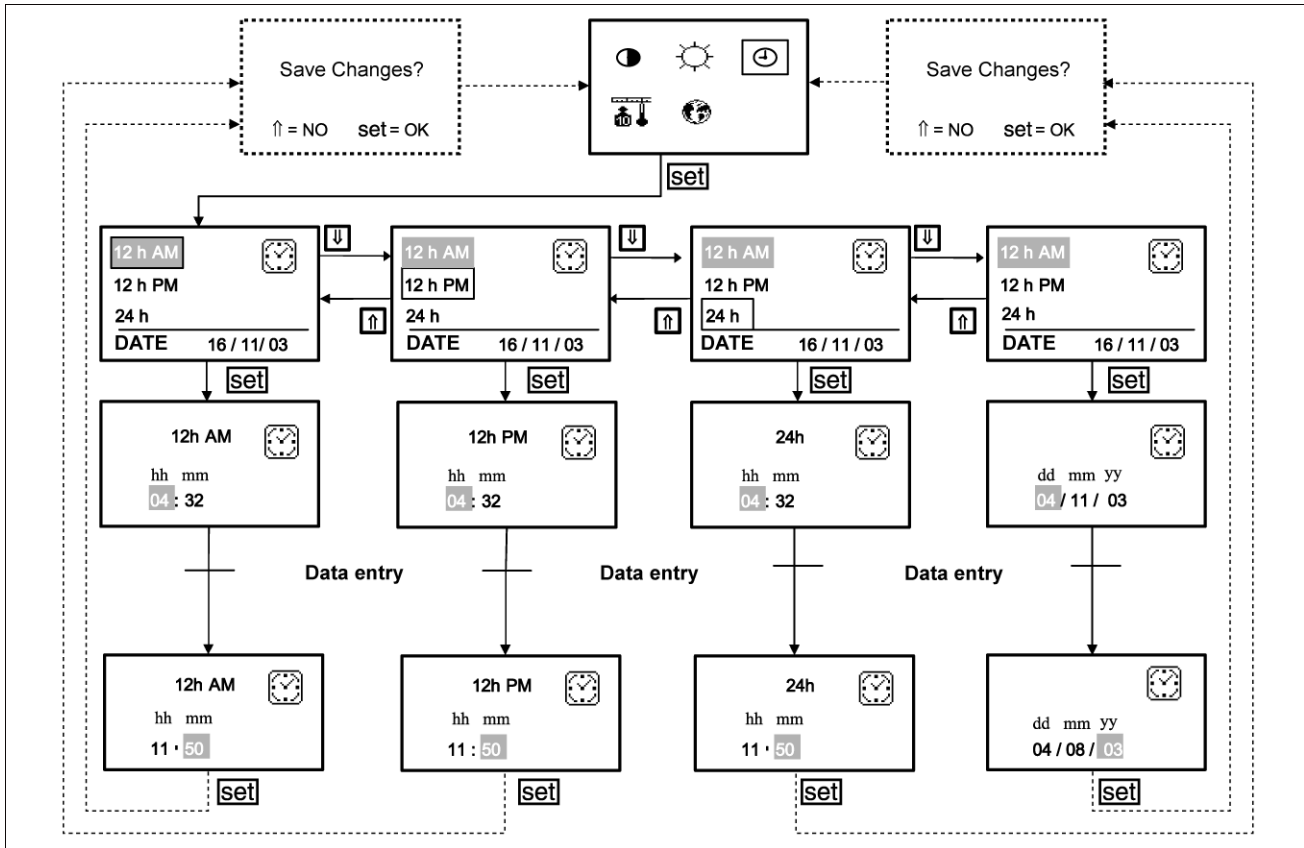
By means of the arrow button you can select one of these options and confirm the selection with set button (3).



F34017N1 30



F34018N 31



F34019N 32

Indication of the 12 hours

Depress repeatedly the arrow keys until the indication “**12 h**” appears on grey background. Confirm the setting with **set** button.

The display shows now the actual time, where **AM** means ante meridiem (morning) and **PM** means post meridiem (afternoon).

The cursor is now on the first digit of the hours setting. By depressing the button with the upward arrow (**1**), the number increases by one unit. By depressing the button with the downward arrow (**2**), the number decreases by one unit. By depressing **set** button, the setting is confirmed and the cursor slides to the right, waiting on the second digit of the hours. Set the second digit of the hours as described previously. The cursor shifts now on the first digit of the minutes. Carry out the minutes setting in the same way as described.

Once the minutes setting is confirmed with **set** button, fields **PM** or **AM** becomes actives. By means of the arrow keys you can scroll through these two settings and confirm the selection with **set** button. After that, the settings are shown on the display and confirmed with **set** button. Now you are asked to memorize the settings. By depressing the button with the upward arrow (**1**), the new setting is not memorized and the modification is not active. By pressing **set** button, the new time setting is memorized and the modification becomes active. After that the upper menu is recalled. Now the setting can be repeated or one of the other setting options (indication of the 24 hours or date) can be repeated. The display shows now on the right near the time **PM** or **AM**.

Indication of the 24 hours

Depress repeatedly the arrow keys until the indication “**24 h**” appears on grey background. Confirm the setting with **set** button.

The display shows the actual time.

The cursor is now on the first digit of the hours setting. By depressing the button with the upward arrow (**1**), the number increases by one unit. By depressing the button with the downward arrow (**2**), the number decreases by one unit. By depressing **set** button, the setting is confirmed and the cursor slides to the right, waiting on the second digit of the hours. Set the second digit of the hours as described previously. The cursor shifts now on the first digit of the minutes. Carry out the minutes setting in the same way as described.

The hours and minutes settings are now shown on the display as active and confirmed by **set** button.

Now you are asked to memorize the settings. By depressing the button with the upward arrow (**1**), the new setting is not memorized and the modification is not active. By pressing **set** button, the new time setting is memorized and the modification becomes active. After that the upper menu is recalled. Now the setting can be repeated or one of the other setting options (indication of the 12 hours or date) can be repeated.

Date

Depress repeatedly the arrow buttons until the indication of the date appears on grey background. Confirm the setting with **set** button.

The display shows the actual date.

The cursor is now on the first digit of the day setting. By depressing the button with the upward arrow (**1**), the number increases by one unit. By depressing the button with the downward arrow (**2**), the number decreases by one unit. By depressing the **set** button, the setting is confirmed and the cursor slides to the right, waiting on the second digit of the day setting. Set the second day digit as described previously. The cursor is now on the month setting. By depressing the button with the upward arrow (**1**), you scroll to next menu. By depressing the button with the downward arrow (**2**) you recall the next month. By depressing the **set** button, the setting of the month is confirmed and the cursor slides to the first digit of the year setting. By depressing the button with the upward arrow (**1**), the number increases by one unit. By depressing the button with the downward arrow (**2**), the number decreases by one unit. By depressing the **set** button, the setting is confirmed and the cursor proceeds of one step to the right and stops on the second digit of the year setting. Set the second, third and fourth digit as described previously.

The year setting is shown on the display as active and confirmed by means of **set** button.

Now you are asked to memorize the settings. By depressing the button with the upward arrow (**1**), the new setting is not memorized and the modification is not active. By pressing **set** button, the new time setting is memorized and the modification becomes active. After that the upper menu is recalled. Now the setting can be repeated or one of the other setting options (indication of the 24 hours or date) can be repeated.

UNITS

Depress repeatedly the button with arrow (2), until the unit symbol appears on grey background (10). Confirm the selection with set button (3).

The display shows two different units for temperature, speed, pressure and flow rate measure with the relevant symbols (11) and (12) highlighted.

Wedges on the edges and on the right and left side of the display show that it is possible to recall other settings, by means of set button (3).

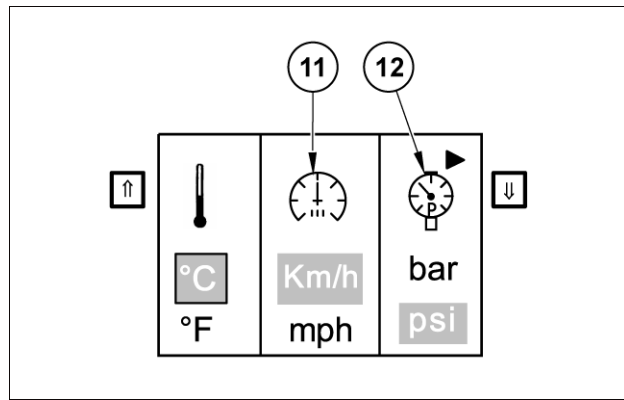
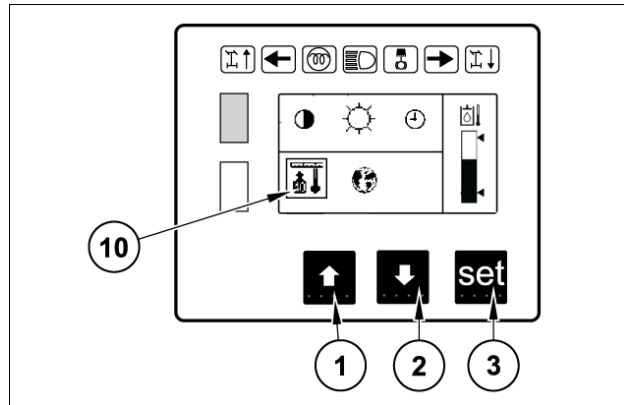
The cursor is now positioned on the temperature unit currently set. Now on grey background is active either field °C (Celsius degrees) or field °F (Fahrenheit degrees). By means of the arrow buttons, you can scroll through these two units and confirm the selection with the set button (3). In like manner it possible to select the unit of:

— speed value: km/h (kilometers/hour) or field mph (miles/hour).

— pressure: bar or field psi (pounds per square inch).

— flow rate: l/min (liters/minute) or field gpm (gallons per minute).

Now you are asked to memorize the settings of the measurement units. By depressing the button with the upward arrow (1) or downward arrow (2) the new setting is not memorized and the modification is not active. By pressing set button (3), the new measurement units setting is memorized and the modification becomes active. After that the upper menu is recalled. Now the setting can be repeated or one of the other setting options (contrast, brightness, time or language) can be repeated. By depressing the button with the upward arrow (1), you exit the display menu and return to the main menu.



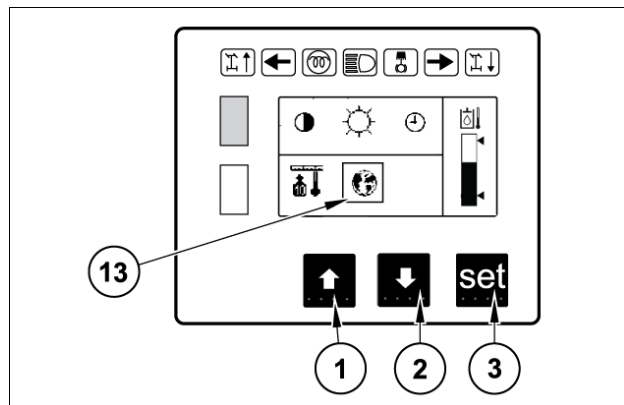
LANGUAGE

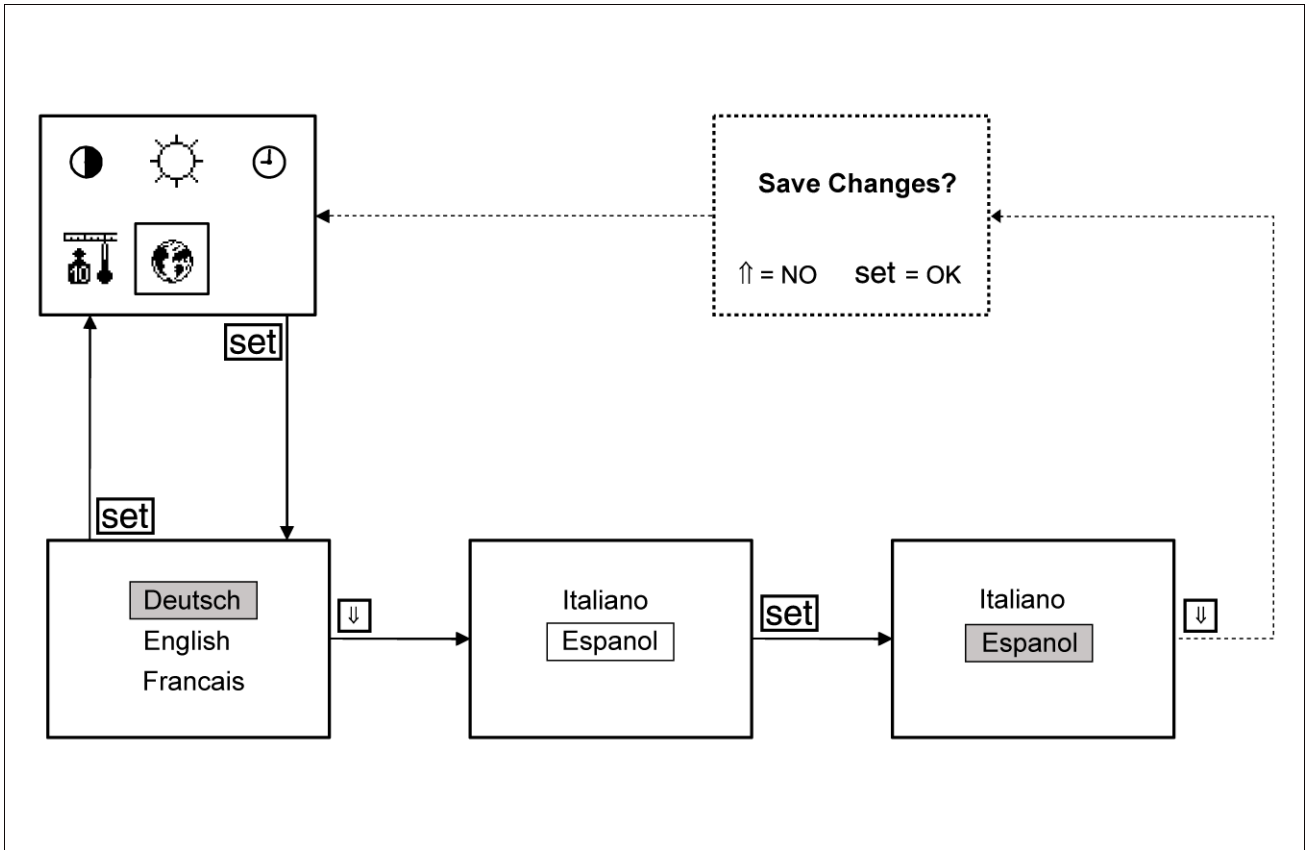
Depress repeatedly button with upward arrow (1) or downward arrow (2), until the language symbol appears on grey background (13). Confirm the selection with set button (3).

The display shows now 5 language options (Deutsch, English, Francais, Italiano, Espanol).

The language currently set is shown as active. The current language setting is on grey background.

Depress repeatedly the arrow buttons until the required language is highlighted inside a frame. Confirm the setting with set button (3). The display shows now the language setting on a grey background and highlighted into a frame. This has to be confirmed again by means of the button with the downward arrow (2). After confirmation by button with downward arrow (2), you are requested to memorize the language setting. By depressing the button with the upward arrow (1), the new setting is not memorized and the modification is not active. By pressing set button (3), the new language setting is memorized and the modification becomes active. After that the upper menu is recalled. Now the setting can be repeated or one of the other setting options (contrast, brightness, time or measurement unit) can be performed. By depressing the button with the upward arrow (1), you exit the display menu and return to the main menu.





F34023N 36

Analogue Gauges

On the instrument panel there are two analogue gauges that provide following information to the operator.

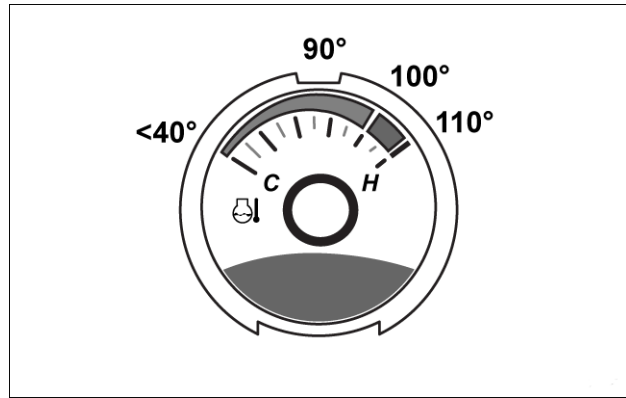
- Engine coolant temperature
- Fuel level

ANALOGUE GAUGE OF ENGINE COOLANT TEMPERATURE

The analogue temperature gauge is enables only when the key is in **ON** position. It has a tolerance of $\pm 3\text{ }^{\circ}\text{C}$

In the following table you can find the temperature and the warnings on the indication lamps in overheating situation.

Gauge indication	Condition	Warning Lamp Color	Buzzer Alarm
< 40 °C	Cooling Temperature is very low		
40 - 105 °C	Cooling Temperature is normal		
105 - 110 °C	Cooling Temperature is high	Yellow	
> 110 °C	Cooling Temperature is very high	Red (Stop)	Intermittent (1 s on 1 s off)



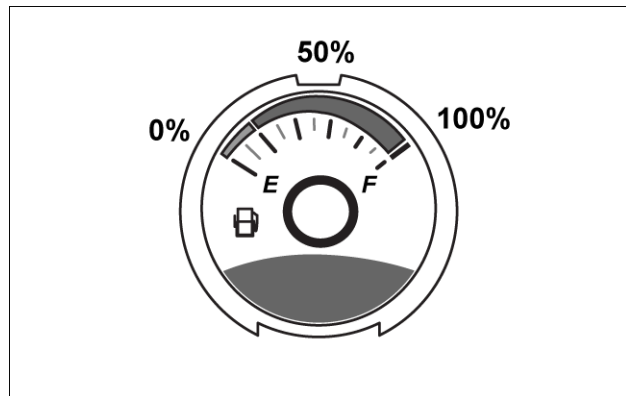
N00795_1 37

ANALOGUE GAUGE OF FUEL LEVEL

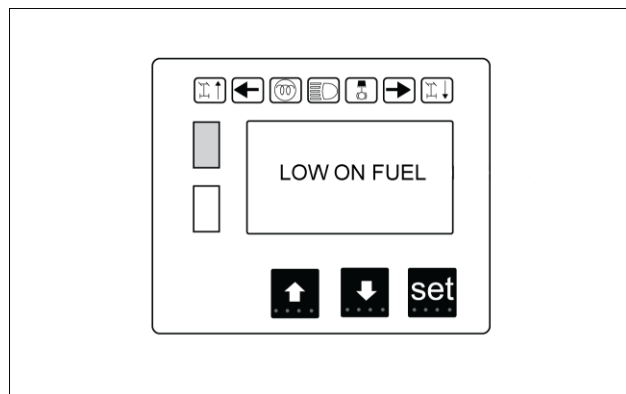
The analogue gauge of fuel level is enables only when the key is in **ON** position.

In the following table you can find the warnings that appear on the monitor in case of low fuel level.

Gauge indication	Condition	Warning Lamp Color/ status	Display Output
< = 15%	Fuel level low	Yellow/ Flashing 5 times every 10 min	LOW ON FUEL every 10 min for 5 s
> 15%	Fuel level normal		



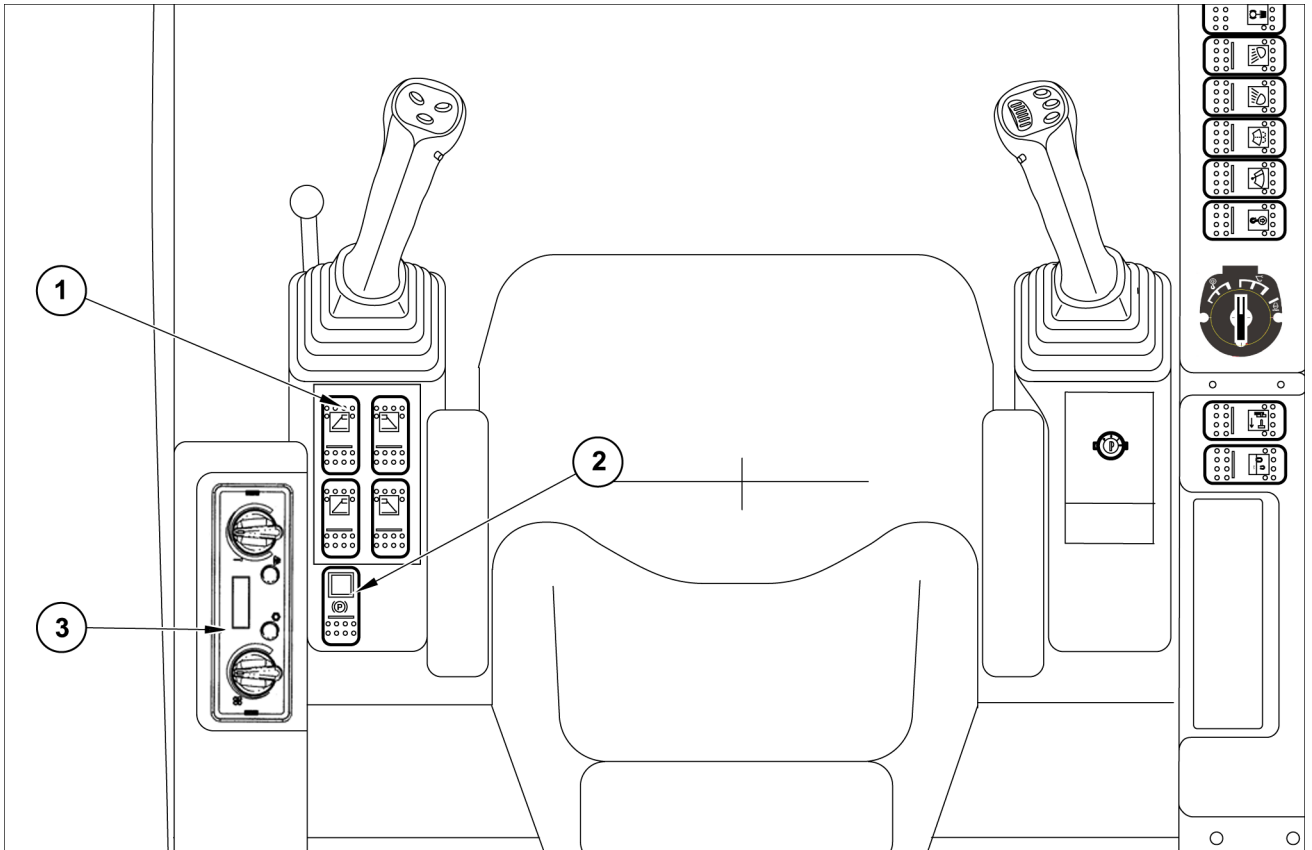
N00796_1 38



F00203N1 39

LEFT-HAND SIDE CONTROLS

Cab controls - Localisation overview Left hand console - Localisation overview



F00317N2 1

- 1. Stabilizer and blade control (optional)
- 2. Parking brake control
- 3. Ventilation, heating and air conditioning (optional)

Parking brake control

The parking brake control prevents the machine to roll down a slope of a gradient less than **18 %**, if the service brake is not engaged or the engine is off.

PARKING BRAKE ACTIVATION

The parking brake is applied by means of the switch **(1)**, by pressing the surface provided with locking selector. In this way the switch is protected against accidental activation. The indicator lamp on the switch lights up red and

the symbol **(P)** is shown in the cluster's display. Concurrently also the floating axle is blocked (independently from the position of push-button **(2)** for floating axle blocking).

With push-buttons **(3)** and **(4)** for travel direction you can select the travel direction but cannot start the machine as the parking brake is engaged. When activating the travel pedal with the travel direction selected but with the service brake engaged, the display warns that the service brake must be released. The travel function is blocked in this situation.

PARKING BRAKE DEACTIVATION

Unlock the switch **(1)** and press its surface under the indicator lamp. The indicator lamp on the switch turns off and the floating axle is released, should it previously not have been blocked by means of button **(2)**.

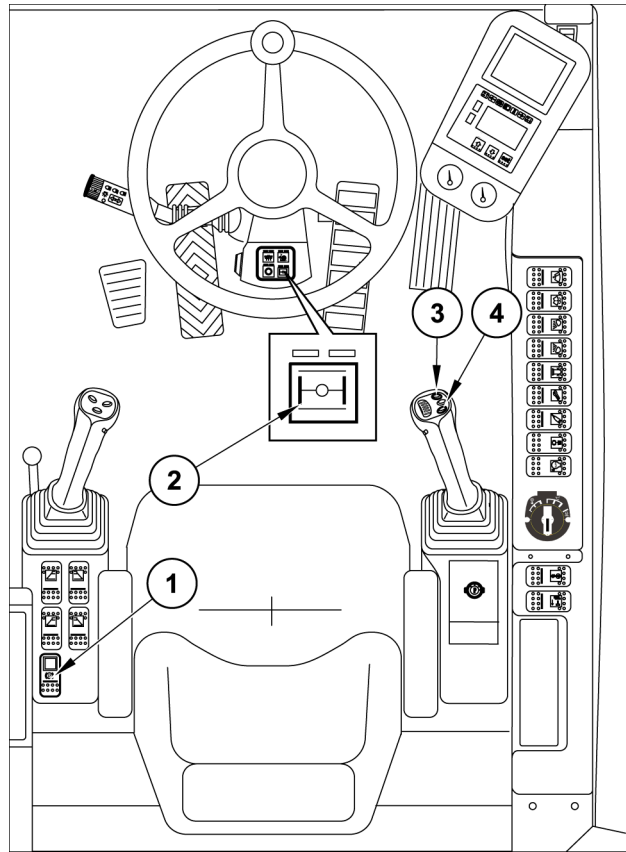
The symbol **(P)** disappears from the cluster's display.

NOTE: the parking brake is always engaged when starting the machine. In this case the lamp on the switch is off but the parking brake is engaged.

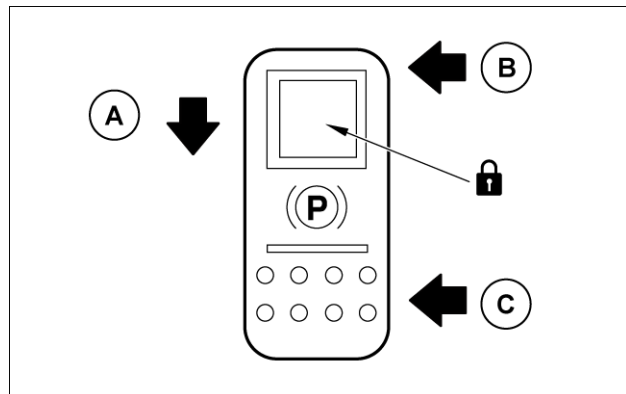
A. Direction to move the lock for either functional change.

B. Press here to release the brake.

C. Press here to locked the brake.



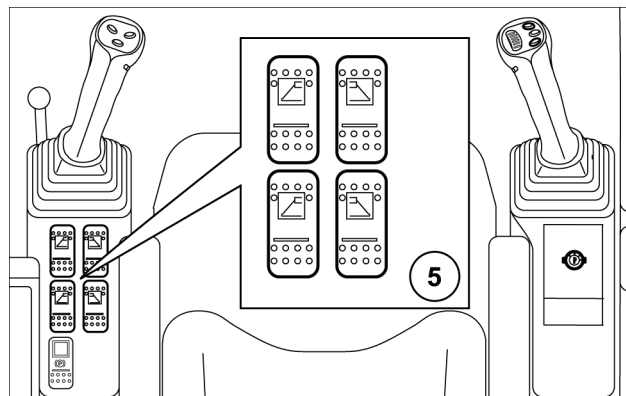
F00319N2 2



F20000N1 3

Independent stabilizers and blade rocker switches (optional)

In the standard version of the machine, the stabilizers are lifted and lowered together. An independent control of the stabilizers is available as an option. Some machine can be equipped with some rocker switches **(5)**. The switches **(5)** are two position rocker switches. Depress the black face of the switch, switch backlighting is on. For deactivation of one or all switches, depress the face with symbol of the switch: the switch backlighting is off.



F00318N1 4

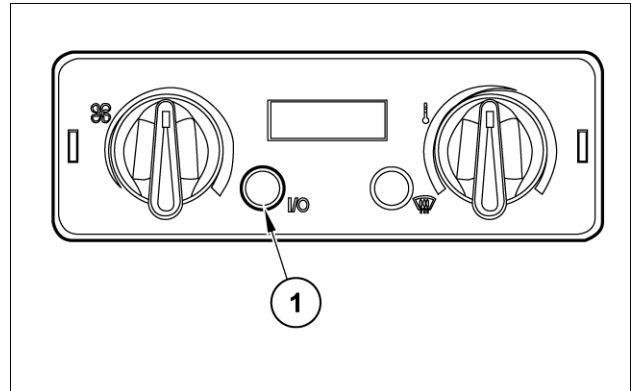
Automatic temperature control (ATC)

Automatic Temperature Control (ATC) (1)

The operator activates the ATC by pressing the left hand button (1) once, when activated, the digital display window will be illuminated and the mode of operation will be displayed along with the desired temperature. The button (1) toggles between two modes:

- “O” = OFF, the cab blower motor may be run by turning the blower speed control, however, the air will not be conditioned and the display will NOT be illuminated.
- “A” = Auto, the system will warm or cool the air as needed to maintain the cab temp and the display will be illuminated.

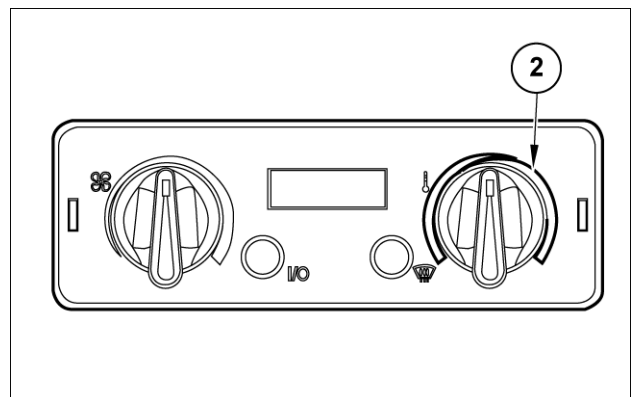
NOTICE: It is advised to run the engine on low idle for at least **5 min** before activating the air conditioning system.



500301422AN 1

Temperature control (2)

The temperature control (2) gives the operator control over the cab interior temperature. Turn the control (2) clockwise to increase the air temperature and counter clockwise to lower the air temperature.



500301420N 2

Blower speed control (3)

With the ATC in "Off" mode, turn the blower speed control (3) to activate the blower only and produce a non-conditioned air flow.

Turn the blower speed control (3) clockwise to increase the blower speed and produce more air flow out of the cab vents, turn counter-clockwise to reduce the air flow.

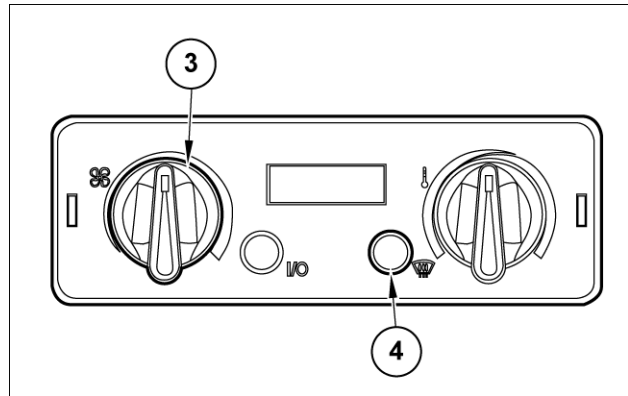
With the ATC in "Auto" mode, the blower speed control (3) position will have NO effect over the blower speed. The ATC controller will increase or decrease the blower motor speed as needed automatically to maintain the desired cab temperature.

If the blower motor control (3) is adjusted, the controller will release the automatic control over the blower motor speed and the system switches to manual mode. In manual mode, only the blower motor speed is adjusted manually, but the system will still control the air conditioning compressor and the water valve to maintain the desired temperature setpoint. In the manual mode, the icon "A" is NOT displayed.

To reactivate the ATC into its "Auto" mode, either toggle the ATC control button OFF and back ON or rotate the temperature control to its maximum/minimum position and back to the desired setpoint.


When operating in the auto climate or "Defog" mode, the blower will make a speed increase for every **0.5 °C (2 °F)** difference there is between the temperature setpoint and the actual cab temperature sensed by the cab temperature sensor.

If the evaporator sensor senses that the evaporator temperature is below **26 °C (79 °F)**, and system is calling for heat the blower speed will not be increased until the evaporator temperature has increased.




500301421N 3

Defog control (4)

With the ATC activated, press the "defog" mode button to activate the defog mode. The digital display window displays the symbol .

The "defog" mode button toggles from automatic or manual mode into defog mode and vice versa (the system will return to the initial mode when "defog" mode is left). When going from automatic mode to "defog" mode, the system will still display the "A" icon.

Automatic "A" mode / manual mode = the system will warm or cool the air as needed to maintain the cab temp and the display will be illuminated.

 = Defog, the system will run the A/C compressor full time to defog the windows and the display will be illuminated.


Defog control operation

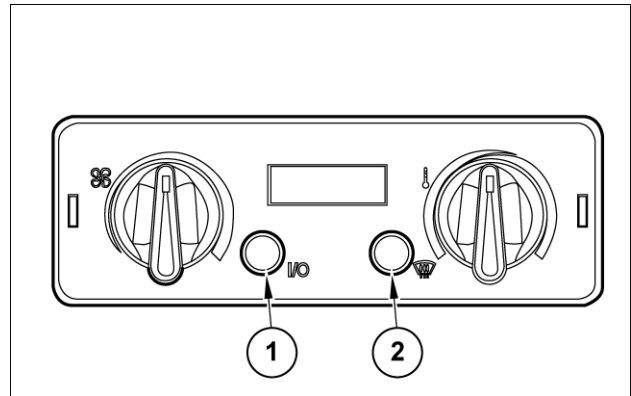
Defog is used to clear off the windows by using the A/C to lower the humidity in the air and using the heater to warm the air enough to dry the windows. The ATC must be activated and the mode button (2) toggled to DEFOG (the windshield icon displayed in the digital display). The temperature control knob may be adjusted to any setting. If the cab vent temperature is too cold, the temperature control may be rotated clockwise to provide some additional heating of the air. The cab temperature will be monitored by the re-circulation air sensor, and be maintained at the temperature control setting by cycling the heater valve. While operating in the defog operation the compressor will run continuously, unless the evaporator sensor determines the evaporator is too cold and could start to freeze up.

The ATC controller will automatically control the blower motor speed as required to maintain the temperature desired. It will be normal for the vent temperature to be cold during early morning start up, due to low engine temperature. If the operator reduces the blower speed until the engine warms up, the ATC controller will disengage the auto mode of the blower speed. To re-activate the auto mode for the blower motor speed, the ATC control button MUST be toggled to reactivate the auto position.

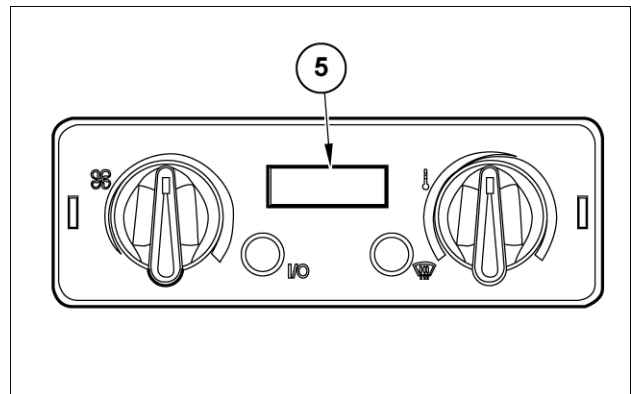
Display unit (5)

The display provides information about the system performance.

- It displays the desired cab temperature selected by the operator. The display reading may be in Fahrenheit or Celsius. To shift between readings, there is a labeled ground wire located under the left rear corner of the cab at the main ground boss. Attaching the wire to the ground provides Celsius readings. The temperature range is mentioned on the display.
- It displays an icon "A", when the system is operating in the automatic climate mode.
- When the "A" is not displayed the blower motor speed MUST be manually controlled. However, the system will control the water valve and compressor automatically, in order to maintain the set temperature.
- It illuminates an icon of a windshield  when the system is in the "Defog" mode.
- It illuminates an icon of a book when the system is not operating correctly. Along with the book icon, a fault code will also be displayed to assist the technician making the correct repairs.



500301423N 4

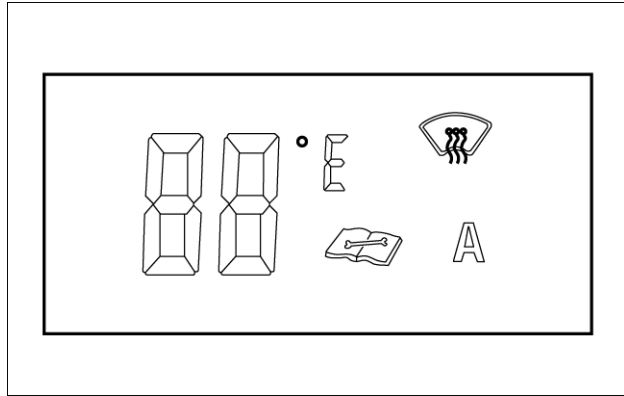


500301420BN 5

The ATC temperature range is between **15.6 - 32.2 °C (60 - 90 °F)**. The temperature setpoint is displayed on the display unit.

15.6 °C (60 °F) = maximum cooling, no ATC, maximum blower speed.

32.2 °C (90 °F) = maximum heating, no ATC, maximum blower speed.



20030143N 6

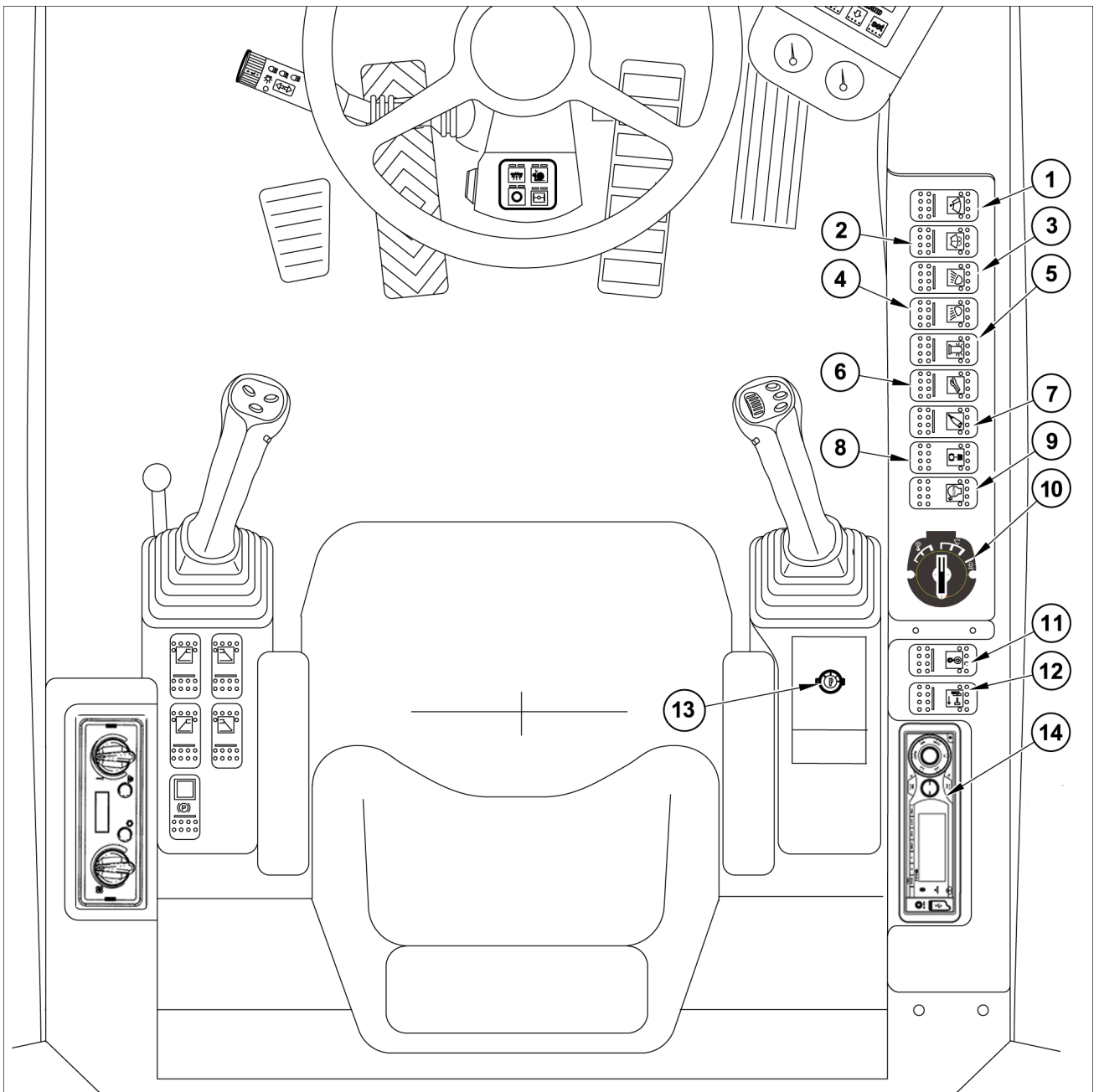
Error codes

NOTE: If an error occurs the display will show alternately the error code and the temperature.

Error	Description	Fault operation
E01	E01 alternating with temperature setting. - High pressure lockout.	Cycle the ATC control switch off and on. The digital temperature display should reappear. If the error reappears, the system requires service.
E02	E02 alternating with temperature setting. - Low pressure fault.	Cycle the ATC control switch off and on. The digital temperature display should reappear. If the error reappears, the system requires service. Error E02 can appear when operating the system in cold ambient conditions or when the quantity of refrigerant is too low.
E03	E03 alternating with temperature setting. - Possible faulty blower control potentiometer.	The blower defaults to auto mode and disregards the blower potentiometer. The system requires service.
E04	E04 alternating with temperature setting. - Possible faulty temperature control potentiometer.	The system defaults to 22 °C (72 °F) . The system requires service.
E07	E07 alternating with temperature setting. - Possible faulty cab temperature sensor or faulty wire harness.	The system defaults to manual mode. The system requires service.
E08	E08 alternating with temperature setting. - Possible faulty evaporator temperature sensor or faulty wire harness.	The compressor does not run. The system requires service.
E09	E09 alternating with temperature setting. - Possible faulty outlet temperature sensor or faulty wire harness.	The compressor does not run. No blower speed limiting during cold start. The system requires service.
E19	E19 displayed instead of temperature setting - No data from control module.	Faulty electrical circuit between control module and display unit. Check the wire harness. If no problems are found, the system requires service.

RIGHT-HAND SIDE CONTROLS

Cab controls - Localisation overview



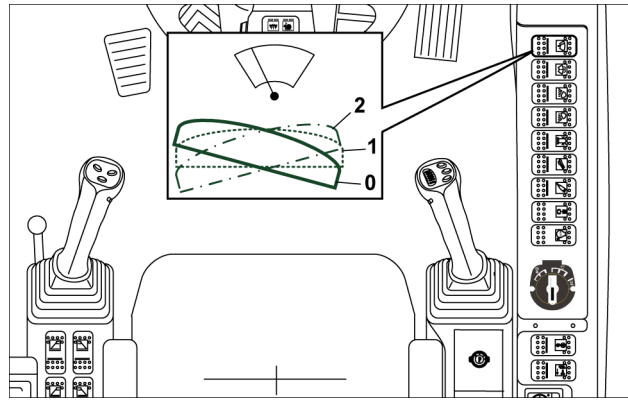
F00320N3 1

- | | |
|--------------------------------|--|
| 1. Windscreen wiper | 8. Upper structure holding brake |
| 2. Screen wiper/washer | 9. Automatic speed reduction (auto idle) |
| 3. Cab/attachment work lights | 10. Engine speed throttle |
| 4. Rear work lights (optional) | 11. Overload (optional) |
| 5. Warning beacon (optional) | 12. Quick coupler (optional) |
| 6. Hydraulic shears (optional) | 13. Starter switch |
| 7. Hydraulic hammer (optional) | 14. Radio |

Windscreen wiper

The screen windscreen wiper is activated by a multistage switch:

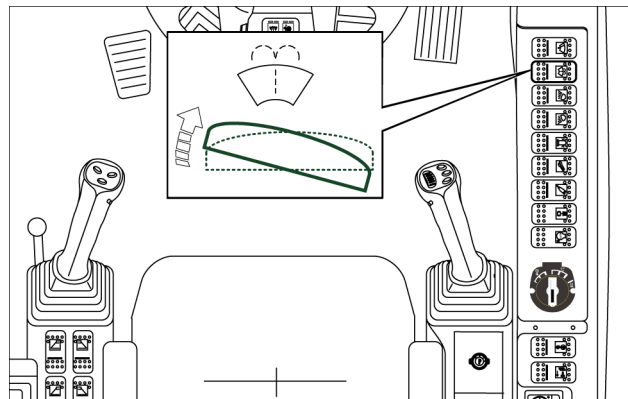
- stage 0: screen wiper off;
- stage 1: intermittent wiping;
- stage 2: windscreen wiper operates continuously;



F00302N1 2

Screen wiper/washer

The windscreen wiper operates continuously with the jet, as long as the button is kept pressed. One click: a wiper stroke and a liquid jet.



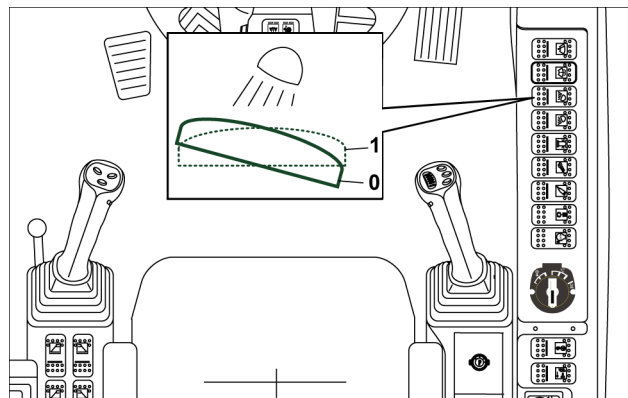
F00303N1 3

Cab/attachment work lights

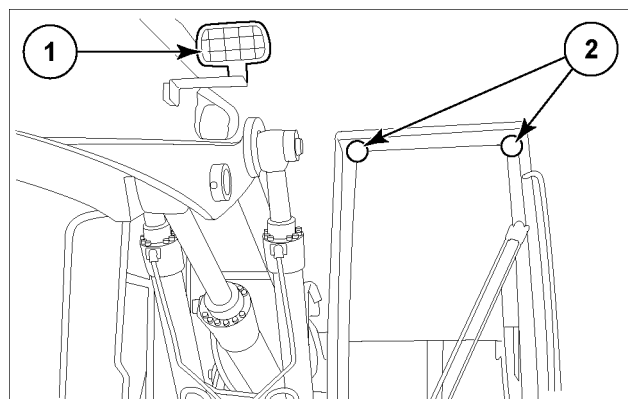
The cab/attachment work lights are activated by a one position rocker switch: to activate, press the switch face without symbol. To deactivate, press the switch face with the symbol.

When the rocker switch is activated, the working light (1) and (2) light on.

- stage 0: cab/attachment work lights off;
- stage 1: cab/attachment work lights on;



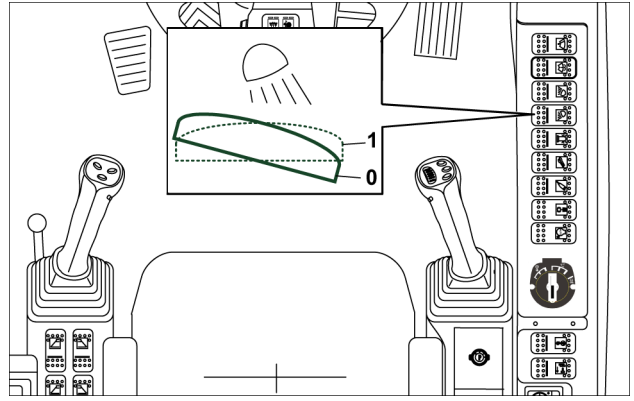
F00304N1 4



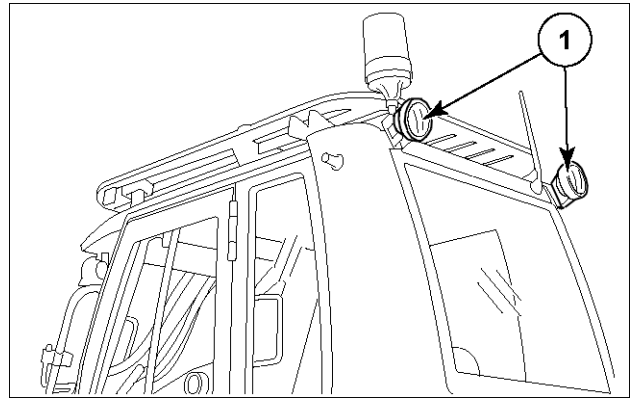
F00333N2 5

Rear work lights (optional)

The rear work lights are activated by a one position rocker switch: to activate, press the switch face without symbol. To deactivate, press the switch face with the symbol. When the rocker switch is activated, the rear working lights (1) light on.



F00305N1 6

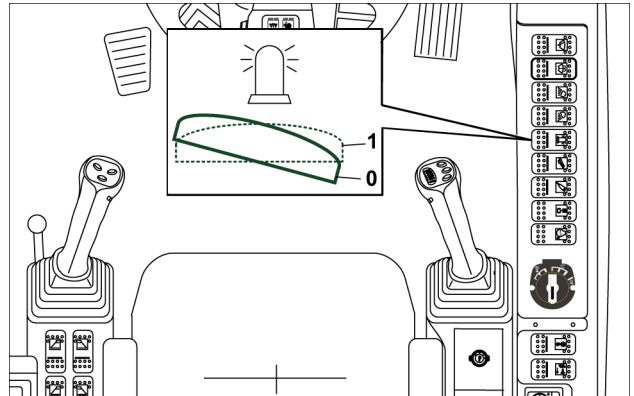


F00327N1 7

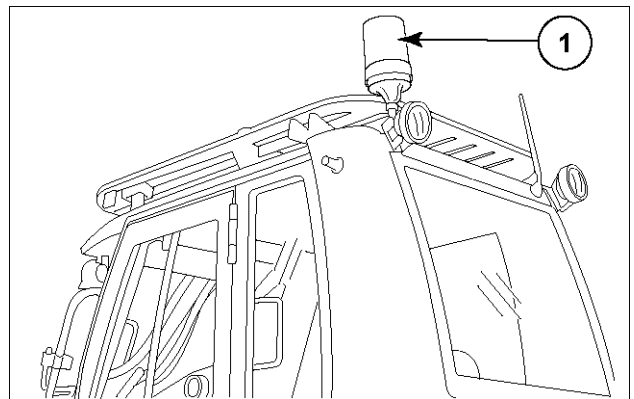
Warning beacon (optional)

The warning beacon is activated by a one position rocker switch: to activate, press the switch face without symbol. To deactivate, press the switch face with the symbol. When the rocker switch is activated, the warning beacon (1) flashing on.

NOTE: In some countries, two warning beacons are mandatory.



F00306N1 8



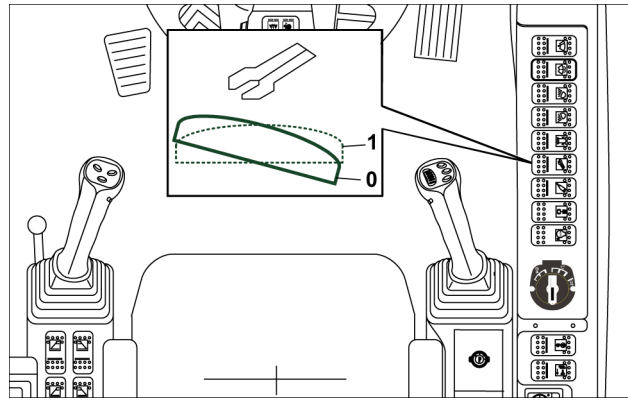
F00328N1 9

Hydraulic shears (optional)

The hydraulic shears is preselected by a one position rocker switch: to preselect, press the switch face without symbol. To deactivate, press the switch face with the symbol.

When the rocker switch is activated, the backlighting of the switch is light on.

NOTE: See "HYDRAULIC SHEARS" in Accessories Chapter.



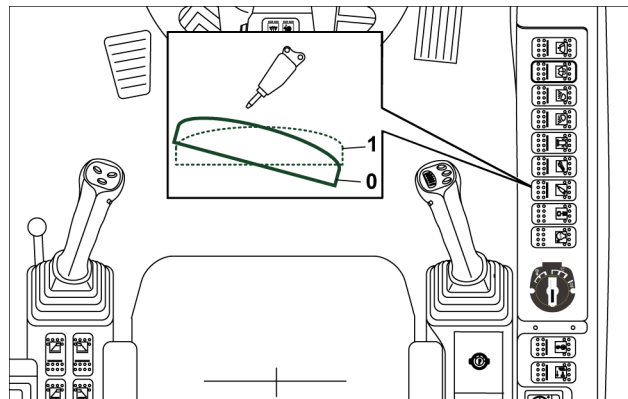
F00307N1 10

Hydraulic hammer (optional)

The hydraulic hammer is preselected by a one position rocker switch: to preselect, press the switch face without symbol. To deactivate, press the switch face with the symbol.

When the rocker switch is activated, the backlighting of the switch is light on.

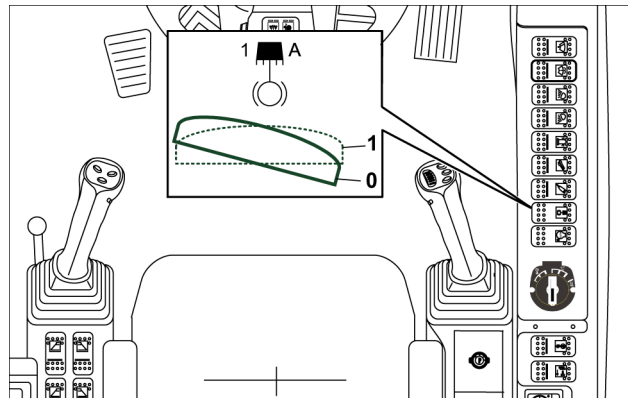
NOTE: See "HYDRAULIC HAMMER" in Accessories Chapter.



F00308N1 11

Upper structure holding brake

The upper structure holding brake is selected by a one position rocker switch: when the rocker switch is disengaged (stage 0, rocker switch lamp is off), the mechanical swing brake is in AUTO-mode. Consequently, the swing brake is released when the joystick is moved out of neutral. When the joystick is back in neutral and the upper carriage rotational speed is below a threshold value, the mechanical swing brake is engaged. The engagement is indicated by the lamps in the cluster and on the rocker switch. When the rocker switch (stage 1) is engaged, the mechanical swing brake is engaged permanently.



F00309N1 12

Automatic speed reduction (AUTO IDLE)

The AUTO IDLE function is used to automatically reduce the engine speed if no hydraulic function is operated. Fuel consumption and noise exhaust emissions are reduced.

To activate the engine's automatic speed reduction press rocker switch (from stage 0 to stage 1).

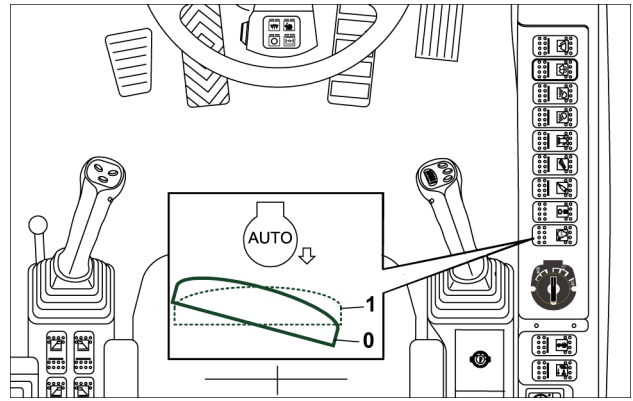
If the rocker switch is activated, and following conditions are met, the engine speed is reduced to the power-level defined in AUTO-IDLE (e.g. **1200 RPM, 800 mA**). The display screen will display 'AUTO IDLE'.

Conditions:

- The control elements (joysticks *, travel pedal, auxiliary pedal *, sliders *, control lever push buttons * with a hydraulic function assigned) are in neutral for minimum 4 seconds.
- The machine is in working mode or in road travel mode.
- The engine speed throttle requests an engine speed significantly (e.g. +70rpm) above AUTO-IDLE power level.
- The safety lever is in up or down position

* Only if Road Travel Mode not activated or Road Travel Mode active and Safety lever in down position.

If the rocker switch is deactivated, and the engine speed throttle request is significantly (e.g. + 70 RPM) above AUTO-IDLE power level, the engine speed rises immediately to the requested engine speed.



Engine speed throttle

The engine speed throttle is used to select the desired engine power level. In the engine speed throttle there are 7 positions:

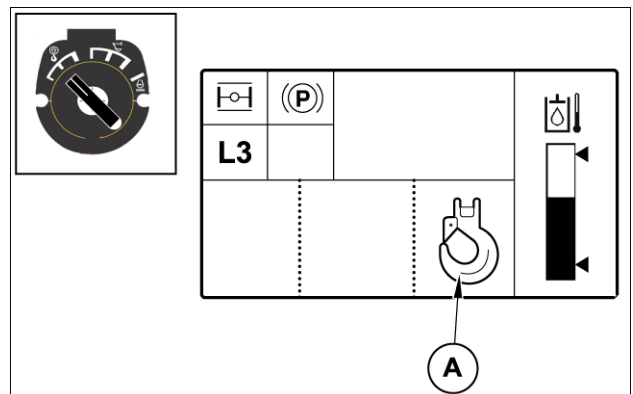
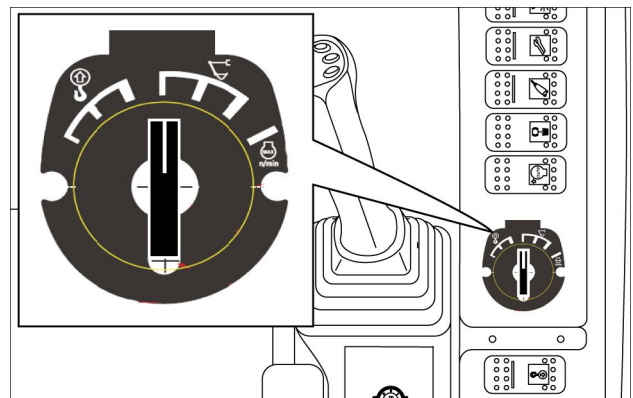
The first three positions from left of the engine speed throttle are assigned to the LIFT-mode, giving the following range of power levels:

- 1st position: Low Idle
- 2nd position: LIFT1
- 3rd position LIFT2

This mode should be selected for object handling. For an engine speed selected between Low Idle and a dedicated engine speed, the machine is in LIFT mode.

Consequently:

- On the right side of the cluster, the load hook (A) is displayed
- The maximum operating pressure of attachment is set to **370 bar** permanently.
- The maximum oil flow of attachment functions in the main valve are reduced to **80 %** for maximum joystick operation angle. In combination with the reduced engine speed, this provides a high resolution of attachment control.



The second three positions from left of the engine speed throttle are assigned to the ECO mode, giving the following range of power-levels:

- 4th position: ECO1
- 5th position: ECO2
- 6th position: ECO3

The last position from left of the engine speed throttle is assigned to the HEAVY-mode, giving the following range of power-level:

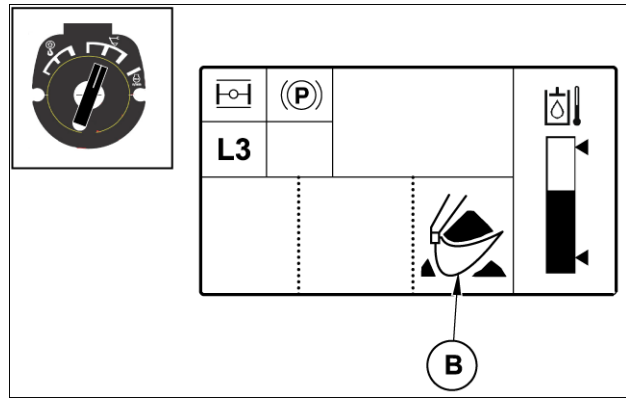
- 7th position: HEAVY

ECO and Heavy mode should be selected for standard operations of the machine (e.g. digging, levelling with bucket, travelling off-road).

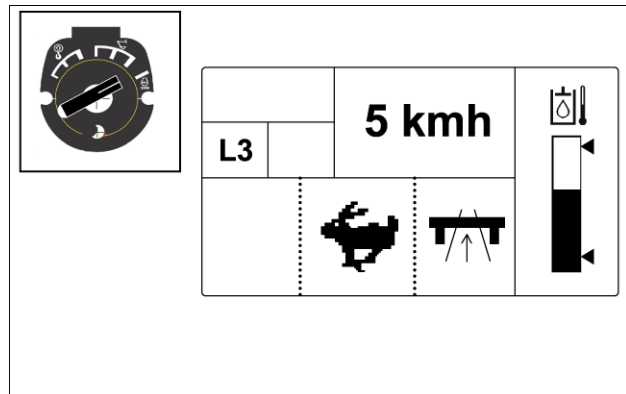
ECO-mode is less in engine speed and available hydraulic power than HEAVY.

When the machine is in ECO or HEAVY mode, on the right side of the cluster, the bucket (B) with dirt is displayed.

The maximum operating pressure of attachment is set to **340 bar (4930.0 psi)** permanently. Can be overwritten by automatic power boost, which is always activated. Maximum oil flow in main valve is **100 %**



F00002N 16



F00003N 17

Overload (optional)

This rocker switch is mounted to give an operator the warning (acoustic and on cluster) about possible instability of the machine.

When the rocker switch is activated, the backlighting of the switch is light on.

The overload system is activated by a multistage rocker switch:

- stage 0: neutral position, overload warning is off;
- stage 1: the overload warning with settings for stabilized machine is active;
- stage 2: the overload warning with settings for unstabilized machine is active;

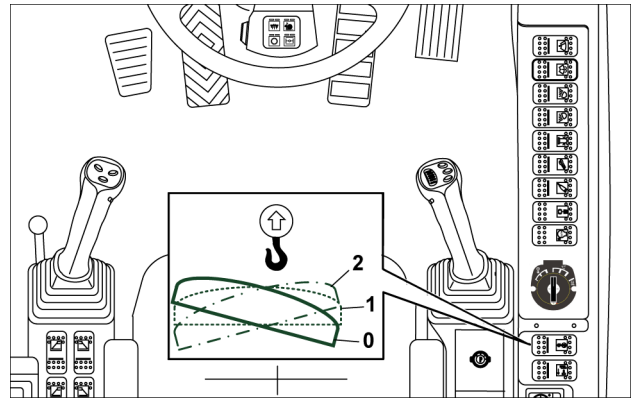
NOTE: See "OVERLOAD WARNING SYSTEM" in Accessories Chapter.

Quick coupler (optional)

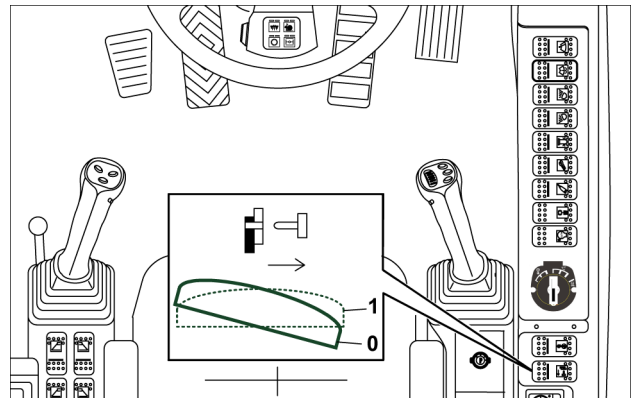
The quick coupler function is activated by a one position rocker switch: to select, press the switch face without symbol. To deactivate, press the switch face with the symbol.

When the rocker switch is activated, the backlighting of the switch is light on.

NOTE: See "HYDRAULIC QUICK COUPLER" in Accessories Chapter.



F00312N1 18



F00313N1 19

Starter switch

⚠ WARNING

Unexpected machine movement!
Before starting the engine, be sure all controls are in neutral or disengaged. This prevents the accidental start up of power-driven equipment.
Failure to comply could result in death or serious injury.

W0169A

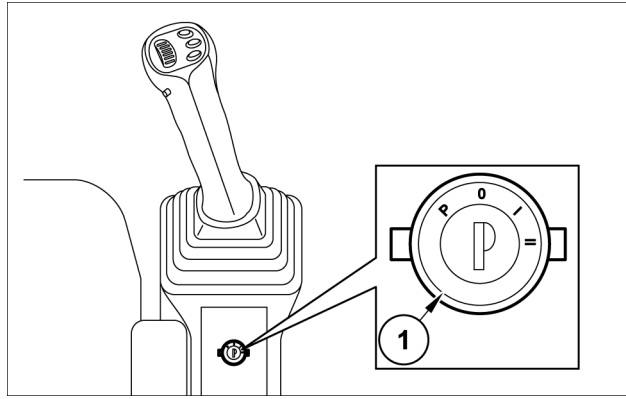
⚠ WARNING

Misuse hazard!
Before starting the engine, make sure you are fully aware of the location and the function of each control.
Failure to comply could result in death or serious injury.

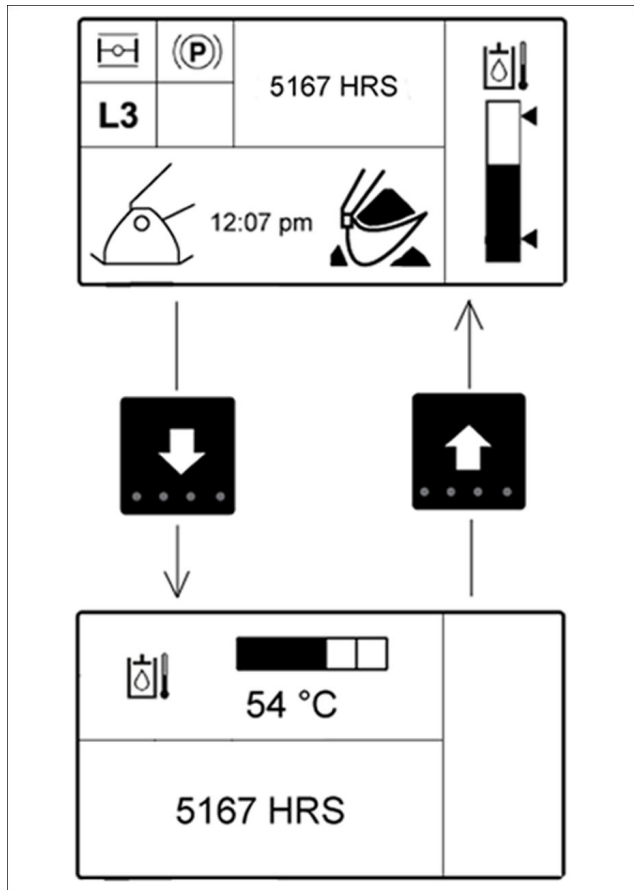
W0226A

The starter switch (1) activates following functions:
0 = The main relay disconnects all electric circuits from the battery. No electric user is under voltage, the engine is shut off. Flash light can be activated.
P = The cab inside light and socket, as well as the radio, are electrically powered. All other users are not under voltage.
I = Electrical system connected. If the start up is locked, the relevant code input is required. If the start up is not locked, the electronic control unit performs the self-test. All pilot and control lights are activated for a few seconds, the buzzer sounds. The display shows some basic information. (Engine hours, clock and hydraulic oil temperature). By means of the arrow buttons it is possible to change the indications showed: the hydraulic oil temperature and the engine hours are displayed. After pressing the arrow buttons in this temperature screen, the display screen changes back to main screen.
II = with the key in this position the started solenoid is energized to start the engine. Once the engine is started, the key is released to return into I position.

NOTE: The engine can be only started if the safety lever is in lock position.

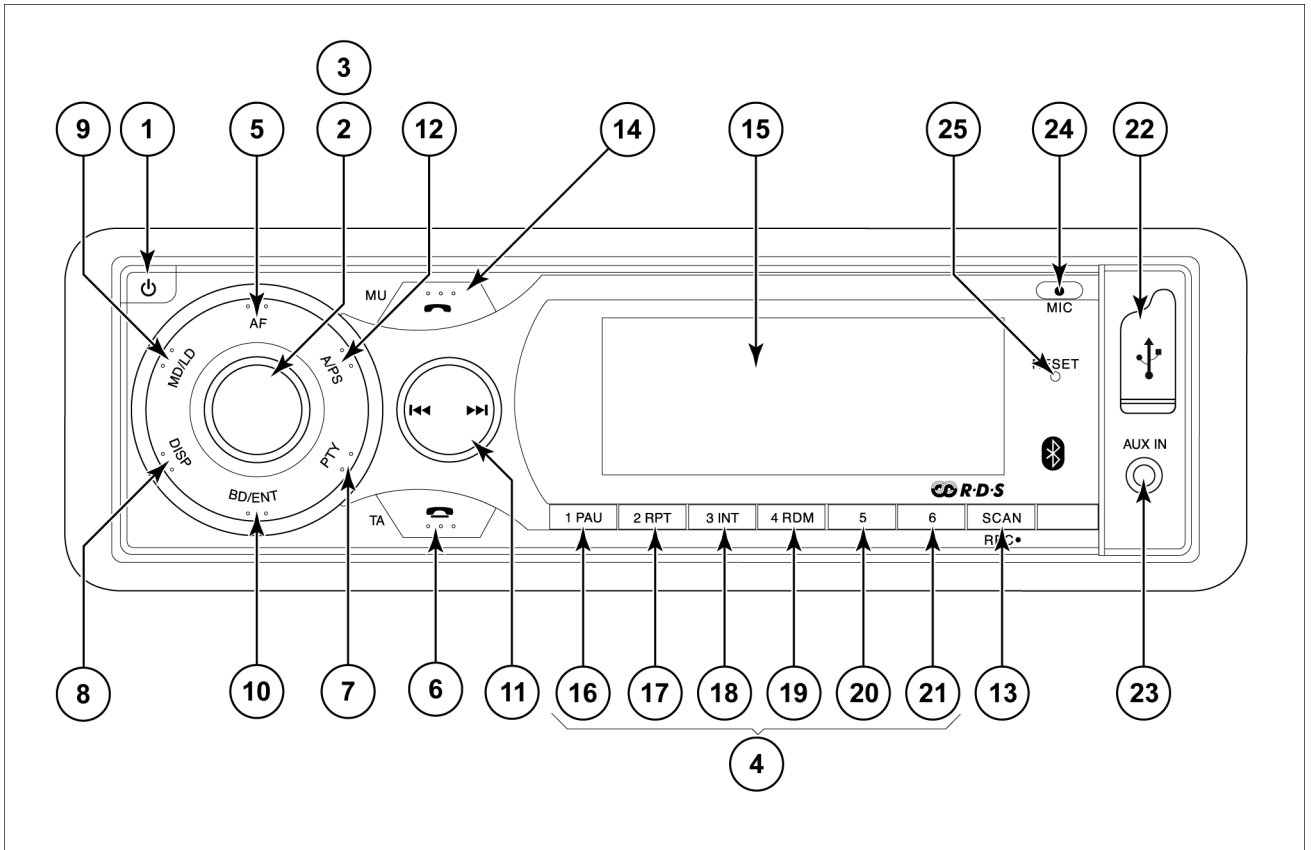


F42705N1 20



F00106N2 21

Radio



NHC0737 1

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Power on/off 2. Volume up / down button: controls for bass / treble / balance / fader / initial volume / ct / ta vol / eon / rec mode / dsp 3. Function select button: controls for bass / treble / balance / fader / initial volume / ct / ta vol / eon / rec mode / dsp 4. Preset stations 5. AF function 6. TA function (traffic announcement) / End a call function 7. PTY function (program type) 8. DISP button (display) 9. MD/LD button (mode/loudness) 10. BD/ENT button (band/enter) 11. Automatic or manual tuning buttons 12. A/PS button (auto seek search tuning) 13. SCAN/REC button (scan automatic tuning control / record) | <ol style="list-style-type: none"> 14. MU button (mute) / Answer a call function 15. Lcd display 16. Pause button (for usb playback only) 17. Repeat button (for usb playback only) 18. Intro button (preview all tracks) (for usb playback only) 19. Random button (for usb playback only) 20. Folder down (mp3/wma files only) (for usb playback only) 21. Folder up (mp3/wma files only) (for usb playback only) 22. Usb port 23. Front aux in 24. Microphone (for bluetooth handsfree conversation) 25. Reset |
|---|---|

POWER ON/OFF

Press button **(1)** to turn on unit. Press and hold to turn off.

VOLUME

Increase or decrease the volume by turning knob **(2)** (right/left).

FUNCTION SELECT BUTTON

To select other functions, press the knob **(3)** shortly until the desired functions are shown on the display (**BAS / TRE / BAL / FAD**). Turn knob (right/left) to adjust.

Press and hold knob **(3)** to adjust **INIT VOL / CT / TA VOL / EON ON / REC MODE/ DSP**.

- **IN VOL**: can adjust initial volume level using this mode.
- **ADJ**: can adjust clock time. Turn knob **(2)** clockwise to set hours and counter clockwise to set minutes.
- **TA VOL**: can adjust the volume level when traffic announcement (**TA**) is transmitted.
- **EON**: can selected EON condition, on or off.
- **REC MP3**: can select rec mode (**MP3** or **WMA**)
- **DSP**: can select DSP mode (**CLASSIC, POP, ROCK, FLAT**).

PRESET STATIONS buttons (1,2,3,4,5,6)

When pressed momentarily, these keys select a preset station directly. When pressed longer than **1 s**, current station is stored in preset memory bank.

AF function (Alternative frequencies)

When pressed momentarily, **AF** switching mode is selected. The radio checks the signal strength of the **AF** all the time. When pressed long, it is activated as regional mode on or off.

TA function (Traffic announcement)

When pressed momentarily, it is activated as **TA** mode on or off. When **TA** mode is on and traffic announcement is transmitted. If the volume level was under the threshold point, it will be raised to the threshold point. When **TP** station is received, **TP** segment is turned on in LCD display.

PTY function (Program type)

When pressed momentarily, it is activated as **TPY ON/OFF** function and start to search corresponding **PTY** information then stops if the corresponding **PTY** information is detected. By pressing this key longer than **2 s**, you can select **PTY** mode by turning Volume knob as below.
NEWS-AFFAIRS-INFO-SPORT-EDUCATE-DRAMA-CULTURE-SCIENCE-VARIED-POP-ROCK-EASY-M-LIGHT M-CLASSIC-OTHER M-WEATHER-FINANCE-CHILDREN-SOCIAL-RELIGION-PHONE

IN-TRAVEL-LEISURE-JAZZ-COUNTRY-NATION. M-OLDIES-FOLK M-DOCUMENT-TEST-ALARM.

DISP button (display)

Press **DISP** button to switch between display information such as radio frequencies, clock, track and other information depending on the playing mode.

MD/LD button (Mode / Loudness)

By pressing this key, user can select **AUX / TUNER / USB / AD2P** mode. By pressing this key longer than **2 s**, you can select **LOUDNESS** mode.

BD BUTTON (Band)

Each band is toggled cyclically by pressing this key: **FM1-FM2-FM3-MW1-MW2-LW**.

AUTOMATIC OR MANUAL TUNING buttons

RADIO MODE

- When pressed momentarily, these keys are operated as seek tuning mode. When pressed longer than **1 s**, they are operated as manual tuning mode.

MP3/WMA PLAYER MODE

- When pressed momentarily, they are operated as track up or track down mode. When pressed longer than **1 s**, they are operated as cue or review mode.

A/PS button (Auto seek search tuning)

PS: by pressing shortly, the radio searches for each preset station. Each preset station will be played for **5 s**.
AS: by pressing longer than **1 s**, the 6 strongest stations are stored in the corresponding preset memory number. When Automatic Scan operation is finish, the radio executes the preset scan.

SCAN/REC button (automatic tuning control)

Press **SCAN** button to activate radio scan. The unit will search for every station and will play **5 s** of each station found. To stop scanning, press the button once more.

MU button (mute)

Press **MU** button to turn off the sound. Press it again to return to the previous volume level.

Lcd display

The Liquid Crystal Display will display the current state of the unit.

PAUSE BUTTON

During PLAY, press **PAU** button to pause. Press it again to resume play.

REPEAT BUTTON

When this button is pressed, **RPT ON** indication is displayed and play of the selected track will be continually repeated until the track repeat mode is cancelled by pressing **RPT** button again.

INTRO BUTTON (Preview all Tracks)

When this button is pressed, **INT ON** indication is displayed and the first several seconds of each track is played. Press again to stop intro and listen to track.

RANDOM BUTTON

When this button is pressed, **RDM ON** indication is displayed and each track is played in random instead of normal progression. To cancel random mode, press **RDM** button again.

USB PORT

Using **USB** cable to connect your portable digital **MP3** player.

HOW TO SELECT MP3/WMA FILES

Searching by Track:

- Press **A/PS**, then search track is activated.
- Turn knob **(2)** left or right, select first digit desired.
- Press knob **(3)**, then the first digit is fixed and second digit will flash.
- Turn knob **(2)** left or right, select 2'nd 3'rd respectively.
- Press **BD/ENT**, the song selected will start.

Searching by Character:

- Press **A/PS** twice, then character search mode is activated.
- Turn knob **(2)** left or right and select the desired letter.
- Press knob **(3)**, repeat steps above for 2'nd 3'rd character.
- The songs with the same character that you selected is displayed.
- Turn "VOL" knob to left or right, you can select the desired song.
- Press "BD/ENT", then the song selected will start.

Searching by File Name:

- Press "A/PS" 3 times, then folder search is activated.
- Turn "VOL" knob to left or right, you can select the desired folder.
- Press "BD/ENT", then the folder is fixed and the first file will be played.

FRONT AUX IN

AUX IN input jack allows easy connection of Portable Media.

MICROPHONE

For bluetooth handsfree conversation

RESET

Reset button is placed on the housing. The reset button is to be activated for the following reason:

- Initial installation of the unit when all wiring is completed.
- All the function button do not operate.
- Error symbol on the display.

4 - OPERATING INSTRUCTIONS

COMMISSIONING THE UNIT

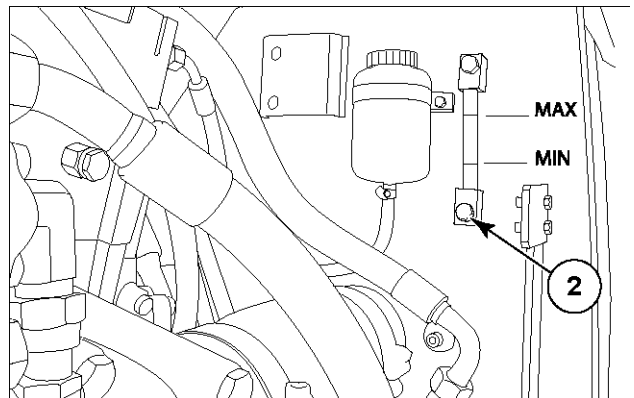
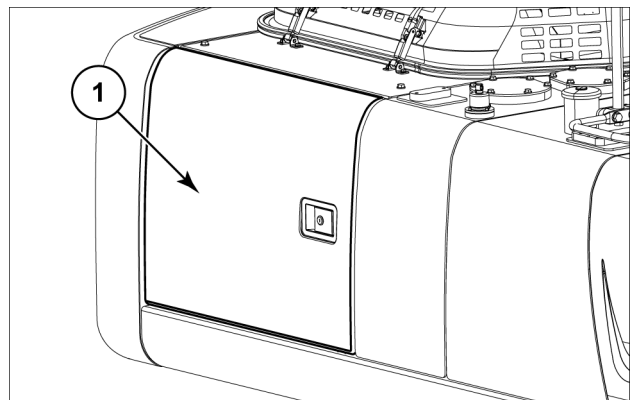
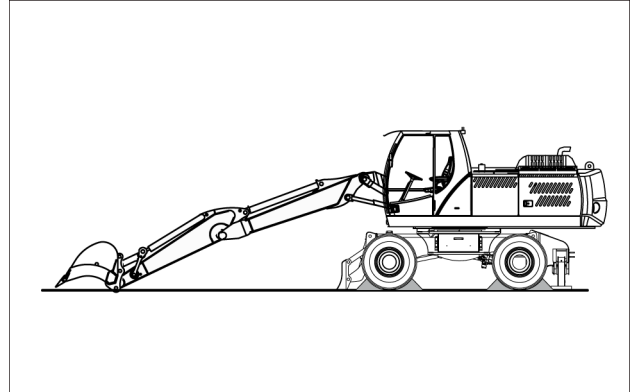
Hydraulic oil level

- Make sure that the machine is positioned on a flat surface and the attachment is positioned in the hydraulic oil level check position, as indicated in figure.
- Open the hydraulic pump compartment panel (1) then check the oil level through the level gauge (2) located on the hydraulic oil tank. Oil level should be between the **MIN** and **MAX** reference marks.
- In the event a low level of hydraulic oil is found, proceed with its topping up, operating as indicated on page 7-45

ATTENTION: do not top up using oil with different specifications from the oil already in the hydraulic oil tank. If the machine was filled with biodegradable hydraulic oil **PANOLIN HLP SYNTH**, do not top up with mineral hydraulic oil, as they cannot be mixed.

ATTENTION: avoid overfilling. An excessive quantity of hydraulic oil could damage the hydraulic system and cause oil spills.

- Close the hydraulic pump compartment panel.



Fuel level

⚠ WARNING

Fuel vapors are explosive and flammable. Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

W0904A

- Turn the starter key into I position and check the fuel level on the relevant instrument cluster meter (1).
- If the level indicator is near to the **E** position or the instrument cluster shows the fuel level warning message and its yellow lamp flashes, turn the starter key into **0** position.

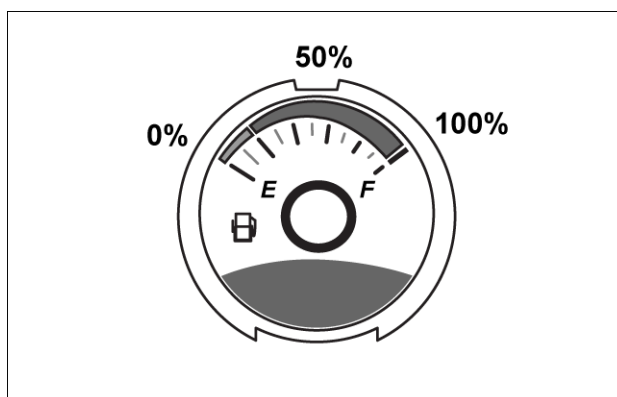
NOTE: During work when the fuel level reach the 15%, on the monitor appears the warning message "LOW ON FUEL". The yellow lamp flashing 5 times every 10 min.

- Remove the fuel tank cap (2).
- Refill the tank.
- Reinstall the fuel tank cap (2).

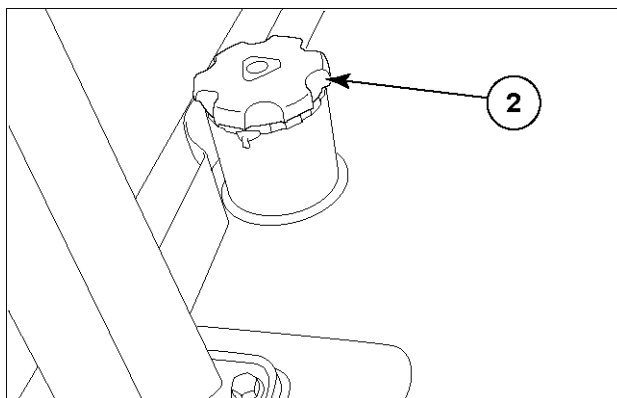
ATTENTION: If the machine is refuelled often or regularly with fuel from cans or barrels, there is an increased risk of foreign matter and water penetrating into the fuel system.

In this case:

- always refuel through a fine mesh filter;
- user only intake hoses with a fine mesh filter;
- bleed water and sludge from the fuel tank at more frequent intervals;
- change all fuel filters at more frequent intervals.



N00796_1 1



F00335N1 2

Engine oil level

ATTENTION: prior to checking the engine oil level, check that the machine is positioned on a flat surface.

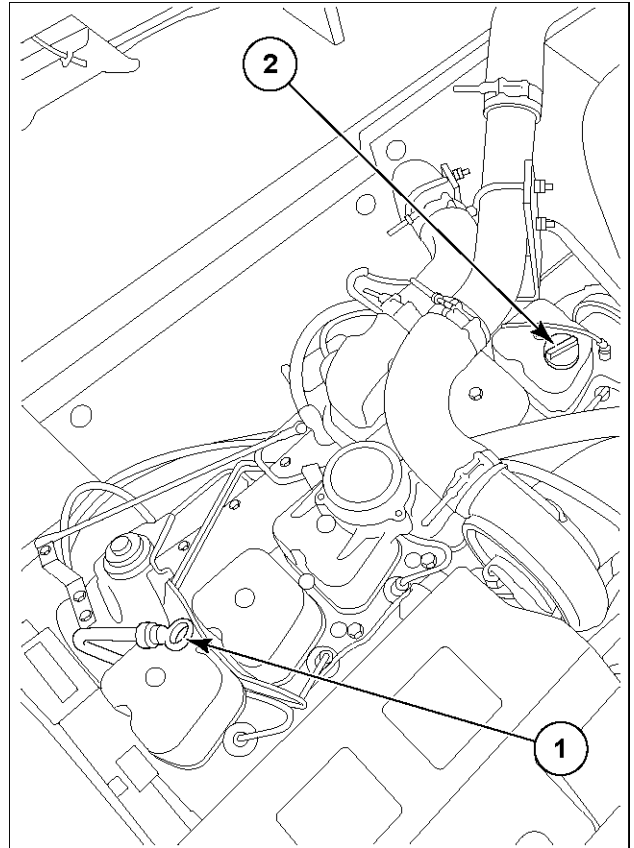
- Open the engine hood and lock it in open position.
- Pull out dipstick (1), clean it with a dry rag and reinsert it into its seat; pull it out again and check the level. This level shall be included between the **MIN** and **MAX** range located at the end of the dipstick.

NOTE: insert the dipstick slowly into its seat, so as to avoid that the pressure alters the level check.

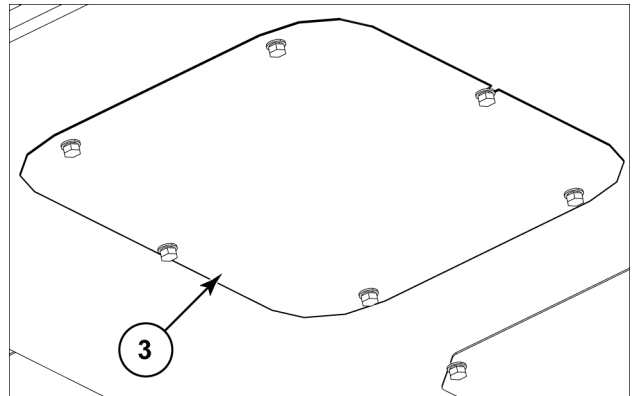
ATTENTION: in the event a low engine oil level is measured, remove the filler cap (2) and top-up the oil level, through the filler neck.

ATTENTION: do not oil with different characteristics from the oil already in the engine (see "Fluids and lubricants" at the end of chapter MAINTENANCE).

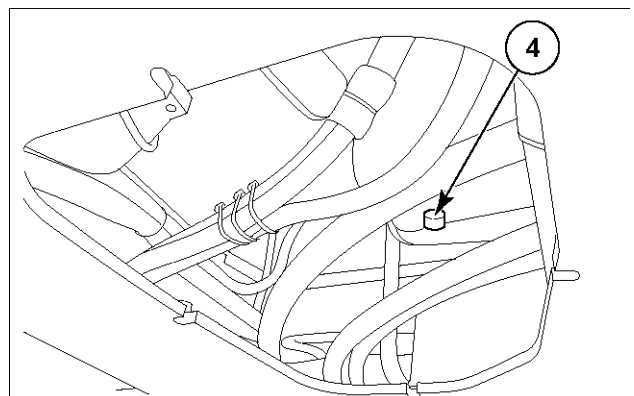
ATTENTION: if the level exceeds the mark **MAX** on the dipstick, get under the turret, remove the panel (3) in correspondence with the engine oil pan and drain the part of oil in excess through draining plug (4).



F00348N1 1



NHC0340 2

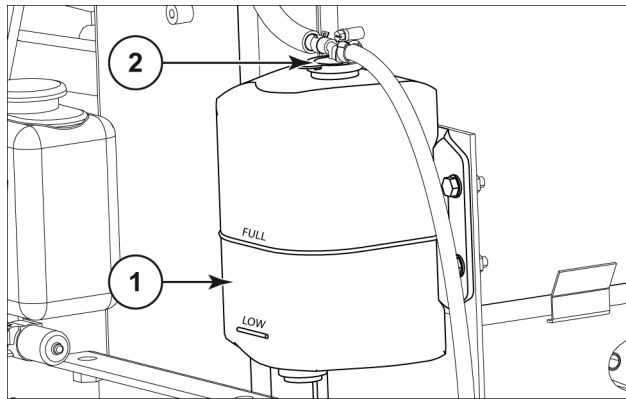
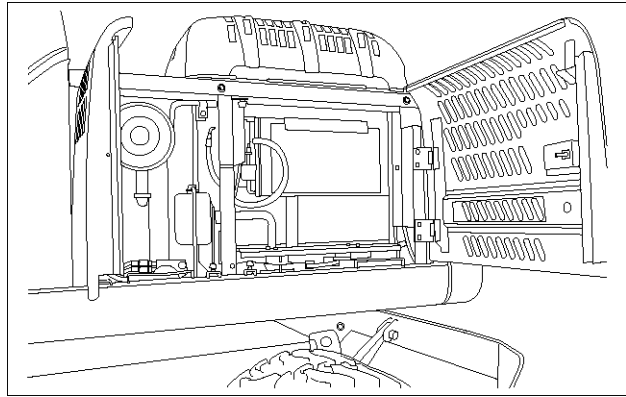


F00349N1 3

Engine coolant level

- Open the radiator and air cleaner compartment panels and lock them in open position.
- Check the coolant level on expansion tank (1). Level must be checked with cold engine and it must be between the **FULL** and **LOW** reference marks.
- In case the level is insufficient, remove the filler cap (2) and top up the level, through the filler neck, until it reaches the **FULL** mark.
- Install the filler cap (2) and close the radiator and air cleaner compartment panels.

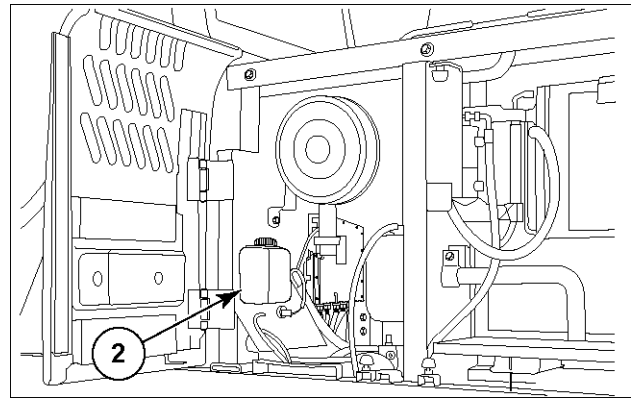
ATTENTION: when topping up, keep the water and antifreeze percentage existing in the system. Use clean water and free from chlorinated compounds whenever possible (see "Fluids and lubricants" at the end of chapter MAINTENANCE).



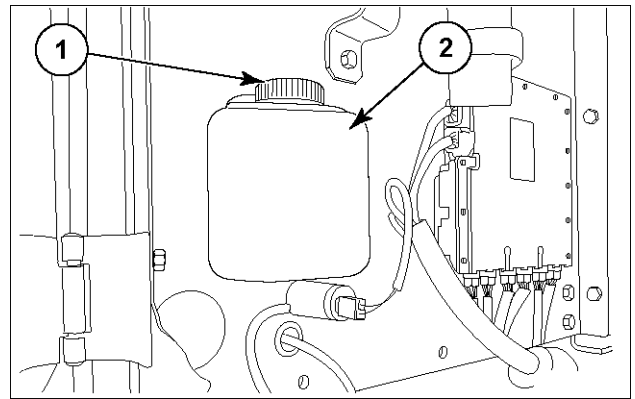
Windshield washer reservoir

This operation should be carried out consistently with how frequently the windscreen washer is used.

- Open the air filters compartment panel and lock it in open position.
- Remove cap (1) from windshield washer tank (2) and top up the level adding water and detergent liquid of the prescribed type (see "Fluids and lubricants") .
- Close the air filters compartment panel.



F00353N1 1



F00352N1 2

Fuel prefilter/water separator

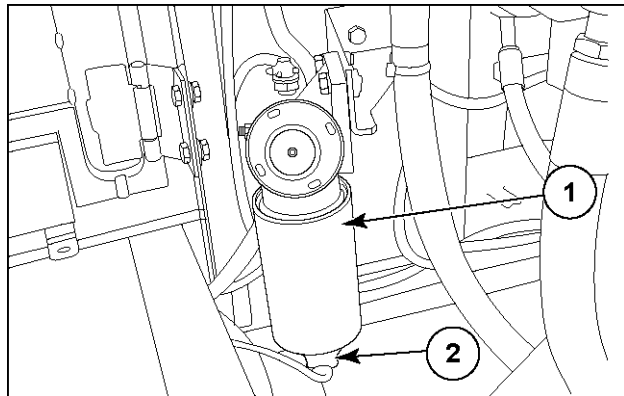
When there is some water inside the prefilter **(1)**, the sensor fastened on the draining ring **(2)** of the prefilter activates the red lamp **(3)** on multifunction display.

A brief warning is released at the same time.

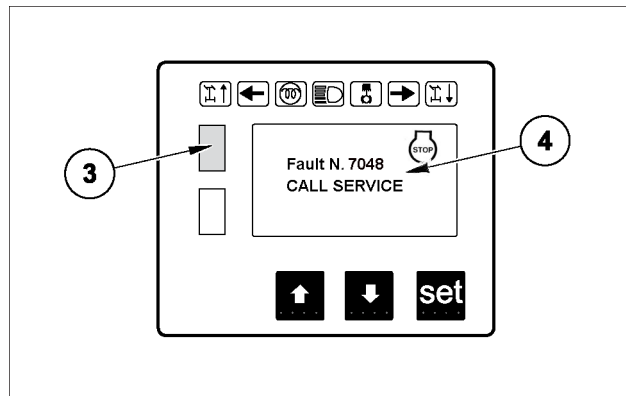
The fault code 7048 appears in the middle section of the multifunction display **(4)**. It means that there is some water in fuel prefilter.

Operate as following:

- Open the hydraulic pumps compartment panel.
- Place an appropriate container under the fuel prefilter.
- Turn slowly draining ring nut **(2)** of the fuel prefilter. When fuel only starts flowing, close the ring nut.



F00354N1 1



F00355N6 2

Wheels and tires Pressure check and wear

⚠ WARNING

Explosion hazard!

When inflating tires, use a clip-on air chuck with a gauge, remote valve, and hose long enough to allow you to stand to one side and NOT in front of or over the wheel assembly. Keep others out of the DANGER AREA. Never inflate a tire beyond the maximum allowable pressure printed on the tire.

Failure to comply could result in death or serious injury.

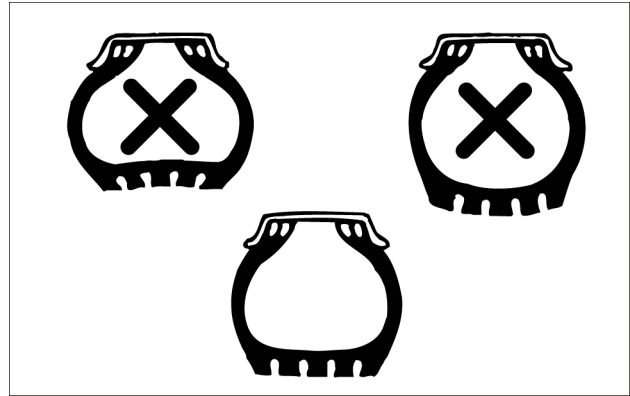
W0059A

ATTENTION: Inflate tires only with normal compressed air. Never use flammable gas: danger of explosions! Check pressure only with cold tires; when tires are warm, the pressure values detected are higher. Watch the tire and the pressure gauge of the inflating equipment permanently during the inflation and never exceed the prescribed tire pressures. Always inflate tires to the prescribed pressure:

- excessive tires pressure means poor handling properties off the road and a risk of bursting tires;
- insufficient pressure means increased wear on the tires and inadequate stability of the machine.

NOTE: Before inflating the tires, check the tires, rims and rim parts for damage, penetrated foreign objects and proper fitting.

- With the machine in safety position (attachment on the ground, safety lever in lock position, parking brake activated and engine shut off) check the tires pressure with a suitable inflating tool equipped with self-locking nozzle and pressure gauge.
- If the pressure results to be lower than expected, proceed to the inflation.
For recommended pressures see chapter "Specifications".



F5640N 1


Hydraulic service brakes - Advice Service brake and parking brake - check

Before starting the machine, check the proper operation of:

- Service brake
- Parking brake

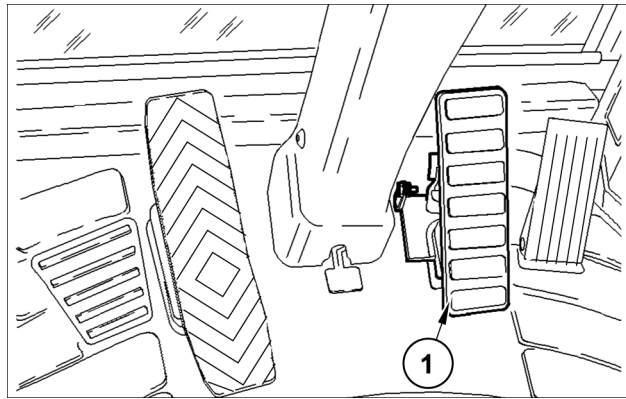
With the machine in safety position (attachment on the ground, safety lever in lock position, parking brake activated and engine shut off) check the operation of brakes as following described:

- Insert the key in to the starter switch and turn it in I position. Now the electronic control unit performs the self test and all pilot and control lights are activated for few seconds; the buzzer sounds. The brakes are monitored from electronic control unit too and if any faults are present, the warning message **(2)** appears on multi function display and the buzzer sounds.

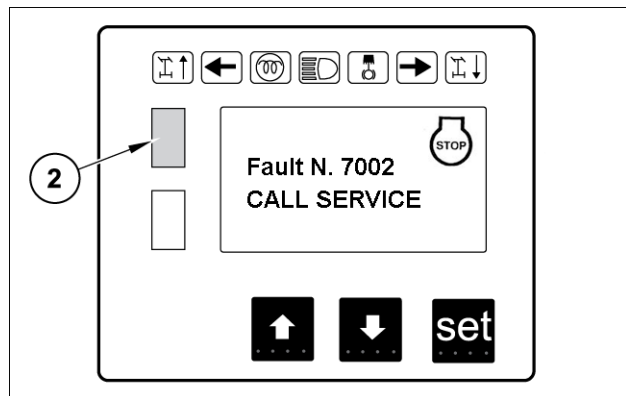
ATTENTION: If you see the fault code 7002 it means that the brake pressure is too low. If appear the symbol  put the machine in parking position and stop the engine. Call service immediately.

- Depress pedal **(1)** and verify the movement of it. It must be moved freely.
- Check the parking brake **(3)** as following way: select the travel direction with the push-buttons on the right control lever and push on the travel pedal: the display warns only once for some seconds that the service brake must be released.

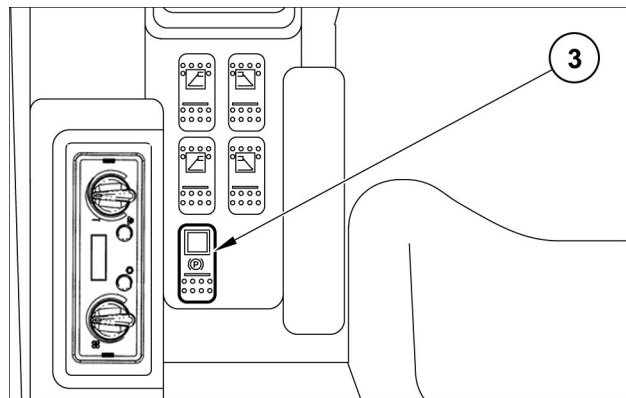
ATTENTION: If the machine moves depress the pedal **(1)** of service brake and stop the machine. Parking the machine and contact service.



F34254N 1



F00356N2 2



F42752N 3

Swing control Upper structure holding brake - Check

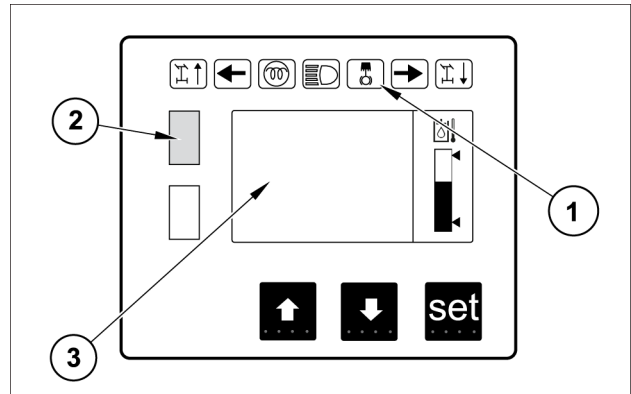
Before starting the machine, check the proper operation of:

- Upper structure holding brake

With the machine in safety position (attachment on the ground, safety lever in lock position, parking brake activated and engine shut off) check the operation of upper structure holding brake as following described:

- Insert the key into the starter switch and turn it in **I** position. Now the electronic control unit performs the self test and all pilot and control lights are activated for few seconds; the buzzer sounds. The upper structure holding brake are monitored from electronic control unit too and if any fault occurs the lamp **(1)** turns on. The red warning **(2)** turns on in multi function display and the buzzer sounds in intermittent way. On the display **(3)** appears the explanation of warning.

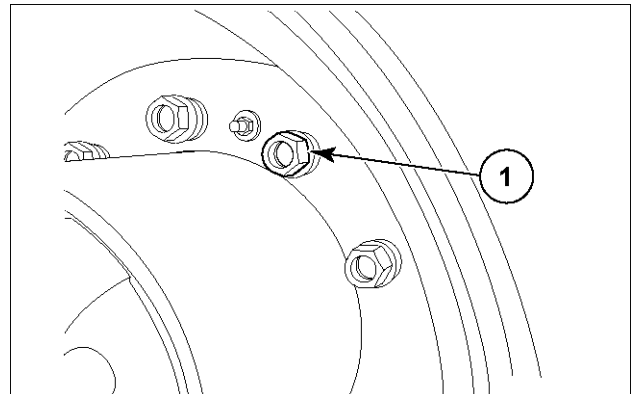
NOTE: For the use of upper structure holding brake rocker switch see Chapter 6 - Working operations



F00357N1 1

Nuts and screws tightening torque

- Park the machine on a flat surface and lower the equipment to the ground.
- Stop the engine.
- Engage the parking brake.
- Secure the machine by placing chocks under the wheels to prevent inadvertent movements.
- Check if nuts **(1)** are tighten.
- Tighten to prescribed torque **500 N·m (368.8 lb ft)**.



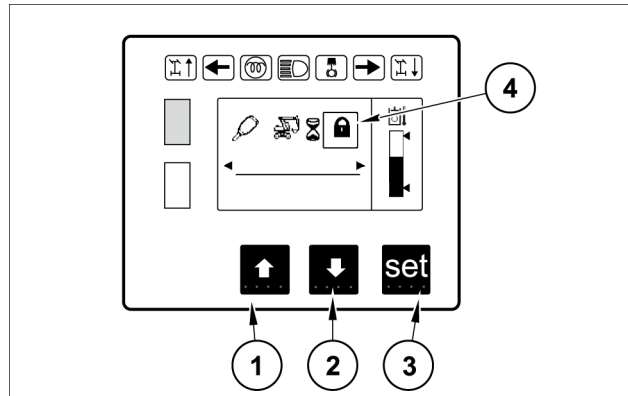
F00359N1 1

STARTING THE UNIT

Before starting the engine Start up immobilizer

This machine is equipped with an electronic immobilizer as a standard feature. When activated, the immobilizer prevents unauthorized starting of the machine.

The immobilizer is not active on delivery from the factory. It can be activated by the customer when the machine is handed over. Before activation, the customer has to enter a 4-digit code chosen by him.



NEW CODE ENTER

- In the operating mode, press the arrow button until the lock symbol (4) is highlighted grey and the text “CODE” appears.
- Confirm the setting with “set” button (3). Using the downward arrow button (2), activate the lock symbol (4) and confirm the selection with the “set” button (3). Enter the presently valid 4-digit code with the arrow buttons and the “set” button. Pay attention when changing it for the first time: the code preset at the factory is 1111.
- After confirming the fourth digit, you are requested to enter the new code again.

NOTE: note the code and keep it in a safe place.

- Confirming with the “set” button, saves the entered code, whereas upward arrow button (1) rejects the change. This takes you back to main menu.

CODE ACTIVATION

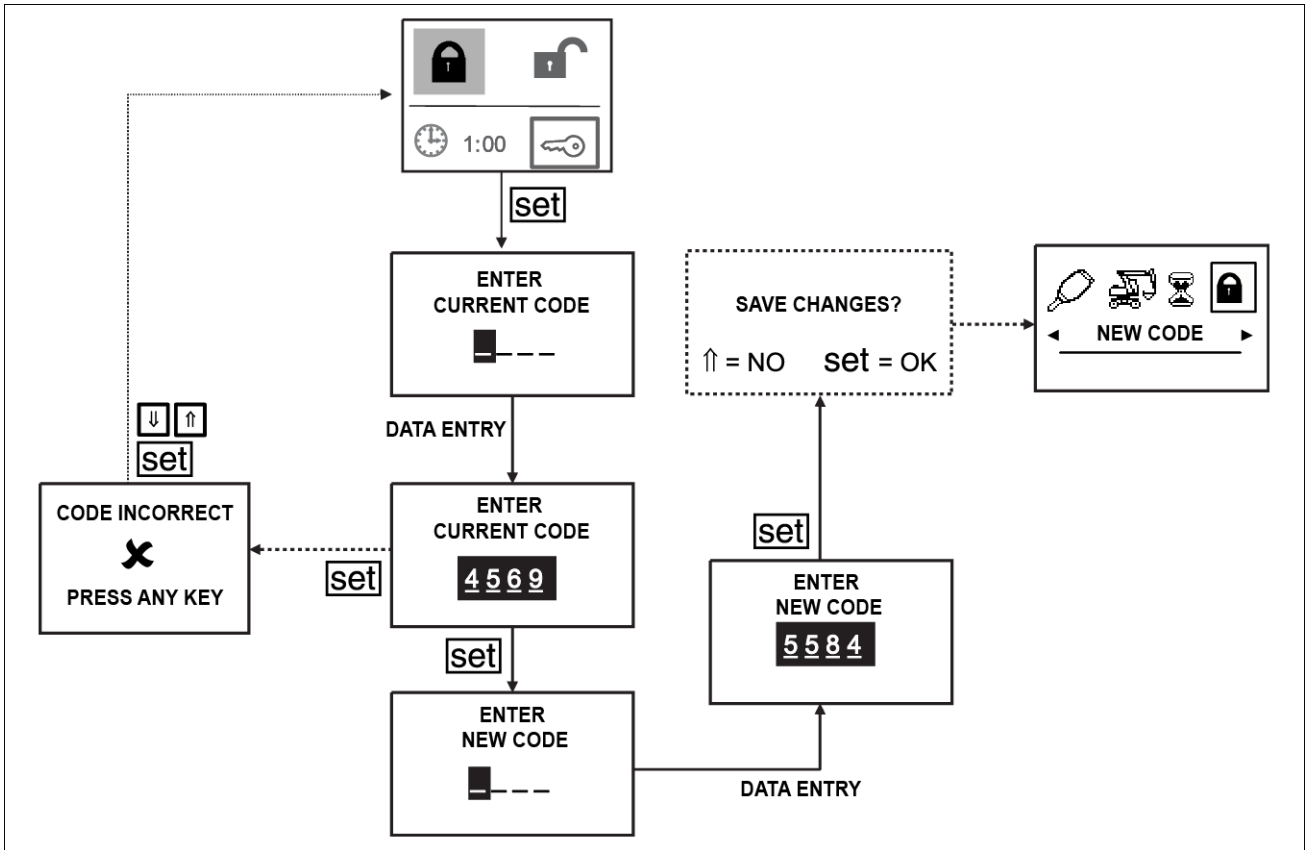
1. In operating mode depress repeatedly the arrow button, until on main menu appears “CODE” on grey background. By means of the arrow buttons you can select “closed-lock” symbol and confirm the selection with “set” button.

CODE DEACTIVATION

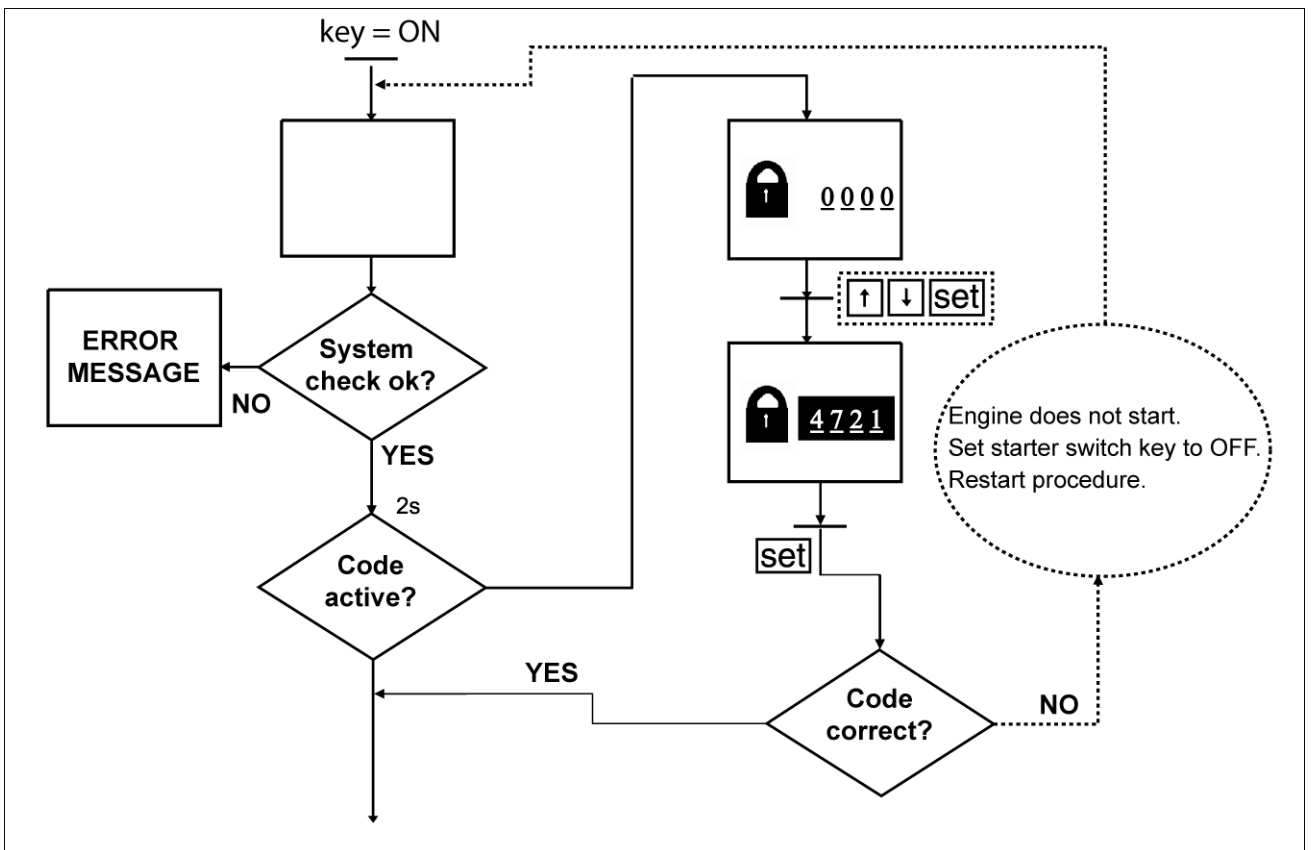
- In operating mode depress repeatedly the arrow button, until on main menu appears “CODE” on grey background and confirm with button “set” By means of the arrow buttons you can select now the “open-lock” symbol and confirm the selection with “set” button.

FURTHER SETTINGS

- Similar to the above procedure, the code can also be changed and deactivated in this sub menu and a time set after which the code is to become active. The machine can thus be put back into operation after a pause without the need to re-enter the new code, if this is done within the preset time.



F34081N1 2



F34082N2 3

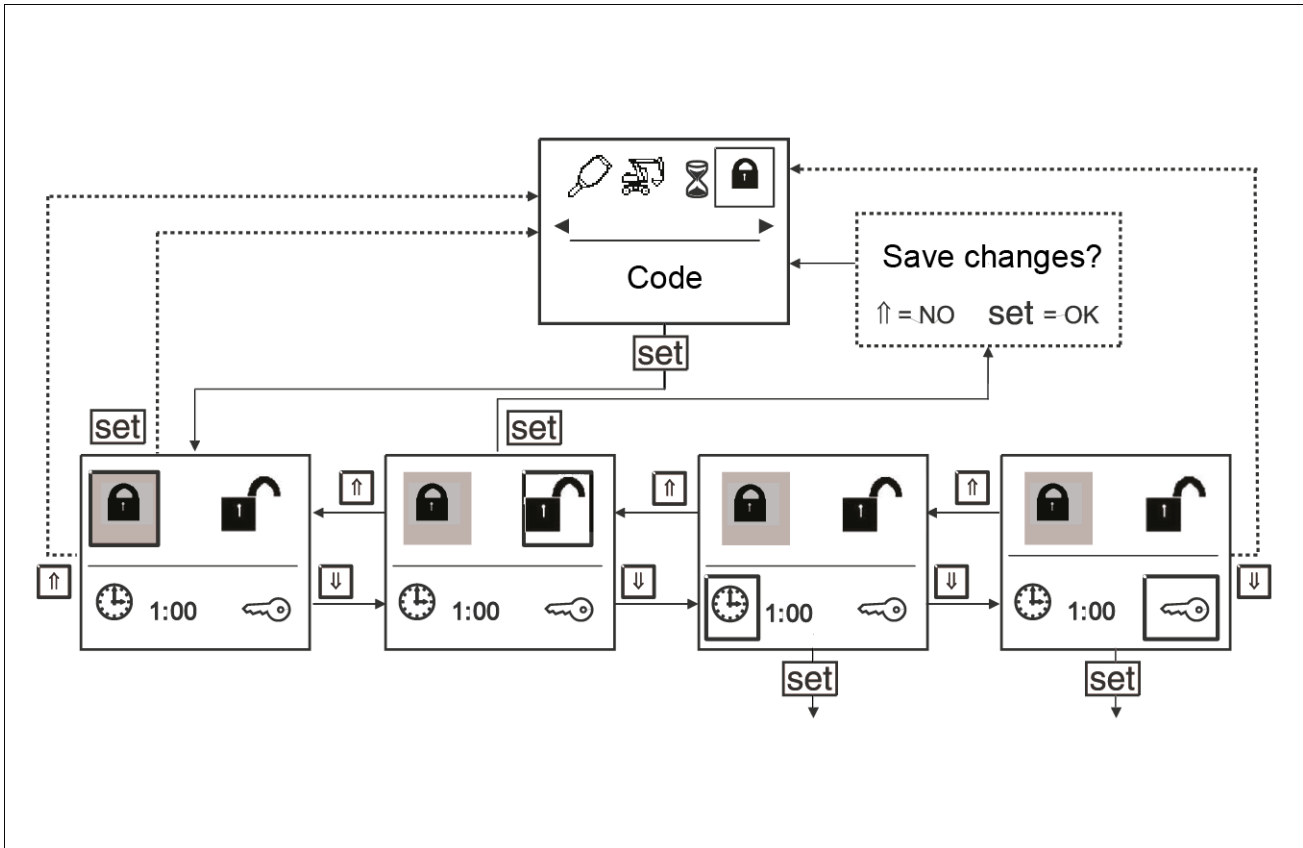
IMMOBILIZER, ACTIVATING THE CODE TIMER FUNCTION

This menu can be used for setting a time after which the code is to be activated.

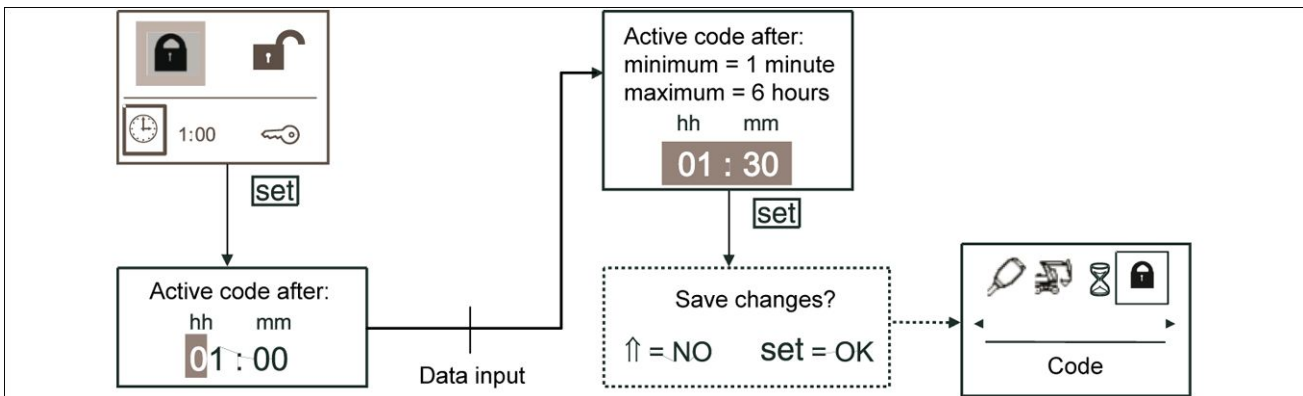
The machine can thus be put back into operation after a pause without the need to re-enter the new code, if this is done within the preset time.

In the operating mode depress the arrow button repeatedly, until on main menu appears "CODE" on grey background. Now activate button "set". By means of the ar-

row buttons you can select "closed-lock" symbol and confirm the selection with "set" button. By means of the arrow buttons you can activate now the clock symbol and confirm the selection with "set" button. Enter the activation time with the arrow buttons and the "set" button, this time can be between 1 min and 12 h. After confirming the last digit, you are requested to confirm the change once again. Confirming with the "set" button saves the selected time of activation, whereas the push-button with the upward arrow cancels the change. This takes you back to the main menu.



F34083N1 4



F34250N1 5


Starting the engine


⚠ WARNING

Inhalation hazard!
Make sure there is proper ventilation before starting the engine.
Failure to comply could result in death or serious injury.

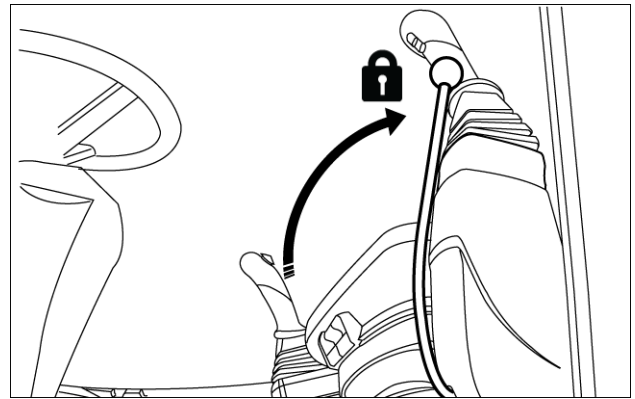
W0928A

Starting the engine in normal conditions

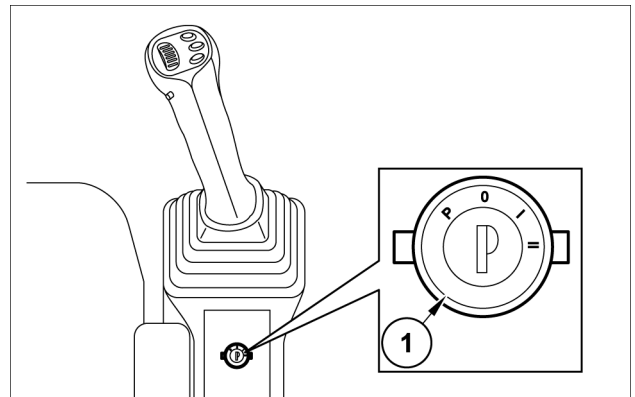
ATTENTION: the engine does not start if the safety lever is in  **UNLOCK** position.

1. Securely fasten the seat belt.
2. Make sure that safety lever is in  **LOCK** position.
3. Make sure that all control levers are in neutral position.
4. Make sure that engine speed throttle **(2)** is turned into engine low idle speed position.
5. Turn the starter key **(1)** into **I** position, and check on the instrument cluster display that all operation conditions are normal.
6. Turn the starter key **(1)** into **II** position until the engine starts. Release the starter key as soon as the engine is started. When released, the starter key returns automatically into **I** position.

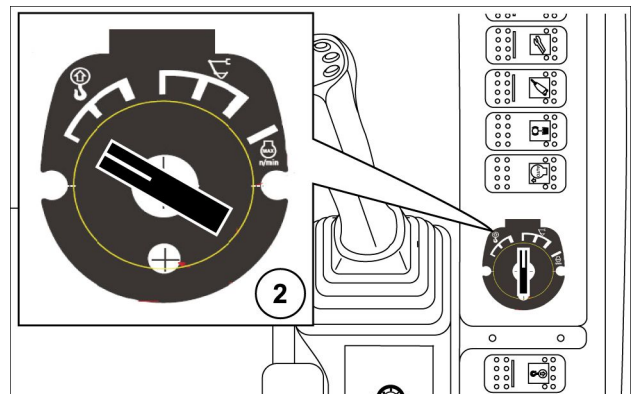
ATTENTION: do not insist with the starter key in **II** position for more than **15 s**. Should the engine fail to start, return the starter key into **0** position. Wait for **30 s**, then try again to start the engine.



F44061_1 1



F42705N1 2



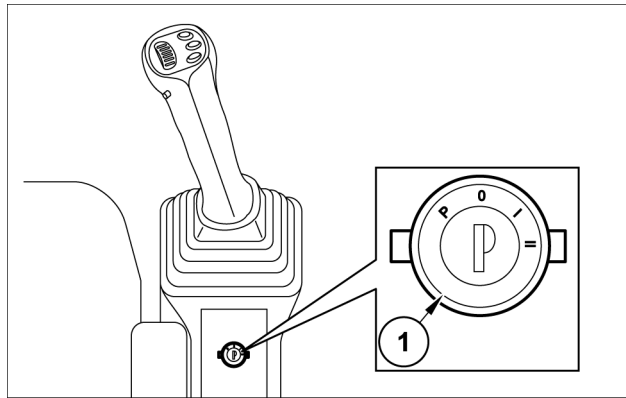
F00900N 3

Starting the engine in cold conditions

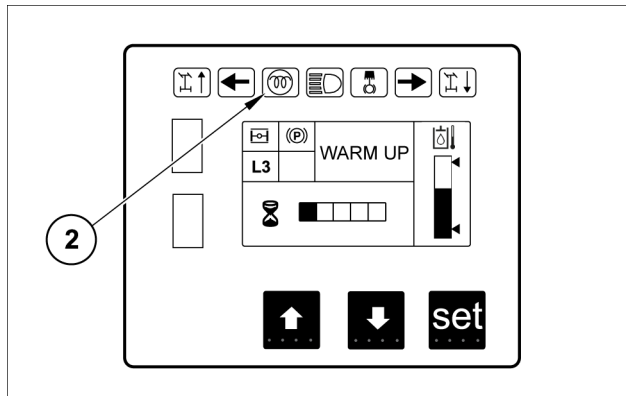
1. Repeat the above procedure from step 1 to 5.
2. In cold temperature condition, the automatic pre heating is activated, signalled by the relevant icon (2) on the instrument cluster display.

ATTENTION: before starting the engine, wait for the icon (2) to disappear.

3. Turn the starter key (1) into II position until the engine starts. Release the starter key as soon as the engine is started. When released, the starter key returns automatically into I position.



F42705N1 4



F00901N1 5

Booster battery procedure

Starting the engine with booster batteries

⚠ WARNING

Explosive gas!

Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.

Failure to comply could result in death or serious injury.

W0005A

⚠ WARNING

Explosion hazard!

Booster batteries or jumper cables must be connected properly to prevent battery explosion and/or damage to the electrical system. Connect positive to positive and negative to negative.

Failure to comply could result in death or serious injury.

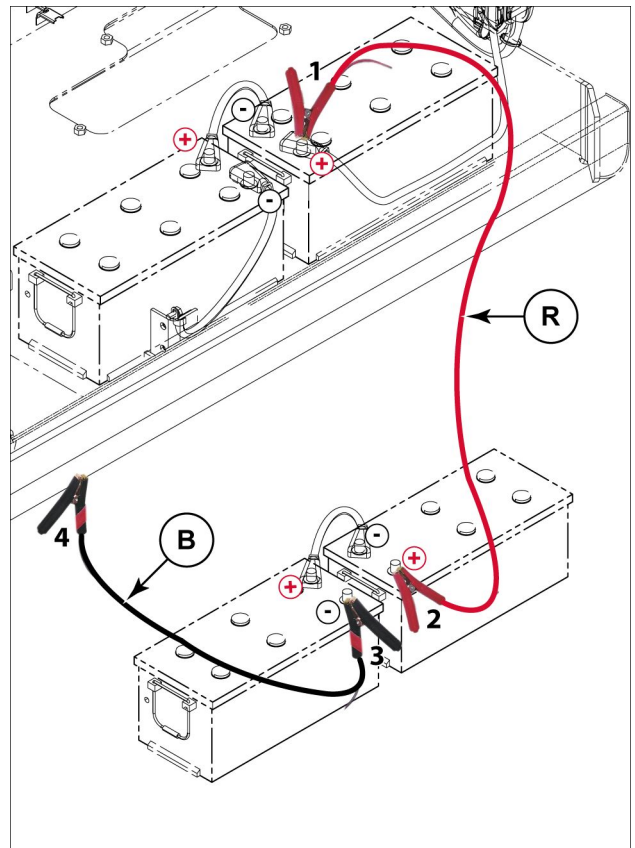
W0343A

ATTENTION: use only booster batteries with the same machine batteries characteristics (12 V - 100 A·h). Use supply cables of appropriate dimensions (at least 50 mm²).

Connecting booster batteries

1. Make sure that the starter key is in **0** position and the safety lever in **LOCK** position.
2. Connect one terminal of the red cable (**R**) to the positive (+) pole of machine batteries.
3. Connect the other terminal of the red cable (**R**) to the positive (+) pole of the booster batteries.
4. Connect one terminal of the black cable (**B**) to the negative (-) pole of the booster batteries.
5. Connect the other terminal of the black cable (**B**) to the upper frame of the machine (ground).

Cables connecting order: 1 --> 2 --> 3 --> 4



NHC0248B 1

Disconnecting booster batteries

1. Disconnect the terminal of the black cable (**B**) from the upper frame of the machine (ground).
2. Disconnect other terminal of the black cable (**B**) from the negative (-) pole of the booster batteries.
3. Disconnect the terminal of the red cable (**R**) from the positive (+) pole of the booster batteries.
4. Disconnect one other terminal of red cable (**R**) from the positive (+) pole of the machine batteries.

Cables disconnecting order: **4 --> 3 --> 2 --> 1**

Inspection after starting the engine

Safety Lever

⚠ WARNING

Avoid injury!

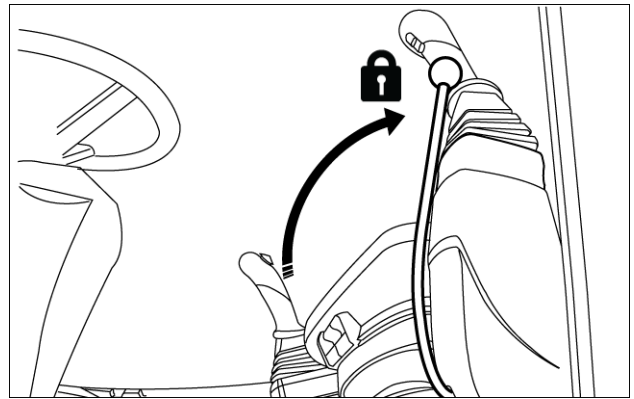
If the machine responds to the controls with the safety lever in the LOCK position, stop the engine immediately and contact your dealer. Failure to comply could result in death or serious injury.

W0937A

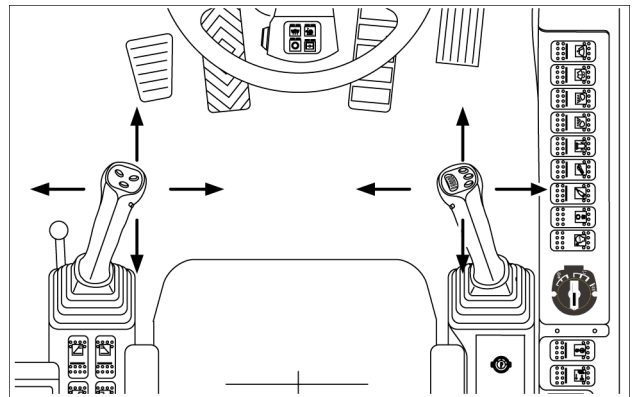
With the engine running and the safety lever in **LOCK** position:

- Operate the right and left control levers and make sure the attachment does not move.

ATTENTION: with the safety lever in **LOCK** position the machine could move if the service brake pedal and the parking brake control are not engaged. Do not select the travel direction by means of the push buttons on the right control lever and do not operate on travel pedal.



F44061_1 1



W00319N 2

Engine warm up

ATTENTION: during the engine warm up phase, do not increase the engine RPM. It may cause failure and trouble to the engine.

Warm up mode

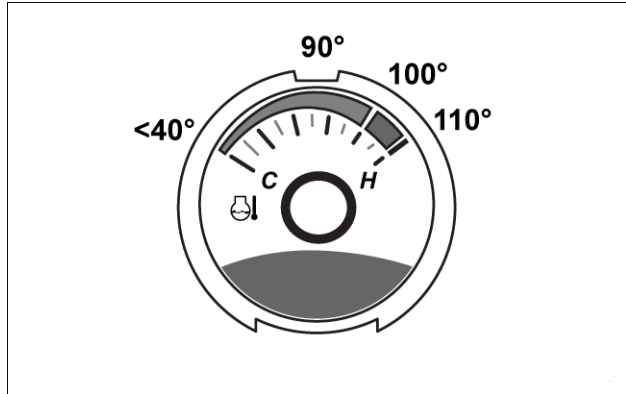
When the engine is started, and the engine coolant temperature is below **40 °C (104.0 °F)**, the WARM-UP mode is activated.

This mode is active as long as the coolant temperature is below **40 °C (104.0 °F)**, or for a maximum period of **5 min**, whichever comes first.

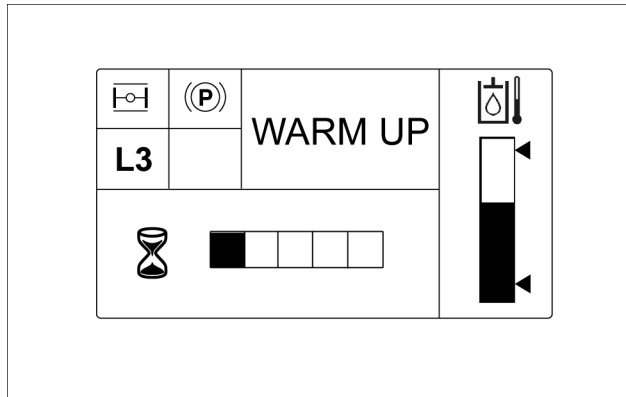
The activation of this mode is displayed in the cluster, overlaying the engine speed indication. In the field below, there is a bar graph divided in 5 fields, representing the time passed. It is a limiting mode, which means that the engine speed is limited to the WARM-UP mode settings if the throttle rotary dial requests an engine speed above WARM-UP. If the throttle rotary dial position is below WARM-UP setting, the engine speed is set according to the rotary dial.

If the joysticks or pedals are operated while in WARM-UP mode, the screen changes to normal operation mode, and switches back to WARM-UP screen if they are back in neutral. If the joysticks or pedals are not in neutral while the conditions to leave the WARM-UP mode are fulfilled, and the rotary dial position requests an engine speed above or below WARM-UP setting, the engine speed does not change until the joystick and pedals are in neutral again (SAFETY). To indicate the zone from **0 °C (32.0 °F)** to **40 °C (104.0 °F)**, there is a red area on the coolant temperature analogue gauge.

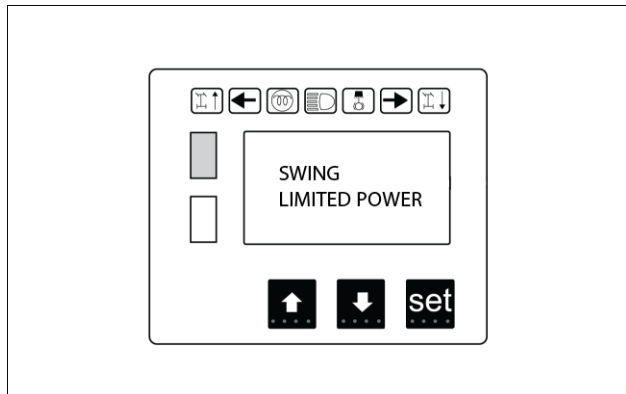
If the swing is operated in WARM-UP mode, the maximum pilot pressure is limited, thus the maximum available acceleration and speed is reduced. This is indicated on the cluster, as long as the swim is operated.



N00795_1 1



W00015N1 2




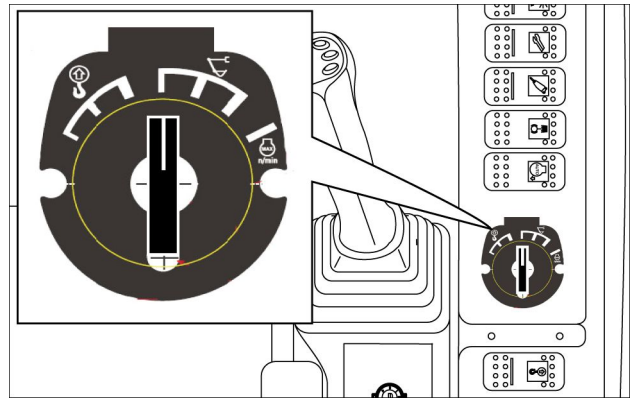
W00203N 3

Hydraulic oil warm up

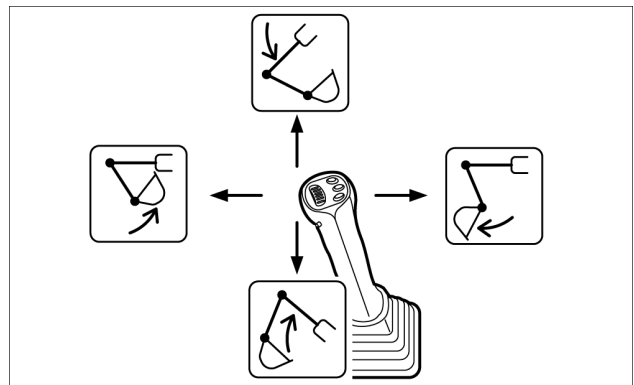
ATTENTION: do not start working prior to completing a correct hydraulic oil warm up, since the hydraulic functions would be slowed down and unexpected movements of the machine could occur. Also, some hydraulic components could be damaged by insufficient lubrication.

To warm up the hydraulic oil, proceed as follows:

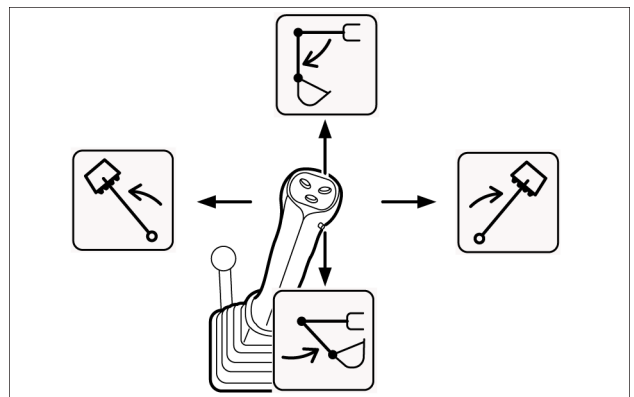
- Make sure to perform the engine warm up.
- Place the safety lever in  **UNLOCK** position and the engine speed throttle in **HEAVY** position (7th position).
- Operate the right control lever to stroke end and perform the bucket roll in and roll out for about **2 min**.
- Operate the right control lever to stroke end and perform the boom lowering and raising for about **2 min**.
- Operate the left control lever to stroke end and perform the arm roll in and roll out for about **2 min**.
- Operate the left control lever and slowly perform swing operations for about **2 min**.



F00315N1 1




F00806N 2



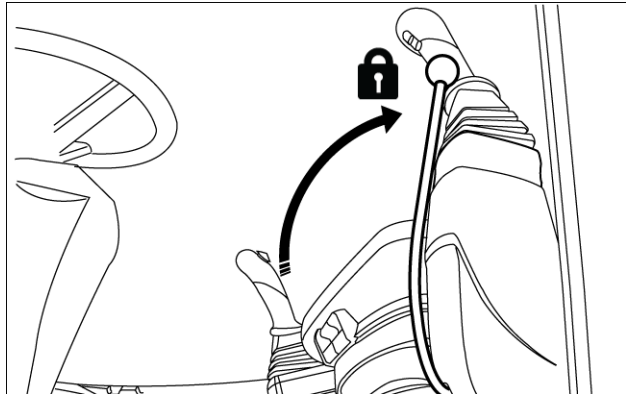
F00805N 3

STOPPING THE UNIT

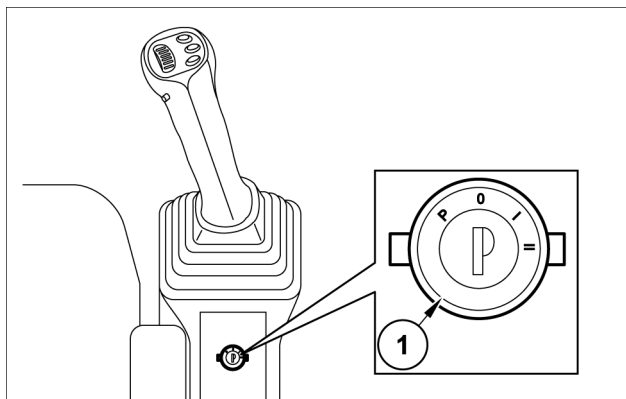
Stopping the engine

1. Park the machine on a firm and possibly level ground.
2. Place the safety lever in  **LOCK** position.
3. Deactivate the Auto Idle function and turn the engine speed throttle (2) to idle speed position **Low idle** (1st position).
4. Let the engine run at low idle for some minutes to guarantee turbocharger progressive slow down and cooling.
5. Turn the starter key (1) into **0** position.
6. Remove the starter key from the starter switch.

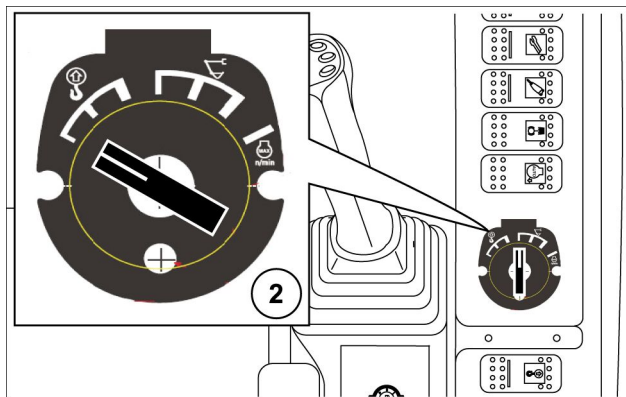
ATTENTION: *stopping the engine while running at high speed may cause the turbocharger turbine shaft to rotate without proper lubrication, with consequent severe damage to the turbocharger.*



F44061_1 1



F42705N1 2



F00900N 3

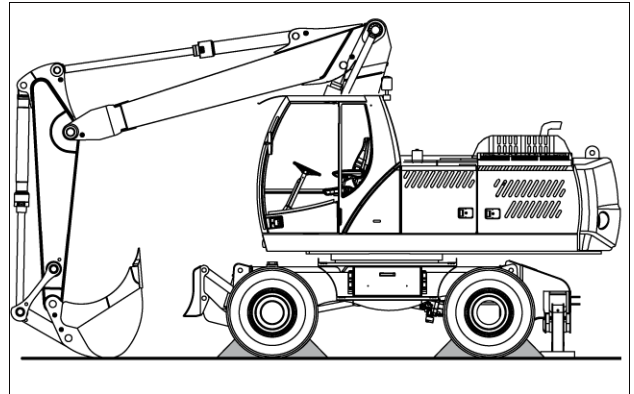
PARKING THE UNIT

Parking the machine

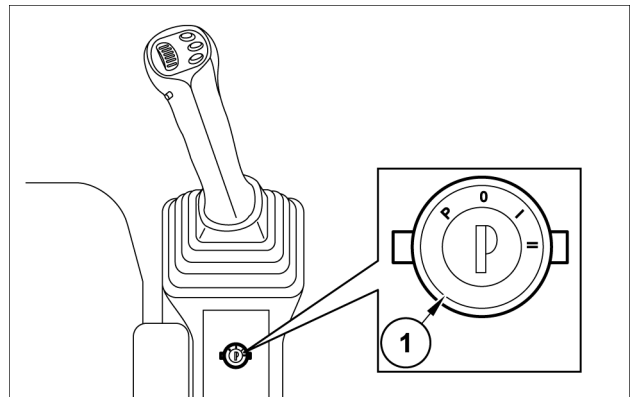
- Park the machine on a level and firm surface.
- Lower the working attachment to the ground.
- Lower the blade and the stabilizers to the ground.
- Lock the upper structure.
- Engage the parking brake.
- Stopping the engine.
- Set the starter switch key **(1)** to position **0**.

ATTENTION: Do not shut off the engine when running at full speed, but let it run idle for some minutes to cool it down.

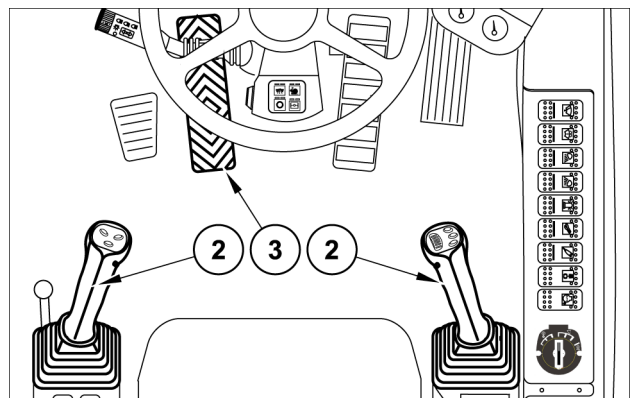
- To allow all cylinders to release pressure set the starter switch key again to position **I** move both hydraulic control levers **(2)** and the pedal **(3)** in all directions.
- Set the starter switch key **(1)** back to position **0** and pull out the key.
- The starter switch key **(1)** has a position **P** where some electrical users are still powered. If these users remain active for a long time, batteries may discharge. Because of this, pay attention that the starter switch key is always set to position **0**, before leaving the machine parked for long time (for instance at work shift end).
- With special attachment, move both hydraulic control levers **(2)** and the pedal **(3)** in all directions, to allow all cylinders to release pressure.
- Lift the left console **(5)** and set the safety lever **(4)** to the locked position.
- Close the window, the sliding roof and the cab door.
- Lock all doors and compartments of the machine. Place some wedges under the wheels so as to prevent the machine from moving.



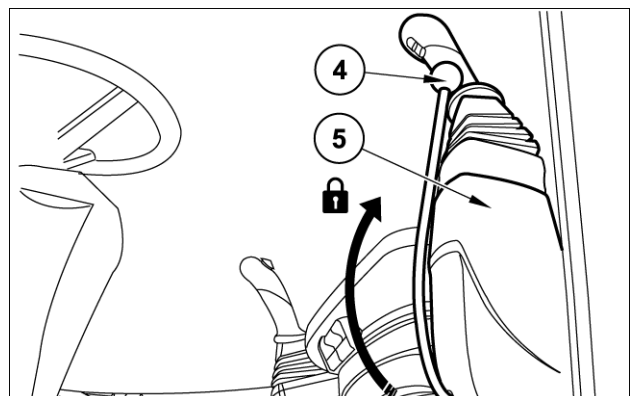
F34530N 1



F42705N1 2



F42711N1 3



F42712N 4

5 - TRANSPORT OPERATIONS

ROAD TRANSPORT

Frame - Load

MACHINE PREPARATION

- Know the total weight, length, width and height of the machine to be transported. Refer to the chapter SPECIFICATIONS.
- Use only a trailer with a rated capacity sufficient to transport the machine. Make sure trailer has ramps or a ramp is available for loading the machine. Use ramps which have sufficient width, length, thickness and strength. The ramp slope should be **15°** or less.
- Investigate beforehand the conditions of the road to be traveled, weight and size limits, and special local traffic regulations.
- Obtain any permits required from proper government agencies for machine transportation.
- Position the trailer on firm and level ground. Put blocks to the tires of trailer to prevent machine from moving.
- Accurately clean the machine undercarriage and tracks to prevent mud or debris from skidding during transport.

LOADING THE MACHINE

▲ WARNING

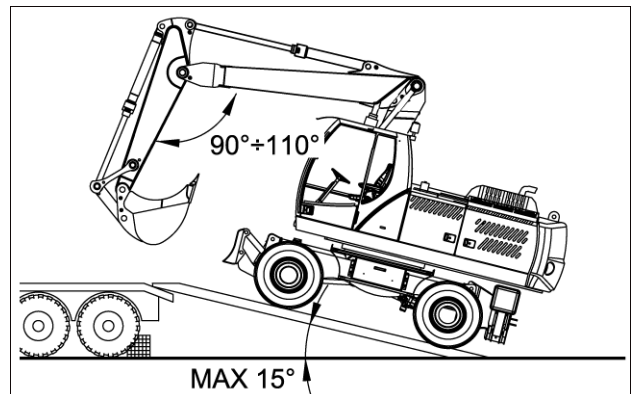
Loss of control hazard!

Turn off the Auto Idle function when traveling downhill or when loading/unloading from a trailer.

Failure to comply could result in death or serious injury.

W0927A

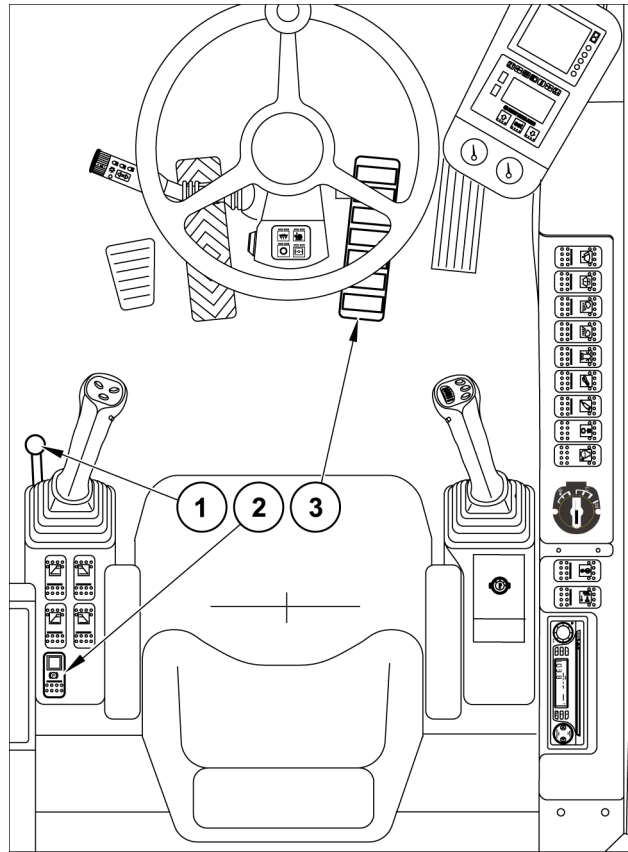
- Travel forward along the ramp with the front attachment at the front.
- Once the ramp top has been reached, and before the machine starts falling forward onto the flatbed (shifting its centre of gravity), rest the bucket flat onto the trailer flatbed (the angle between the booms should be **90°** to **110°**).
- Travel slowly forward until the wheels are correctly positioned on the trailer flatbed.
- Slightly raise the bucket from the flatbed, retract the dipper and keeping it tucked under, slowly swing the upper structure of **180°**.
- Retract the bucket and rest it on proper blocks (e.g.: wooden blocks).



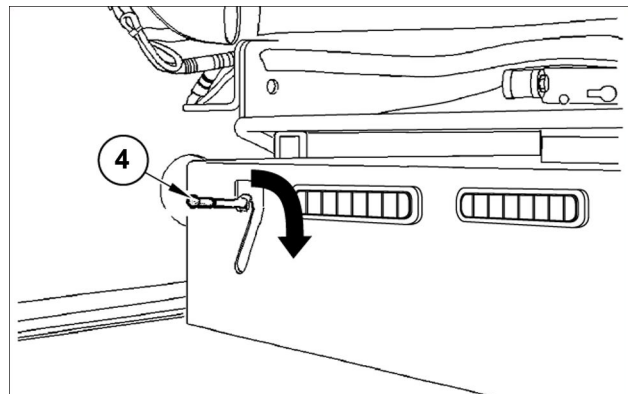
F34534N 1

5 - TRANSPORT OPERATIONS

- Activate the parking brake by switch **(2)**.
- Lock the service brake **(3)**.
- Lock the upper structure by means of proper pin **(4)**.
- Deactivate the controls with lever **(1)**.
- Stop the engine. Remove the starter switch key from the ignition lock.

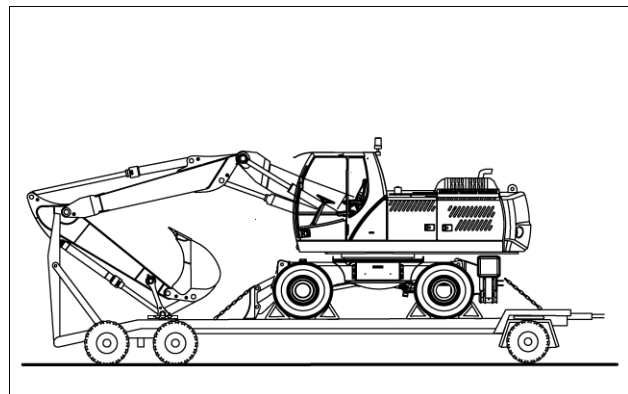


F00321N 2



F44062N 3

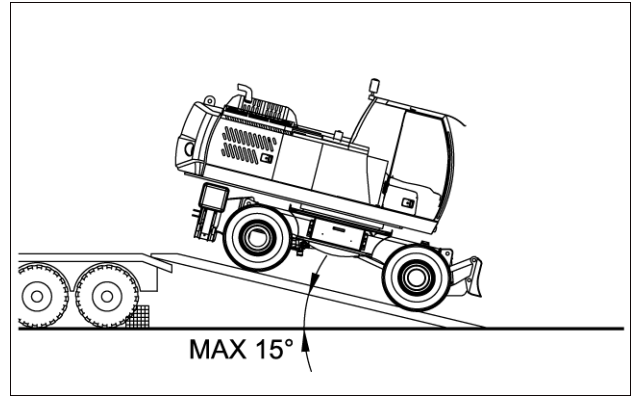
- Close all windows, front windscreens, and cab door.
- Cover the exhaust pipe to prevent water or dirt from entering.
- Place the chocks to the wheels.
- Secure the machine to the trailer correctly, so as to prevent dangerous movements, proceed as described in the relevant chapters.



F34552N 4

Loading machine without front attachment

If loading the machine when the front attachment is removed, direct counterweight upward direction on the ramp.



F34532N 5

SECURING THE MACHINE

For transport purposes, the machine must be tied down in front and at the rear with two tying chains each. Depending on the existing tying points, working equipment or stabilization variant, the following prescriptions/ spacings are applicable for tying down the machine.

FRONT FASTENING POINT WITHOUT BLADE AND STABILIZERS — WX188

Tie down the machine at the outer holes of the fastening bracket on both sides using heavy-duty shackles

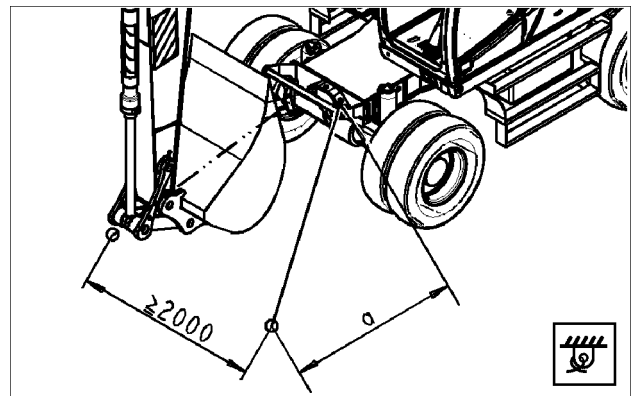
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf) (10 t) / EN 12195-3**.

NOTE: See lashing point decal position on the undercarriage.



F44264N1 6

WX188	Fastening distance a
Machine with rear blade only	500 - 1300 mm (19.7 - 51.2 in)
Machine with rear stabilizers only	600 - 1500 mm (23.6 - 59.1 in)

FRONT FASTENING POINT WITH BLADE — WX188

NOTE: always drive the machine onto the low-bed trailer in forward gear. Lower the levelling blade for transport and for fastening onto the loading platform.

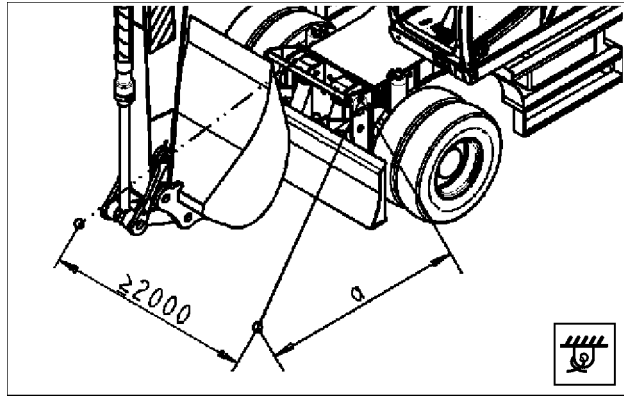
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf)** (**10 t**) / **EN 12195-3**.

NOTE: See lashing point decal position on the undercarriage.



F34149N1 7

WX188	Fastening distance a
Machine with rear stabilizers only	500 - 1500 mm (19.7 - 59.1 in)

FRONT FASTENING POINT WITH STABILIZERS — WX188

Tie down the machine at the outer holes of the fastening bracket on both sides (not crosswise) using heavy-duty shackles.

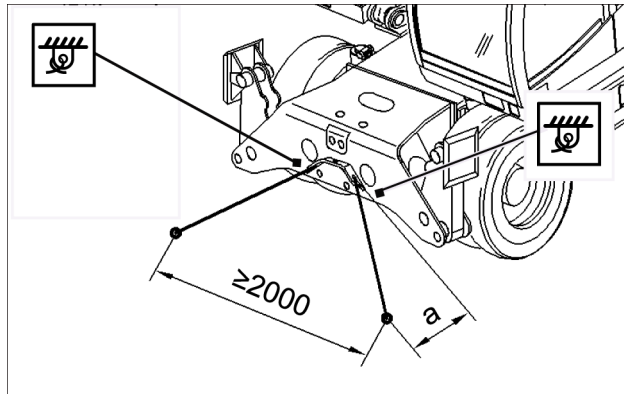
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf)** (**10 t**) / **EN 12195-3**.

NOTE: The fastening points on the loading platform must be at least **2 m (6.6 ft)** part.



F42742N1 8

WX188	Fastening distance a
Machine with rear and front stabilizers	450 - 1000 mm (17.7 - 39.4 in)

REAR FASTENING POINT WITH BLADE — WX188

NOTE: always drive the machine onto the low-bed trailer in forward gear. Lower the levelling blade for transport and for fastening onto the loading platform.

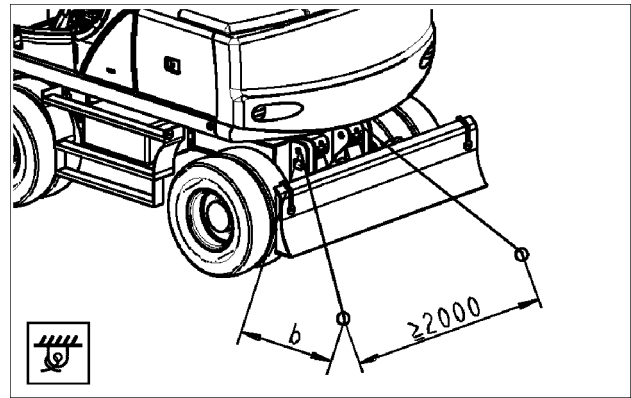
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf) (10 t) / EN 12195-3**.

NOTE: See lashing point decal position on the undercarriage.



F00322N 9

WX188	Fastening distance b
Machine with rear blade only	1050 - 1900 mm (41.3 - 74.8 in)

REAR FASTENING POINT WITH STABILIZERS — WX188

Tie down the machine at the outer holes of the fastening bracket on both sides (not crosswise) using heavy-duty shackles.

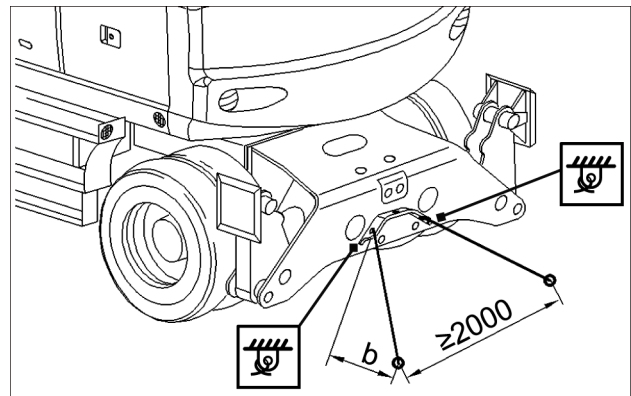
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf) (10 t) / EN 12195-3**.

NOTE: The fastening points on the loading platform must be at least **2 m (6.6 ft)** part.



F42743N1 10

WX188	Fastening distance b
Machine with rear stabilizers only	1500 - 2650 mm (59.1 - 104.3 in)
Machine with front blade and rear stabilizer	1500 - 2450 mm (59.1 - 96.5 in)
Machine with rear and front stabilizers	1200 - 1800 mm (47.2 - 70.9 in)

FRONT FASTENING POINT WITHOUT BLADE AND STABILIZERS — WX168

Tie down the machine at the outer holes of the fastening bracket on both sides using heavy-duty shackles

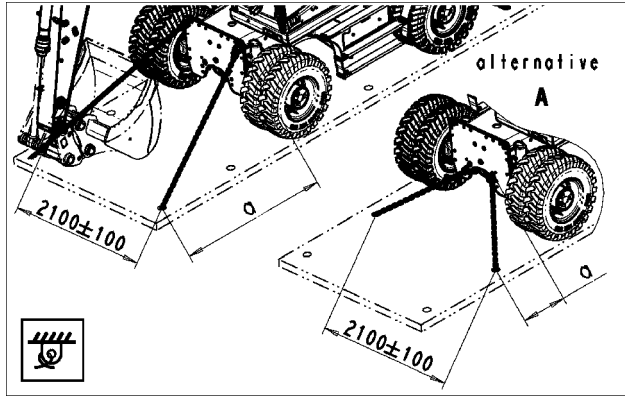
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

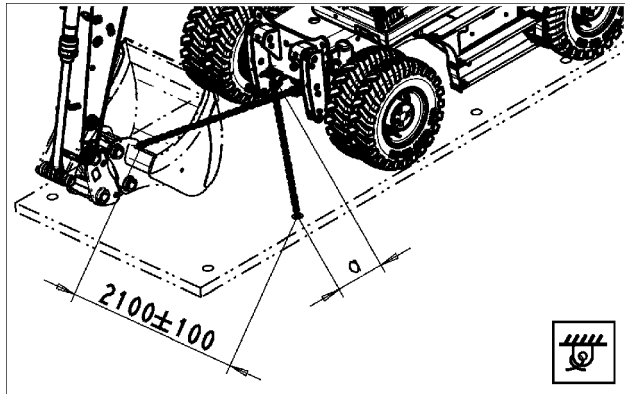
Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf)** (10 t) / **EN 12195-3**.

NOTE: See lashing point decal position on the undercarriage.



F44265N1 11



F44265N2 12

WX168	Fastening distance a
Machine with rear blade only	2000 mm +/- 250 (78.7 in +/- 9.8)
Machine with rear blade only — Alternative A	800 mm +/- 150 (31.5 in +/- 5.9)
Machine with rear stabilizers only	1100 mm +/- 150 (43.3 in +/- 5.9)

FRONT FASTENING POINT WITH BLADE — WX168

NOTE: always drive the machine onto the low-bed trailer in forward gear. Lower the levelling blade for transport and for fastening onto the loading platform.

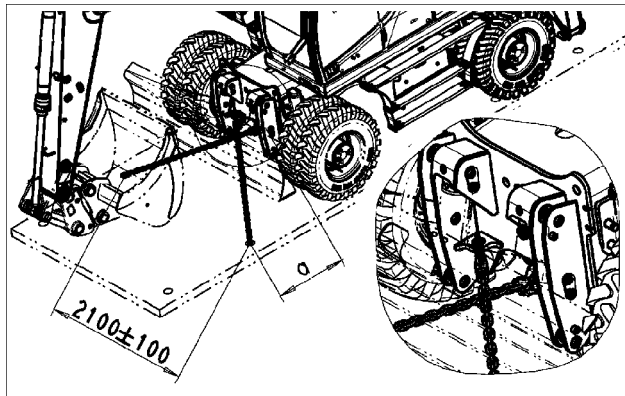
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf)** (10 t) / **EN 12195-3**.

NOTE: See lashing point decal position on the undercarriage.



F34149N5 13

WX168	Fastening distance a
Machine with front blade and rear stabilizers	1100 mm +/- 200 (43.3 in +/- 7.9)

FRONT FASTENING POINT WITH STABILIZERS — WX168

Tie down the machine at the outer holes of the fastening bracket on both sides (not crosswise) using heavy-duty shackles.

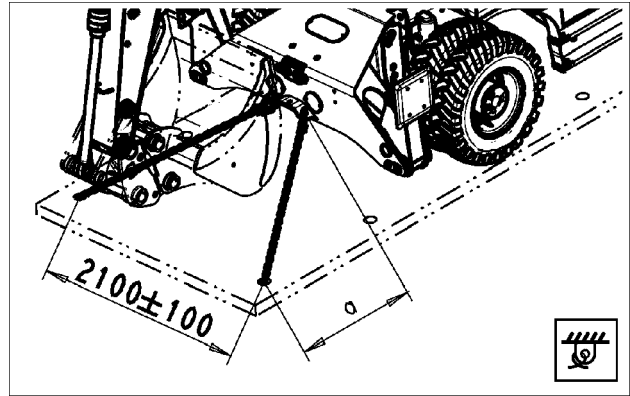
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf) (10 t) / EN 12195-3**.

NOTE: The fastening points on the loading platform must be at least **2.1 m (6.9 ft)** part.



F42742N4 14

WX168	Fastening distance a
Machine with front stabilizers only	1300 mm +/- 200 (51.2 in +/- 7.9)

REAR FASTENING POINT WITH BLADE — WX168

NOTE: always drive the machine onto the low-bed trailer in forward gear. Lower the levelling blade for transport and for fastening onto the loading platform.

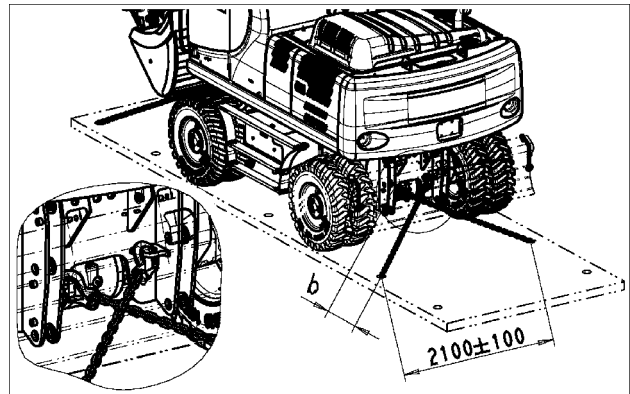
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf) (10 t) / EN 12195-3**.

NOTE: See lashing point decal position on the undercarriage.



F00322N6 15

WX168	Fastening distance b
Machine with rear blade only	1100 mm +/- 150 (43.3 in +/- 5.9)

REAR FASTENING POINT WITH STABILIZERS — WX168

Tie down the machine at the outer holes of the fastening bracket on both sides (not crosswise) using heavy-duty shackles.

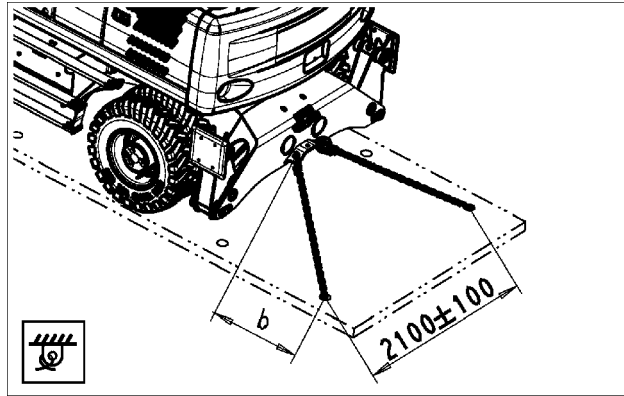
Shackles

- Form **A / DIN 82101**, tensile load **8500 kg (18739.3 lb)**
9500 kg (20943.9 lb) **12000 kg (26455.5 lb)**

Tie-down chains

- \varnothing **13 mm (0.5 in)** and an admissible tensile load of **10000 daN (22480.9 lbf)** (**10 t**) / **EN 12195-3**.

NOTE: The fastening points on the loading platform must be at least **2.1 m (6.9 ft)** part.



F42743N8 16

WX168	Fastening distance b
Machine with rear stabilizers only	1300 mm +/- 200 (51.2 in +/- 7.9)
Machine with front blade and rear stabilizer	1300 mm +/- 200 (51.2 in +/- 7.9)
Machine with rear and front stabilizers	1300 mm +/- 200 (51.2 in +/- 7.9)

UNLOADING THE MACHINE

ATTENTION: Before unloading the machine, make sure all tie-down chains are removed and the trailer wheels blocked.

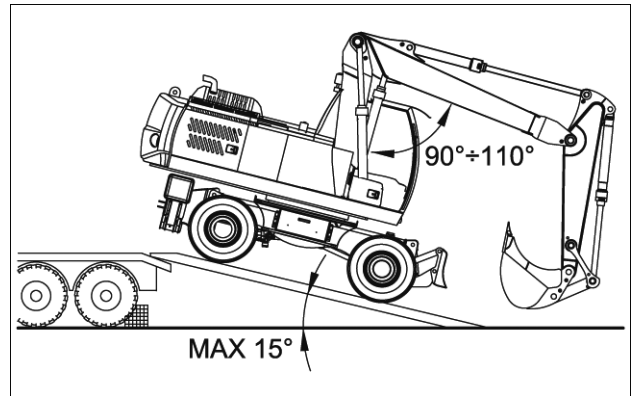
Unloading procedure may vary dependent upon whether the front attachment is installed or not.

- Position the trailer on firm and level ground. Put blocks to the tires of trailer to prevent machine from moving.
- Remove chains or wire ropes used to secure the machine.
- Start engine and move the safety lever to **UNLOCK** position.
- Travel slowly in reverse along the flatbed.
- Once at the flatbed end and before the machine starts falling forwards onto the ramp (shifting the position of its centre of gravity), rest the bucket's flat side onto the ground (the angle between the booms should be **90 °** to **110 °**).
- Drive slowly forward while retracting the boom, extending the arm and repositioning the bucket resting onto the ground until the entire machine is unloaded.

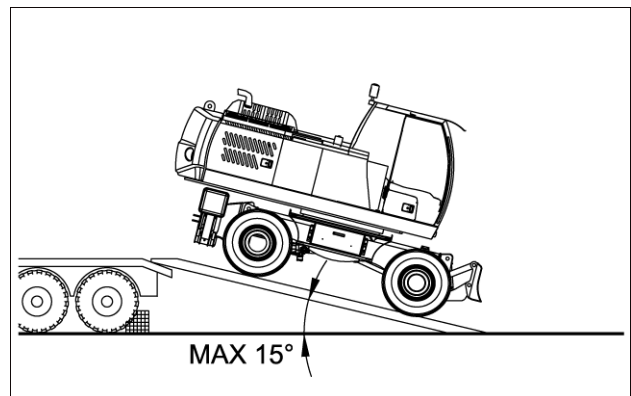
ATTENTION: to avoid damaging the front attachment, observe the following while unloading the machine: minimum angle between boom and arm should never be lower than **90 °** and the bucket should never suddenly hit the ground.

WITHOUT FRONT ATTACHMENT

Travel forward down the ramp.



F00016N 17

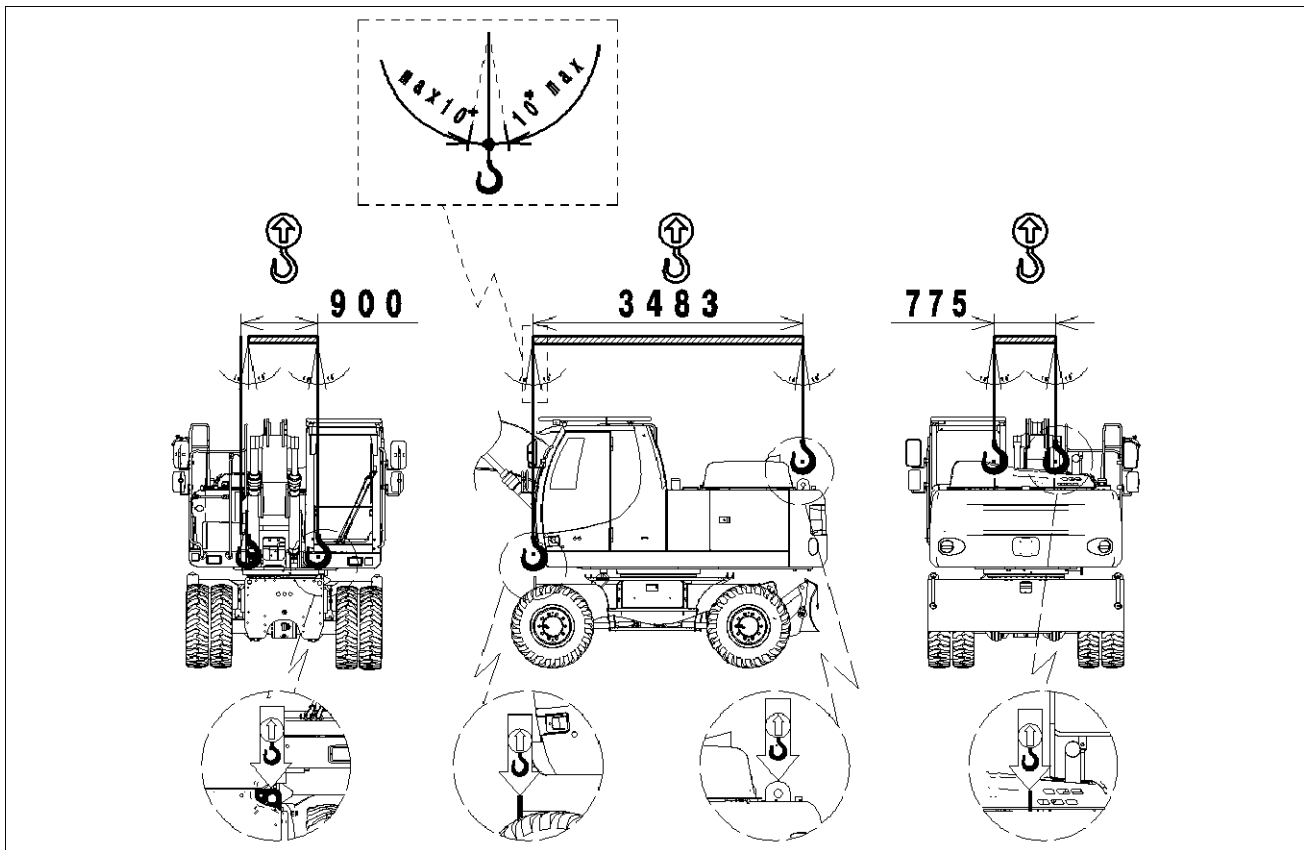


F34532N 18

SHIPPING TRANSPORT

Lifting the machine

The following procedures are for lifting the machine **WX168**. These procedure do not take into account modifications made to the machine that affect machine mass or centre of gravity.



F005011 1

NOTE: this lifting up procedure is applicable for machines in standard specification. The lifting procedure differs for each attachment type and each machine in option. In such cases, contact our dealer/distributor.

⚠ WARNING

Crushing hazard!

The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches. Failure to comply could result in death or serious injury.

W0256A

Check the operator's seat and area for any loose item, tools, etc. that could fall or cause a problem or injury during the procedure and remove or secure them.

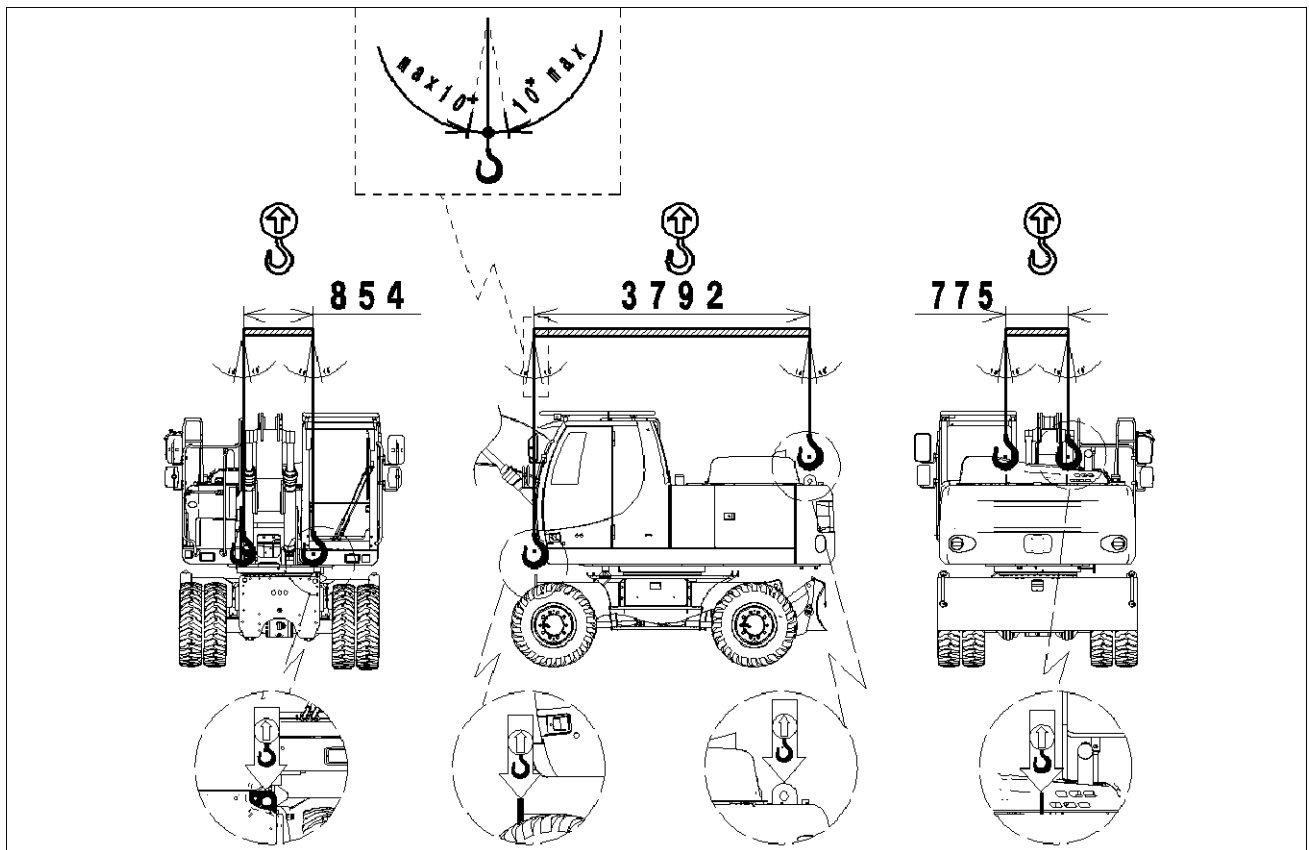
- Use wire rope and expander of sufficient length to prevent interference with the machine body when lifting up machine. Cover wire rope with cloth to protect machine from damaging if necessary.
- Use lifting hooks fixed to the relevant grommets on the machine (lifting point decals).
- The inclination of the wires must be no more than **10 °**.

Lift the machine from firm level ground as follows:

- Stop the engine and move safety lock lever to **LOCK** position. Remove starter key and get off the machine.

Lifting the machine

The following procedures are for lifting the machine **WX188**. These procedure do not take into account modifications made to the machine that affect machine mass or centre of gravity.



F005010 1

NOTE: this lifting up procedure is applicable for machines in standard specification. The lifting procedure differs for each attachment type and each machine in option. In such cases, contact our dealer/distributor.

⚠ WARNING

Crushing hazard!

The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches.

Failure to comply could result in death or serious injury.

W0256A

Check the operator's seat and area for any loose item, tools, etc. that could fall or cause a problem or injury during the procedure and remove or secure them.

- Use wire rope and expander of sufficient length to prevent interference with the machine body when lifting up machine. Cover wire rope with cloth to protect machine from damaging if necessary.
- Use lifting hooks fixed to the relevant grommets on the machine (lifting point decals).
- The inclination of the wires must be no more than **10 °**.

Lift the machine from firm level ground as follows:

- Stop the engine and move safety lock lever to **LOCK** position. Remove starter key and get off the machine.

RECOVERY TRANSPORT

Towing the machine

Tow only if the emergency actuation device is activated. It interrupts the power flow between travel gearbox and axle which allows an emergency towing on the vehicle.

ATTENTION: No braking effect of the parking brake, when the emergency actuation is actuated.

ATTENTION: No gear must be selected if the emergency control is activated. Apply parking brake.

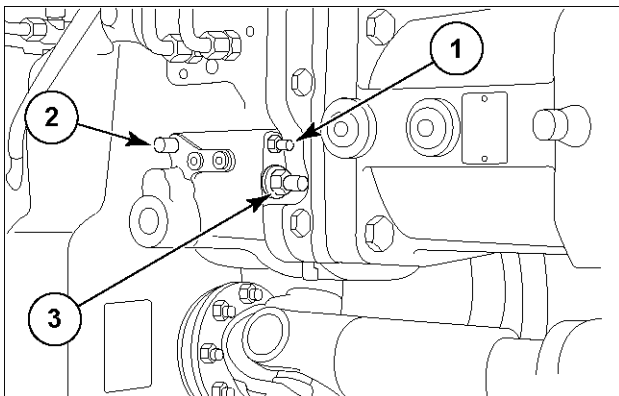
To activate the emergency actuation:

Pump grease into the nipple (1) until it comes visible out of the pressure relief valve (3). In these conditions, the connection between travel gearbox and axles is interrupted

ATTENTION: Engine must be switched off while actuating the emergency actuation.

ATTENTION: Block the vehicles against rolling away!

ATTENTION: No regreasing must be effected on the grease nipple of the emergency control.



TOWING BY OTHER VEHICLES

- Tow the machine only with a tow rod.
- The tow-rod must be free from damage. It must be dimensioned in such a way that the calculated breaking load is equal to three times the tractive power of the towing machine.
- The towing vehicle must have adequate tractive and braking power.
- Drive slowly, carefully and smoothly.
Towing speed: max. **10 km/h (6.2 mph)**
Towing distance: max. **5 km (3.1 miles)**

- All persons must keep clear of the tow-rod area.
- For a longer distance it is best to have transported the defective vehicle on a low loader.
- Tow only if the brakes and the steering of the machine are functioning properly and if the machine cannot be transported otherwise.
- When the engine is running, the service brake is active. When the engine is not running, the service brake is only active as long as the accumulator has pressure.
- A filled brake pressure accumulator permits about 6 to 8 braking cycles until standstill of the machine.
- Tow defective machines only as far as necessary to recover the machine from hazardous areas and the service brake is working.
- Repair the machine before transporting it over long distances or loading it onto a transport vehicle.

ATTENTION: If the emergency actuation device is deactivated incorrectly, the transmission will be damaged during operation.

ATTENTION: Since there is no transmission lubrication, damages may occur due to lacking oil supply, if the instructions are not observed.

AFTER RECOVERY AND TOWING

- After the recovery, the machine must be secured against inadvertent movements and unauthorized starting.
- Place the working attachment on the ground. Rest the bucket on the ground.
- Place chocks under the wheels.
- To deactivate the emergency actuation, open the bleeder valve (2) and shift into the road speed (apply a control pressure of **30 - 35 bar (435.0 - 507.5 psi)** at the connection of the brake). In these conditions, the connection between travel gearbox and axles is restored.

TOWING OTHER VEHICLES

- The machine is not suitable for towing trailers or other vehicles; this would result in damage to the axles and gearbox. The tow coupling is designed solely for towing or recovering vehicles from hazardous areas or for lashing purposes on transport vehicles.

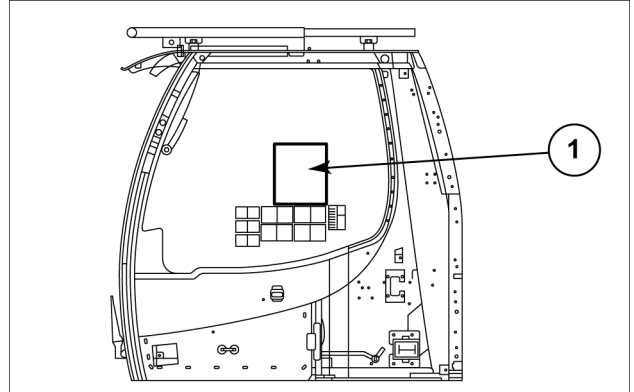
6 - WORKING OPERATIONS

GENERAL INFORMATION

Booms, dippers, and buckets - Operating

The instructions to follow have the purpose of informing the operator about the basic function of each hydraulic control. Learning these instructions and practising on the machine make the operator more efficient in operating the machine. Each operator must read carefully, learn and implement the safety rules described in this manual and on the machine prior to operating it.

Inside the cab, on the right window, the decal **(1)** shows the effect of the movement of the controls. Read and heed the functions associated with the respective controls listed on this decal prior to operating the machine.



F20005N 1

Hydraulic travel system - Operating

Before Starting the travel

- Make sure that the safety lever is lowered in **UNLOCK** position. Raise the attachment from the ground.
- Check if the machine is in base position.

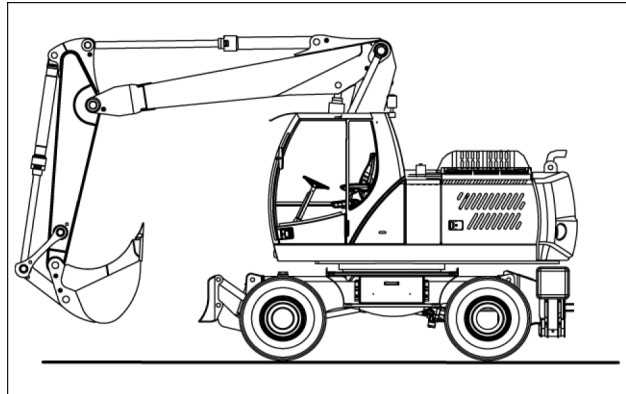
NOTE: The machine is in its basic position when the cab (1) is over the left pair of wheels of the steering axle (2).
A = forward travel: the pair of wheels of the steering axle is in front.

B = backward travel: the pair of wheels of the rigid axle is in front.

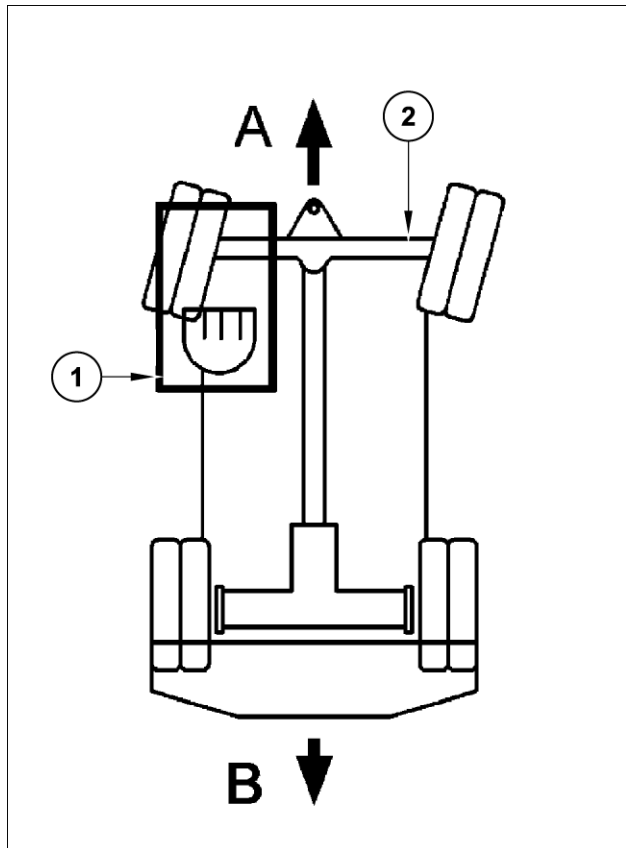
Only in the basic position are the travel direction selected and the true travel direction the same.

NOTICE: If the upper structure is slewed more than 90° out of basic position, the machine moves in the opposite direction of the one selected.

- Raise the blade and the stabilizers completely.



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F34089N 2


Travel on road

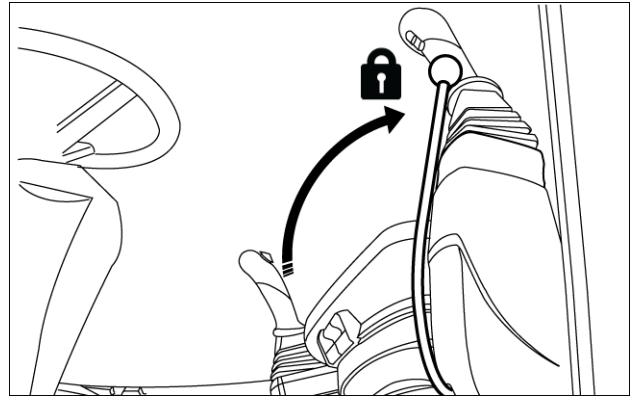
NOTE: the Road travel mode function is a memorized function. After the ignition key is put on, the Road travel function is active if it was active when the ignition key was put off before and vice versa.

The machine is in parking state

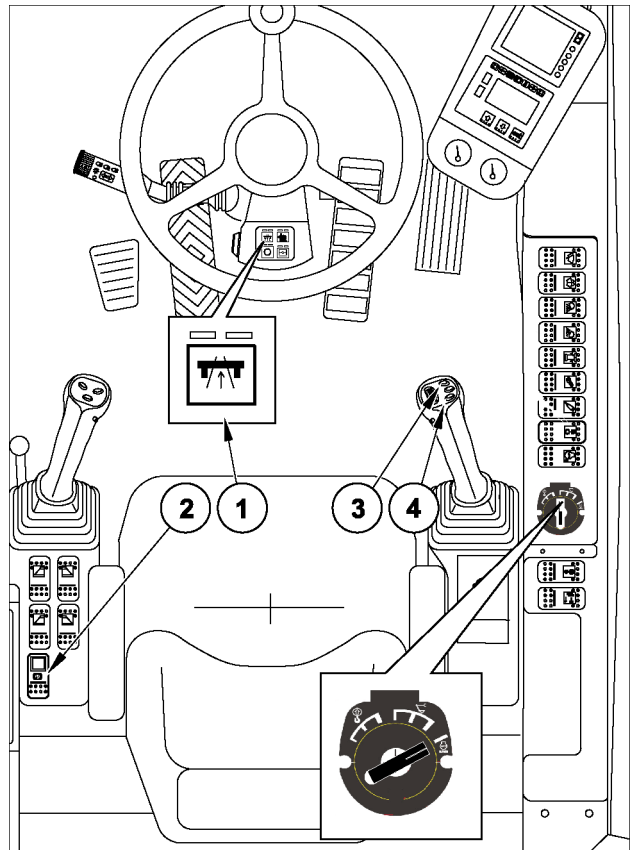
- Starting the engine and put the safety lever to the top position **LOCK**.

NOTE: the activation of Road Travel Mode is only possible when the safety lever is in top position **LOCK** .

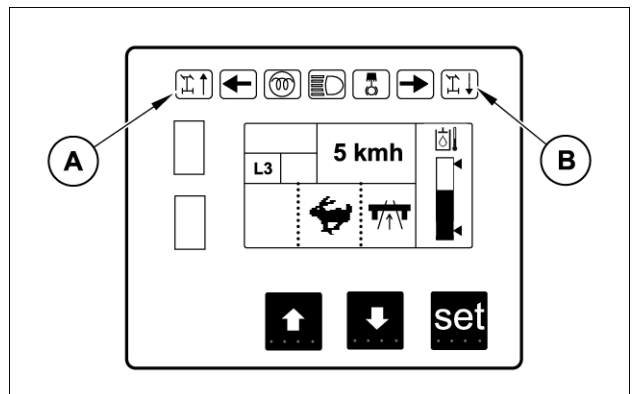
- Lock the upper structure (see Upper structure holding lock in **3-12**).
- Move the engine speed throttle in HEAVY mode.
- Depress the road travel button **(1)**: the right lamp of button lights up.
- The cluster shows the road travel symbol .
- In Road travel mode the upper structure holding brake is applied automatically.
- Deactivate the parking brake by means of the button **(2)**.
- Select the travel direction by means of button **(3)** or **(4)**.
Button **(3)**: forward travel gear; the travel direction is shown by the indicator lamp **(A)** on the cluster. A single acoustic warning is sounded.
- Button **(4)**: reverse travel gear; the travel direction is shown by the indicator lamp **(B)** on the cluster.



F44061_1 3

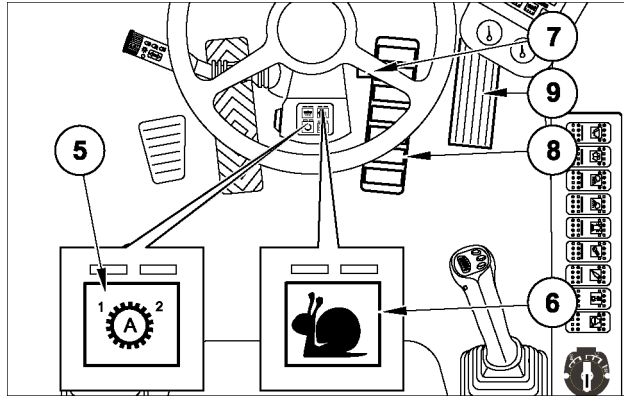


F44135N3 4



F34096N1 5

- If you have to work at a particularly low speed, select the 1st speed (off-road travel) with push-button (5) and then the creep speed with push-button (6).
- Remove the service brake lock, by pressing the lock lever (7) to the left of the pedal (8). The pedal has to be released slowly.
- Lock the lock lever (7) in travel position as show in figure. In this way the lock lever cannot lock itself if the brake pedal is pushed in the lowest position.
- Press the pedal (9), the machine starts travelling. The display shows the selected gear and speed; the indicator lamps indicate the selected travel direction. Adjust the speed with the pedal (9).



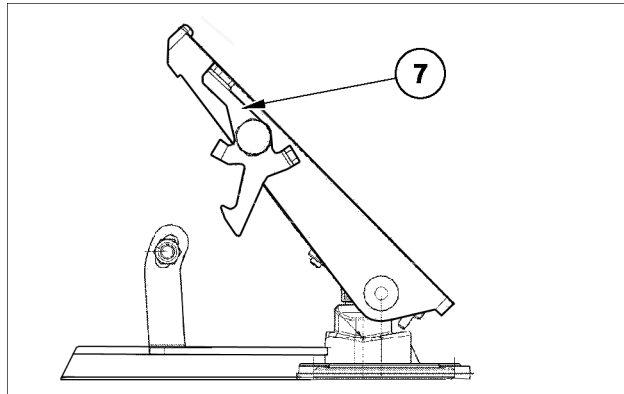
F42720N2 6

NOTE: If the safety lever is put to down position while in Road Travel Mode, there is a red warning in the cluster in combination with an intermittent loud acoustic warning. But in this state, it is possible to operate with Boom, Bucket, Dipper and Positioning with reduced speed. The operator is supposed to raise the safety lever back to the top position.

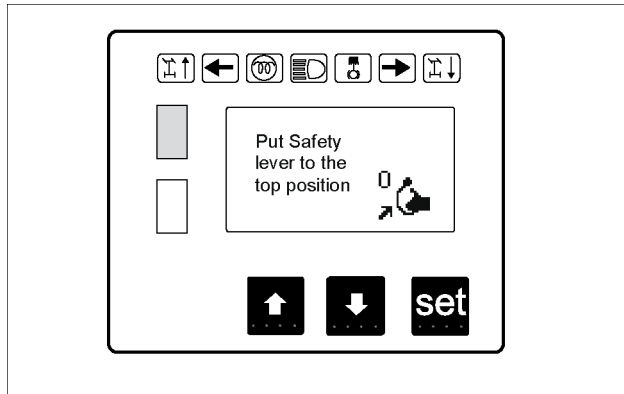
To deactivate the Road travel mode:

- Put the safety lever in top position **LOCK**
- The machine have to be in standstill.
- Press the road travel button: right light of road travel button lights off.
- The road travel symbol disappears from the cluster.

NOTE: if the machine is travelling, the deactivation of Road travel mode will be ignored.





WE0008N1 7




F00001N2 8

The machine is working and the operator needs to select the Road travel mode.

- Stop the machine
- Check that the oscillating axle is free (not manually blocked)
- Put the safety lever in top position **LOCK** 
- Depress the road travel button: the right lamp of button lights on.
- The cluster shows the road travel symbol .

To deactivate the Road travel mode:

- Put the safety lever in top position
- The machine have to be in standstill.
- Press the road travel button: right light of road travel button lights off.
- The road travel symbol  disappears from the cluster.

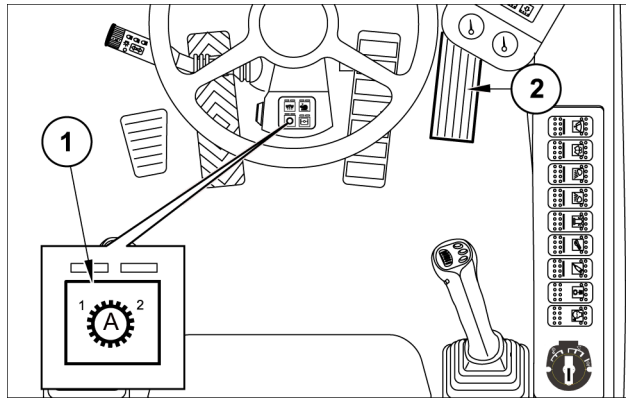
Gear shifting

According to travel conditions and to type of work, you can choose different types of gearshift modes:

- 1st gear fixed (for slow travelling and object handling)
- 2nd gear fixed (for on road travelling)
- AUTOMATIC gearshift active

The user interface is on the switch pad on the steering column.

It is a key with a symbol gear and two led (named 1 and 2). These led indicate the selected gearshift operating mode.



F42722N2 9

LED 1	LED 2	GEAR STATUS
ON	OFF	1st gear fixed
OFF	ON	2nd gear fixed
OFF	OFF	AUTOMATIC gearshift active MODE

Gear change

- From 1st gear, by pressing the button (1) shortly, the machine shifts to the automatic gearshift mode (both led are off).

With this mode activated, by shortly pressing the button (1), the machine shifts to 1st gear again (left led on) or, by pressing and holding the button (1), the machine shifts to 2nd gear (right lamp on).

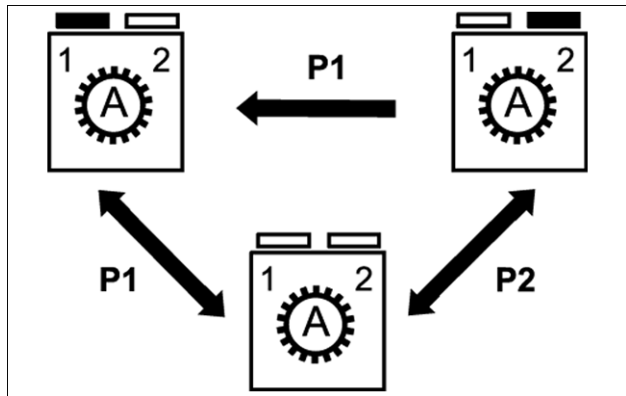
With the 2nd gear engaged, by shortly pressing the button (1), the machine shifts back to 1st gear.

Manual downshifting from 2nd to 1st gear act as a preselection if travel speed is higher than **1 km/h (0.6 mph)**. When travelling in 2nd gear, pressing shortly the gearshift button on the switch pad the 1st gear is preselected but not active.

It will become active as soon as the speed falls down to **1 km/h (0.6 mph)**, independently from the load.

P1: short pressing of the button (≤ 2 s).

P2: long pressing of the button (≥ 2 s).

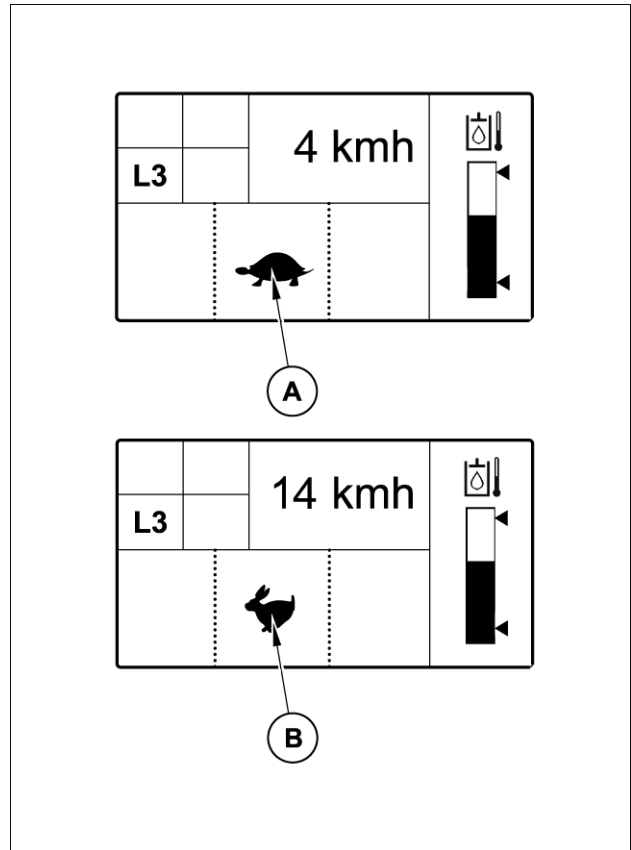


F42721N 10

- When the travel pedal is activated, in the middle of the lower section, the cluster shows the symbol of gear engaged: the tortoise (A) = 1st speed or the rabbit (B) = 2nd speed.

In according to the position of engine speed throttle there are following restrictions:

- LIFT-Working Mode: no AUTOMATIC-mode available (to prevent shifting and therefore a swinging of the load when object handling). Only 1st gear fixed or 2nd gear fixed are possible. To engage 2nd gear fixed, you have to go via AUTOMATIC-Mode by pressing button (1) short, but when no led are ON, the machine is still in 1st gear fixed status.
- LIFT, ECO, HEAVY, ROAD TRAVEL Working mode: the 2nd gear fixed status is immediately engaged when changing from AUTOMATIC mode, independent from the load condition.



F34101N 11

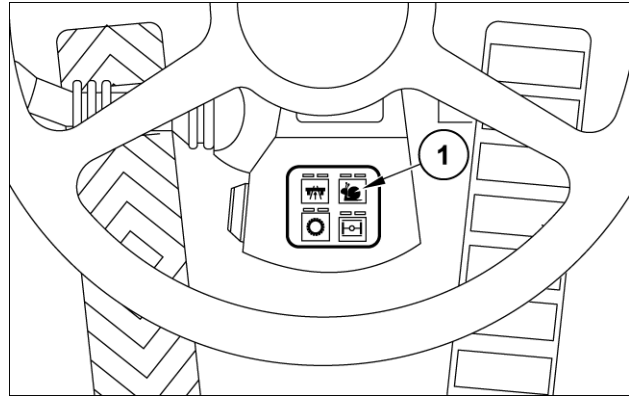
Gear shifting in AUTOMATIC MODE

- During travel in automatic gear change mode (both leds are off on button) the machine down shifts to 1st gear immediately in the following conditions:
 - travel speed is $\leq 0.3 \text{ km/h}$ (**0.2 mph**): standstill and snail On
 - travel speed is $\leq 1 \text{ km/h}$ (**0.6 mph**) and snail in Off.
 - travel speed is 1 km/h (**0.6 mph**) up to 5 km/h (**3.1 mph**) with high travel load (e.g. travelling uphill).
 When travel speed increases, the gear will automatically shift to 2nd gear. Travel speed threshold for upshifting depends on machine type, current engine power level and travel load.
- If creep speed button (snail) is activated in the 2nd gear in the AUTOMATIC gear shift mode, the gearshift into the 1st gear will be activated only at standstill ($v \leq 0.3 \text{ km/h}$ (**0.2 mph**)).

NOTE: when the machine travels in automatic gear mode up or down shift will not take place if one of the following functions are operated: Boom, Bucket, Dipper, Positioning, Hammer / Shears, Grab Rotation.

Creep speed (snail)

- The creep speed gear can be activated and deactivated with the button **(1)**, located on the switch pad in the steering column. By pressing the button **(1)**, the engagement of the creep gear is preselected. Now the left led on the button is ON. When the feature-enable conditions are met, the creep speed is engaged, and the right LED on the button is ON. At the same time, the snail symbol shows up in the display at the lower right **(A)**. The traveling speed is reduced immediately in the respective gear by **0 - 60 %** depending on load conditions.

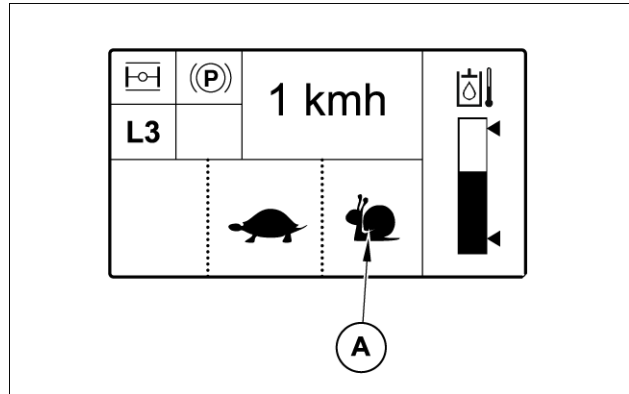


F42723N 12

If the travel motor is already at maximum displacement due to heavy load, the creep gear doesn't show an effect. The engagement / disengagement of the creep speed is possible only at a travel speed lower than **15 km/h (9.3 mph)**.

If traveling faster than this speed and pressing the button of creep speed the left led will be ON to indicate the pre choice, but the shifting takes places after the travel speed is reduced below **15 km/h (9.3 mph)**

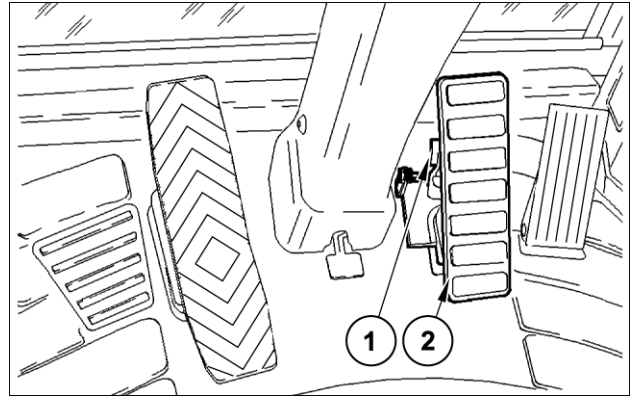
NOTE: if the creep speed is activated, manual down-shifting or up shifting is prohibited. This is to protect the clutches of the gearbox to prevent shifting on maximum torque.



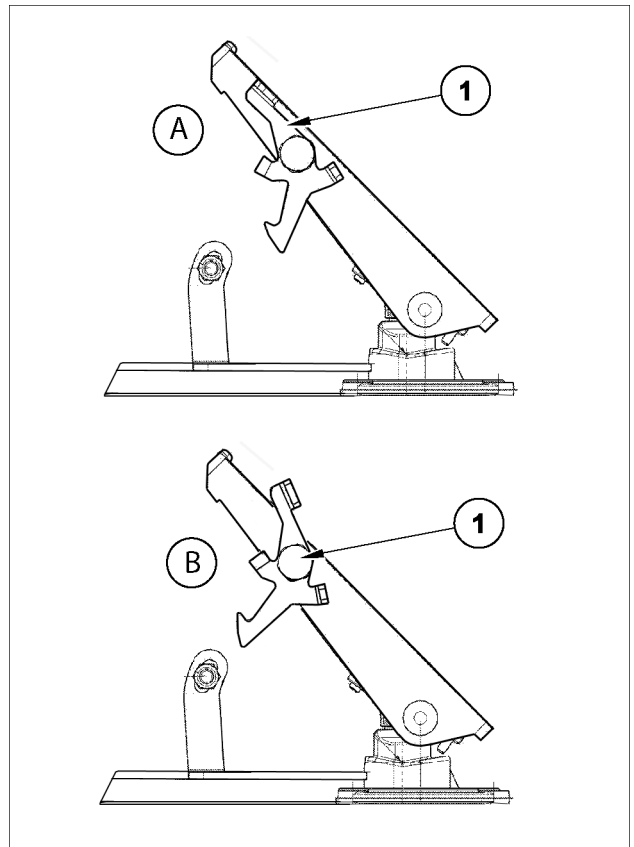
F34385N 13

Travel stop

- Release the travel pedal.
- Press the Service brake pedal **(2)** until the machine stops.
When the lock lever **(1)** is in lock travel position **(A)** it cannot lock the service brake pedal. To release the lock lever from travel position, press the lock lever **(1)** on the left side of the pedal **(2)**.
- Check if the lock lever **(1)** is free to lock the service brake pedal in its lowest position during work activity (position **(B)** of lock lever).



F34053N 14



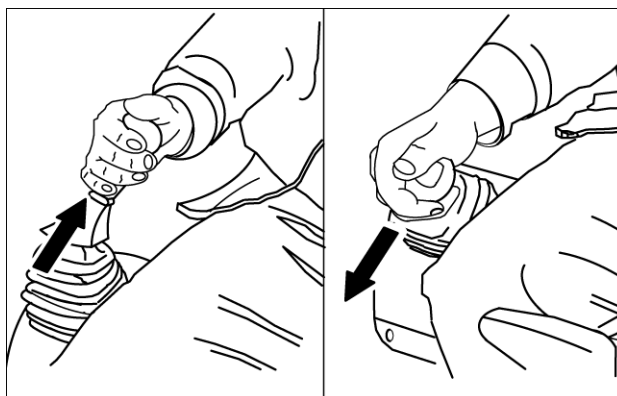
WE0009N 15

Attachment controls

Boom operation

The boom is actuated by pushing or pulling the right control lever forward or backward. The speed of the movement is determined by the stroke of the lever.

- When pulling the right control lever **BACKWARD** the boom is raised.
- When pushing the right control lever **FORWARD** the boom is lowered.
- When returning the right control lever centrally (neutral position) the boom stops moving.

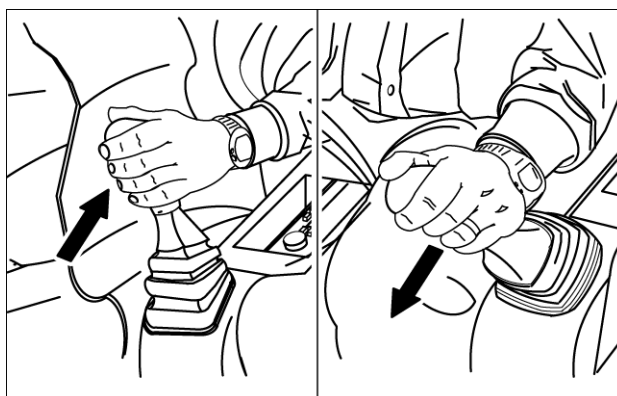


NH0113 1

Arm operation

The arm is actuated by pushing or pulling the left control lever forward or backward. The speed of the movement is determined by the stroke of the lever.

- When pushing the left control lever **FORWARD** the arm is extended.
- When pulling the left control lever **BACKWARD** the arm is retracted.
- When returning the left control lever centrally (neutral position) the arm stops moving.

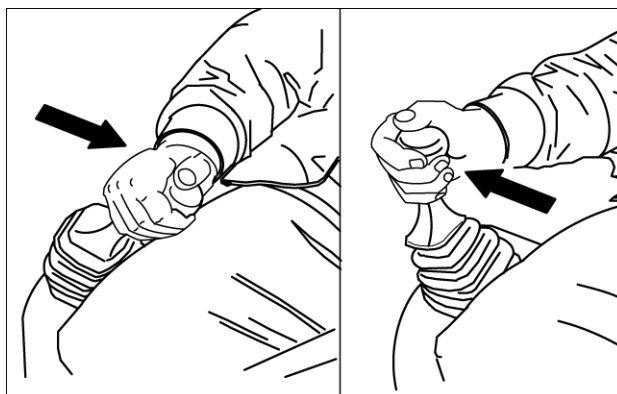


NH0114 2

Bucket operation

The bucket is actuated by moving the right control lever rightward or leftward. The speed of the movement is determined by the stroke of the lever.

- When moving the right control lever **leftward**, the bucket is closing (digging, bucket cylinder extended).
- When moving the right control lever **rightward**, the bucket is opening (dumping, bucket cylinder retracted).
- When returning the right control lever centrally (neutral position) the bucket stops moving.

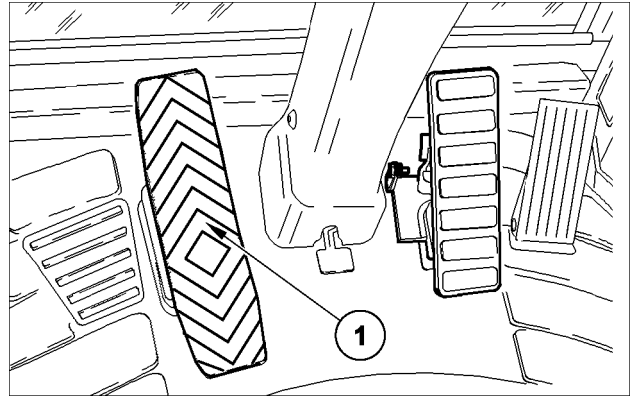


NH0115 3

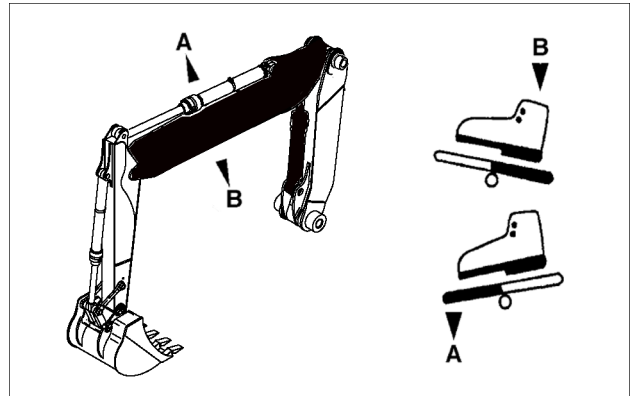
Positioner operation (Triple Articulation Version)

The positioner is actuated when pressing control pedal **(1)** with the left foot. The speed of the movement of the positioner is determined by the stroke of the pedal.

- When pressing with the tip of the left foot FORWARD, the positioner is extended.
- When pressing with the heel of the left foot BACKWARD, the positioner is retracted.
- When the pedal is released, it returns automatically into neutral position and the positioner stops moving.



W0001N 4



WE9001 5

Power boost

Power boost increases the max. operating pressure. This means higher lifting force, higher grab forces and higher traction forces.

The Power boost function is permanently active in power levels **1–3** and during travelling. It is not displayed at the screen.

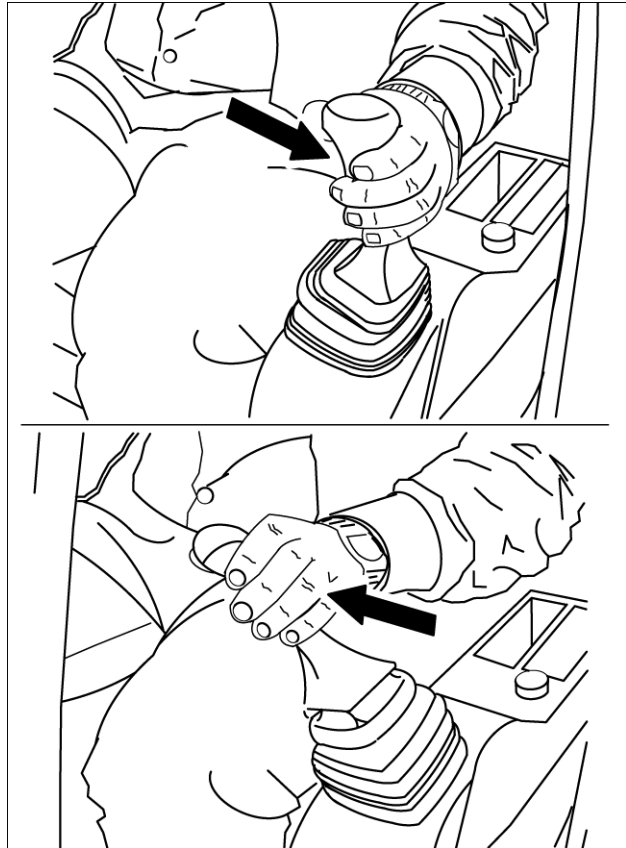
The Power Boost function is activated automatically in performance power levels **4–7** for the “bucket close” and/or “dipper in” movements, if maximum system pressure is prevailing for prolonged periods. The auto power boost is activated with delivery from factory.

Swing control

Swinging the turret

The turret swings when the left control lever is moved rightward or leftward. The swinging speed is determined by the stroke of the lever.

- When moving the left control lever leftward, the turret swings leftward.
- When moving the left control lever rightward, the turret swings rightward.
- When returning the left control lever centrally (neutral position) the turret stops moving.



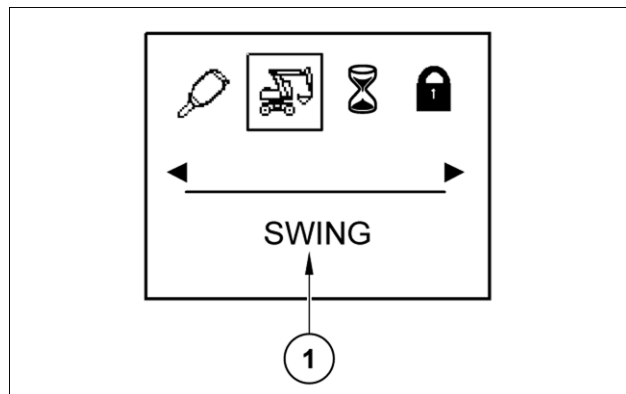
NH0118 1

SWING MENU

The hydraulic slewing power of the upper structure can be individually adapted to the working needs and to the conditions of use to harmonize lifting and slewing. On the right window there is the label to inform the operator about the opportunity to modify the parameters of the swing. In the working mode, depress repeatedly an arrow button until the background of "SWING" (1) on main menu is highlighted grey. Confirm with **set** button.



AF45976 2



F34119N 3

There are two types of swing adjustment:

- Swing power (2)
- Swing braking (3)

Swing power adjustment

Select the SWING POWER (2) and confirm the setting by depressing button **SET**.

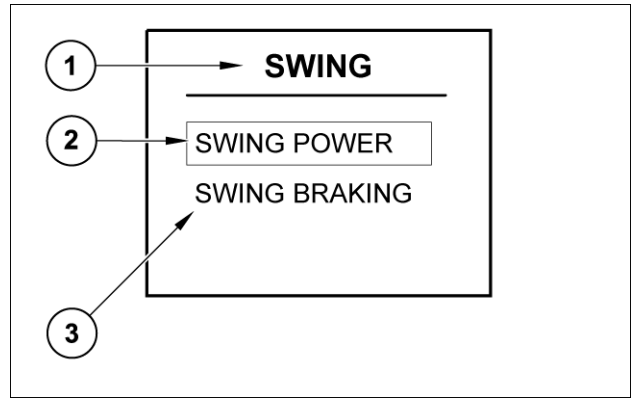
It can be adjusted in 4 steps:

- 1-min
- DEFAULT
- 2
- 3-max

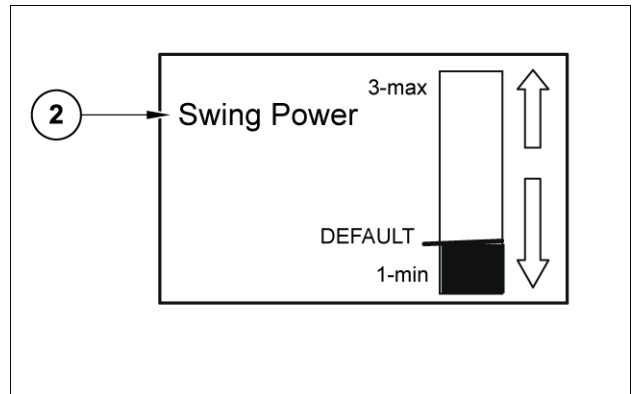
With the arrow buttons it possible to adjust the value of swing power needed:

if the swing power is adjusted to non-default value, this is indicated by displaying a relevant symbol (4) on the cluster.

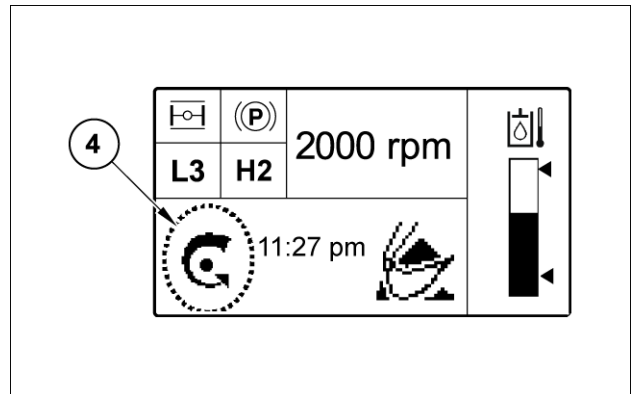
The value of swing power is memorized. Every time the ignition is put on, the swing power is set to the previously adjusted value.



F00010N 4



F00011N 5



F34120N 6

Swing braking adjustment

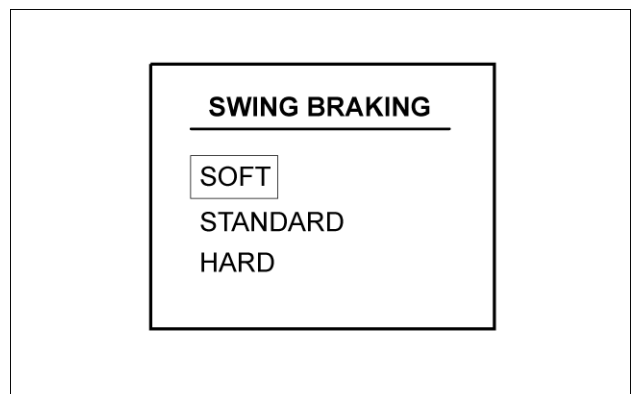
Select the SWING BRAKING (3) and confirm the setting by depressing button **SET**.

This adjustment is used for swing operations with swinging load, like a clamshell.

It can be adjusted in 3 steps:

- SOFT
- STANDARD
- HARD

The level of swing braking is memorized. Every time the ignition is put on, the swing braking is set to the previously adjusted value.



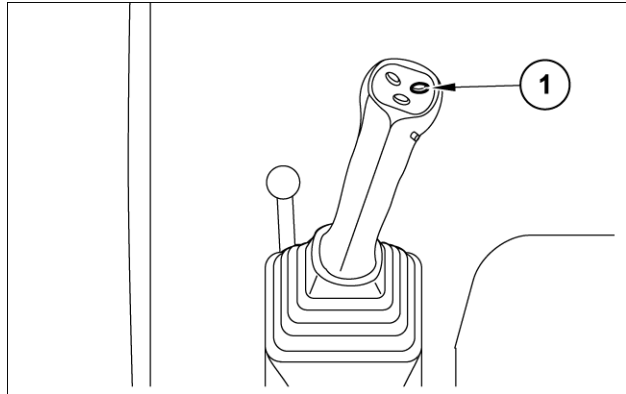
F00012N 7

Leveling mode

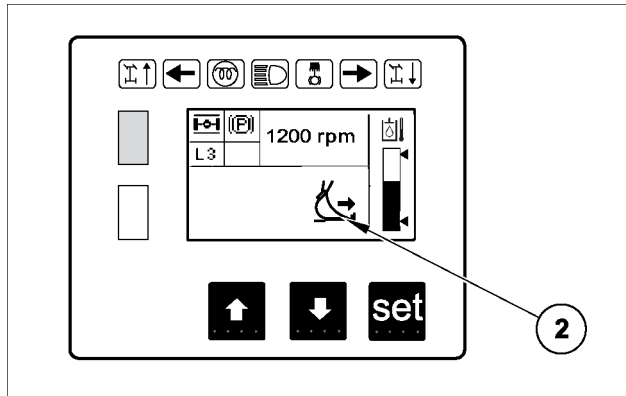
The Leveling mode can be activated in the power levels 4 - 7 of engine speed throttle (ECO-mode or HEAVY mode). Depress button **(1)**. The cluster shows the symbol of leveling **(2)**.

Moving the hydraulic control levers the attachment works smoother: the attachment speed is reduced to **90 %** of the speed available in ECO or HEAVY mode.

Press button **(1)** again to switch off leveling mode and digging mode is engage immediately.



F42738N 1



F44069N2 2

Stabilizers or blade

ATTENTION: Stabilizer and/or blade are safety devices that allow the operator to minimize the risk during the operations of digging and material handing work. Stabilizer and/or blade must be used to stabilize the machine in addition to the blocking of oscillating axle.

Before starting work

- Stop the machine on a level surface.
- Rest the bucket to the ground.
- Inspect the zone of job site where you must work: make sure that the digging area is sufficiently stable and firm to support the weight of the machine during the work operation.
- Move the machine to the area of digging, stop the machine and operate with stabilizer and/or blade controls for stabilize the machine before start the work. Block the front oscillating axle. **6-18.**

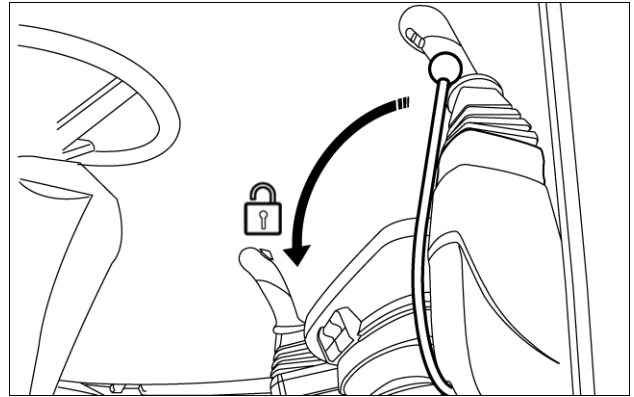
Lowering of stabilizers and blade

- Make sure the control lever in unlock position and the travel mode is not active.

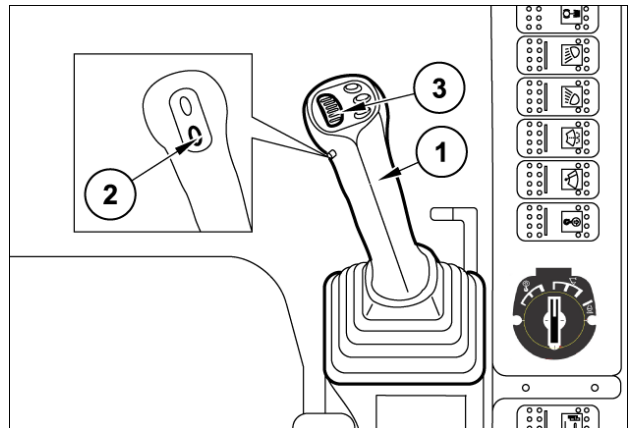
- Press the pushbutton **(2)** on the front of the right joystick **(1)**.

NOTICE: Make sure the roller **(3)** at the right control lever **(1)** is in neutral position.

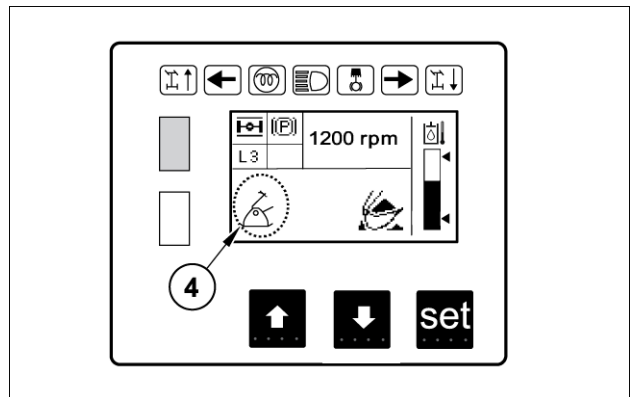
- A loud beep can be heard.
- The symbol for stabs control **(4)** is displayed on the monitor on the left lower corner, with the highest priority.
- Stabilizers/blade control is active.
- Move the slider **(3)** on the right joystick handle **(1)** to the top **(A)**. The stabilizers moves to the ground.
- Release the slider **(3)** when the machine is stabilized.
- Push the pushbutton **(2)** for deactivate the stabilizers/blade control.
- On the cluster the symbol for stabilizers/blade control **(4)** disappears and two loud beeps can be heard.



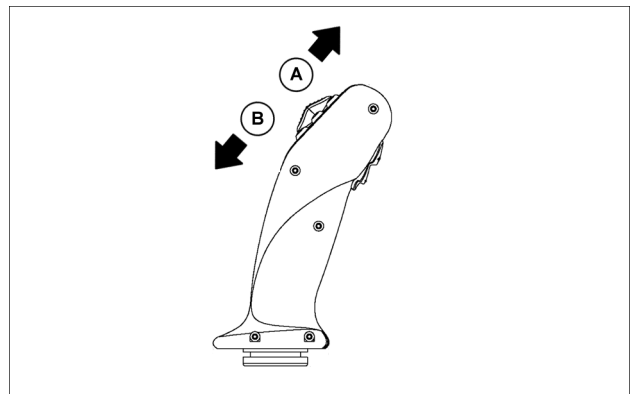
F44059_1 1



F42739N1 2



F00004N1 3



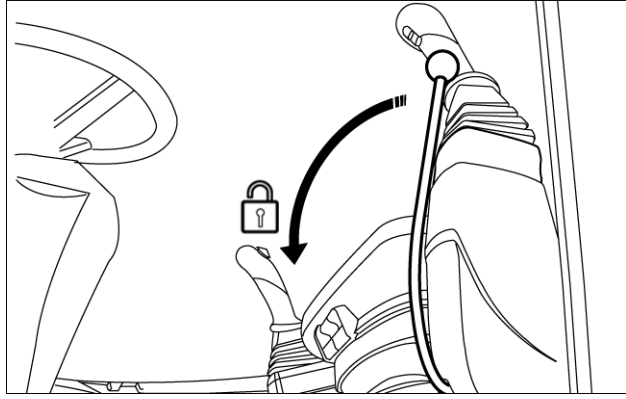
W00017 4

Raising of stabilizers and blade

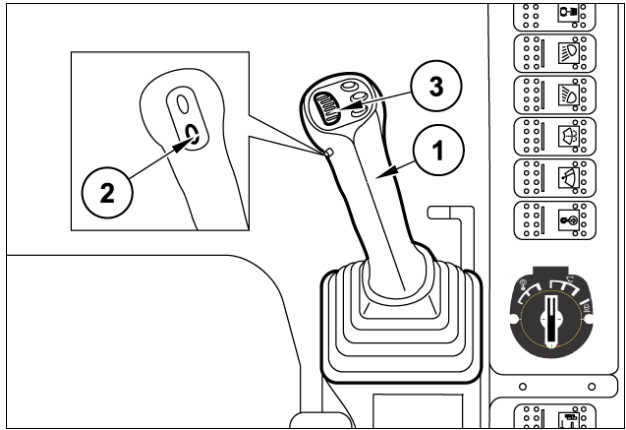
- Make sure the control lever in unlock position and the travel mode is not active.
- Press the pushbutton (2) on the front of the right joystick (1).

NOTICE: Make sure the roller (3) at the right control lever (1) is in neutral position.

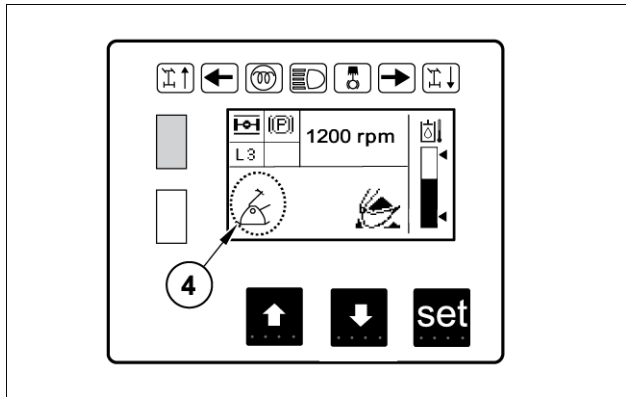
- A loud beep can be heard.
- The symbol for stabs control (4) is displayed on the monitor on the left lower corner, with the highest priority.
- Stabilizers/blade control is active.
- Move the slider (3) on the right joystick handle (1) to the towards the bottom (B). The stabilizers/blade are raised.
- Release the slider (3).
- Push the pushbutton (2) for deactivate the stabilizers/blade control.
- On the cluster the symbol for stabilizers/blade control (4) disappears and two loud beeps can be heard.
- Move the machine if necessary.



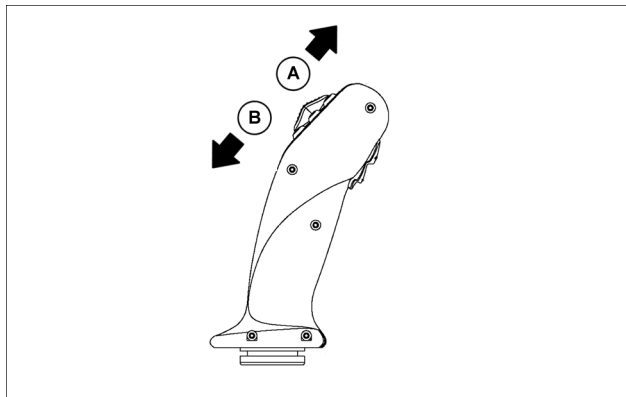
F44059_1 5



F42739N1 6



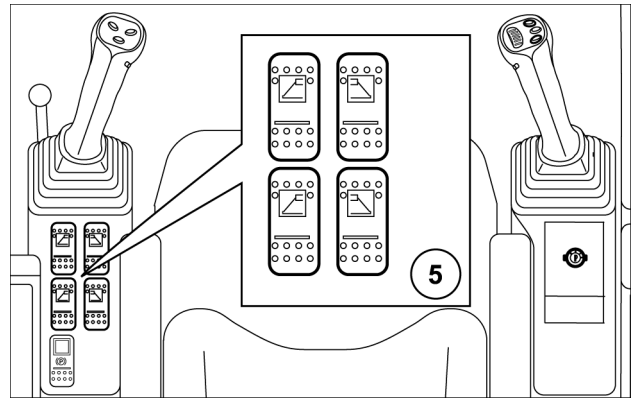
F00004N1 7



W00017 8

Independent stabilizers and blade rocker switches

- An independent control of the stabilizers is available as an option. Some machine can be equipped with some rocker switches **(5)**.
The operation of raising or lowering is the same as described but it is possible to move each stabilizer independently.



F00318N1 9

Oscillating axle control

ATTENTION: The blocking of the front oscillating axle is a necessity for digging and material handing work, to provide stability.

NOTE: After ignition (starter switch in I position) the axle blocking is in automatic mode: both led on push button (1) are off and the relevant symbol of axle is shown in the display. Since the parking brake is engaged after ignition, the axle is blocked consequently. When the parking brake is released, the axle is released as well and the relevant symbol of axle disappear.

Before starting work

- Stop the machine on a level surface and rest the bucket to the ground.
- Inspect the zone of job site where you must work: make sure that the digging area is sufficiently stable and firm to support the weight of the machine.
- Move the machine to the area of digging, stop the machine and block the oscillating front axle. Then operate with stabilizer and/or blade controls 6-15 for stabilize the machine.

Blocking front oscillating axle — manual locking mode

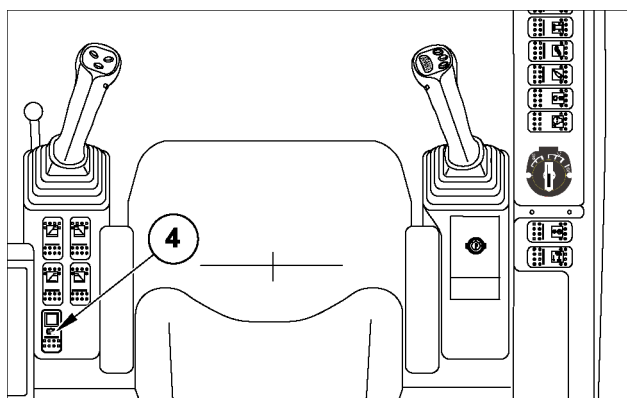
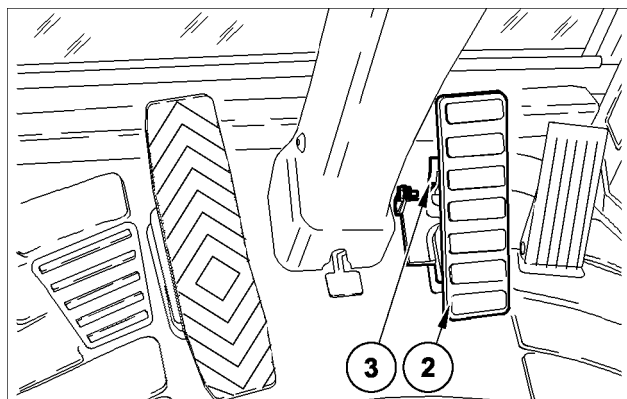
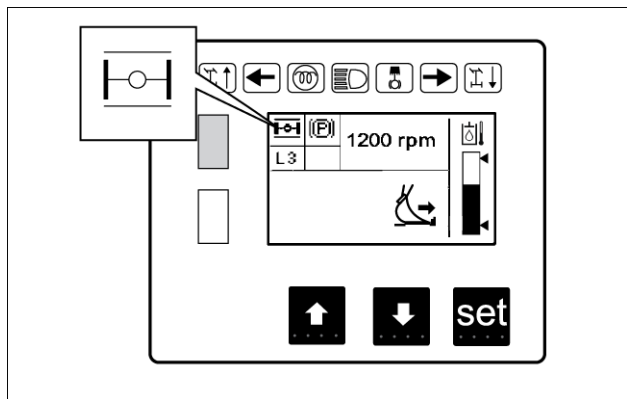
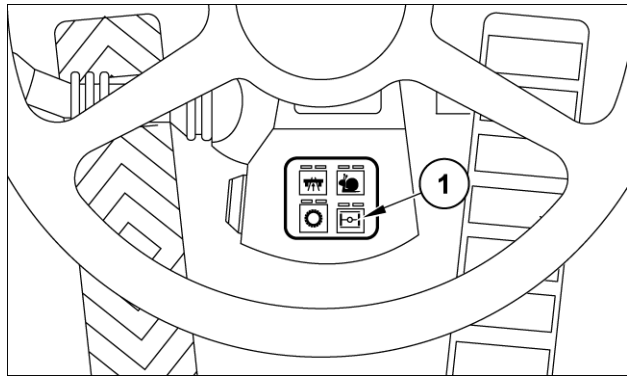
- Press the push button (1) on the key pad module of the steering column: both led are on and the symbol is shown in the display.

ATTENTION: Manual blocking has priority to automatic mode: If manual blocking is engaged when the axle is already blocked by service or parking brake, the axle stays blocked if the brakes are released. If the axle is manually blocked, the road travel mode cannot be activated. This is to avoid wrong operation while object handling.

NOTE: For move from manual locking mode to automatic locking mode, press the push button (1). A short beep is heard and a message is displayed in the cluster 'GOING TO AUTO MODE PRESS KEY IN 2 SEC'. If the push button is pressed again in a time period of 2 seconds, the axle is in automatic mode. If the key is not pressed a second time, the axle stays in manual blocking mode.

Blocking front oscillating axle — automatic locking mode

- Press the service brake pedal (2) in lowest position: the pedal is locked by means of lock lever (3).
- Engage the parking brake (4).



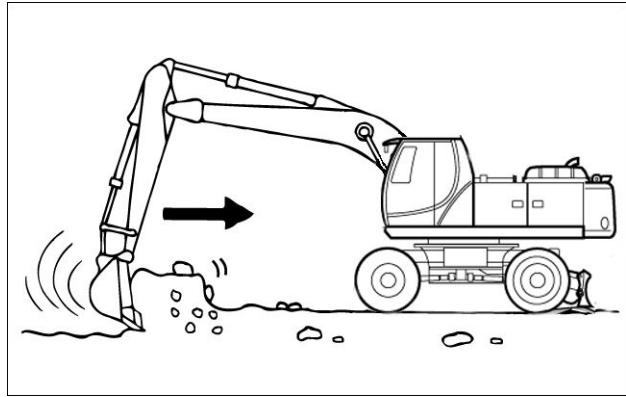
6 - WORKING OPERATIONS

Truth table for the conditions to have the axle blocked				
1st action	2nd action	3rd action	Axle blocked	Notes
MANUAL SWITCH	Service brake	Park brake	YES	
		No action	YES	
	Park brake	Park brake	YES	
		No action	YES	
SERVICE BRAKE	Road travel	Park brake	YES	The machine cannot move, but when both brakes are released the axle is NOT blocked
		No action	YES	The machine cannot move, but when service brake is released the axle is NOT blocked
	Manual switch	Park brake	YES	
		No action	YES	
	Park brake	Manual switch	YES	
		Road travel	YES	The machine cannot move, but when both brakes are released the axle is NOT blocked
		No action	YES	
	PARK BRAKE	Road travel	Service brake	YES
No action			YES	The machine cannot move, but when park brake is released the axle is NOT blocked
Manual switch		Service brake	YES	
		No action	YES	
Service brake		Manual switch	YES	
		Road travel	YES	The machine cannot move, but when both brakes are released the axle is NOT blocked
		No action	YES	
ROAD TRAVEL		Service brake	Park brake	YES
	No action		NO	
	Park brake	Service brake	YES	
		No action	YES	

Practice to improve efficiency

Use arm in action

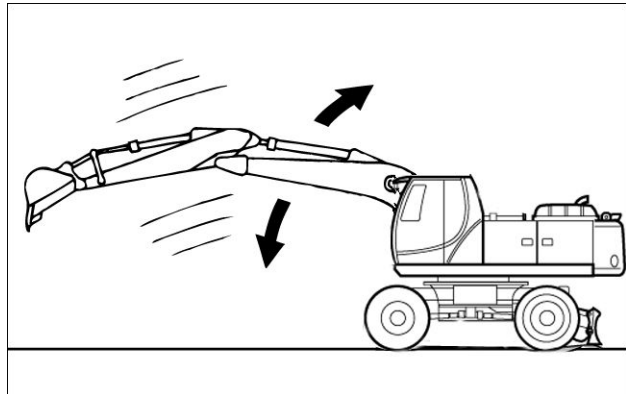
Operate the bucket at shallow depths and use the arm cylinders at the same time to improve efficiency. Setting the bucket too deep will decrease the machine's efficiency.



WE0119 1

Operate boom smoothly

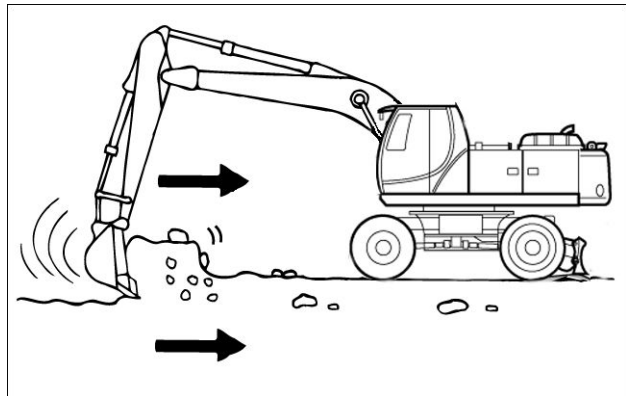
Always begin and end boom operation slowly with smooth, careful movement of the control lever. Do not perform sudden starts and stops of the boom as this creates unnecessary stress on the machine and its components.



WE0120 2

Bucket teeth direction

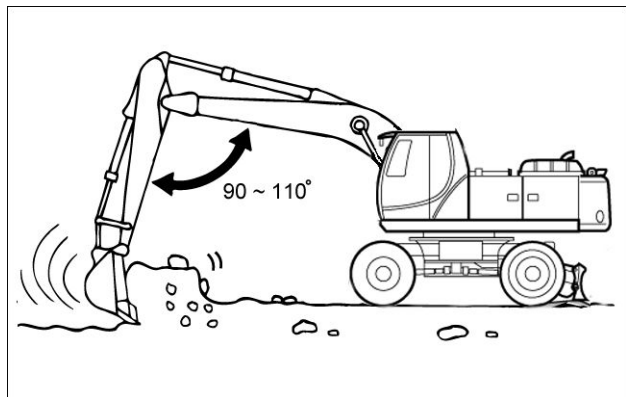
Always point bucket teeth in the direction the machine will be digging to reduce digging resistance and the possibility of bucket teeth damage.



WE0121 3

Maximum Digging Force Position

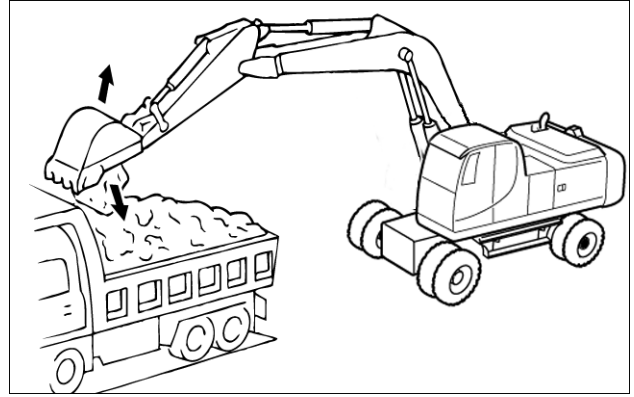
The attachment will provide maximum digging force when the arm and boom are at 90° to 110° of each other.



WE0122 4

Cleaning sand & soil from bucket

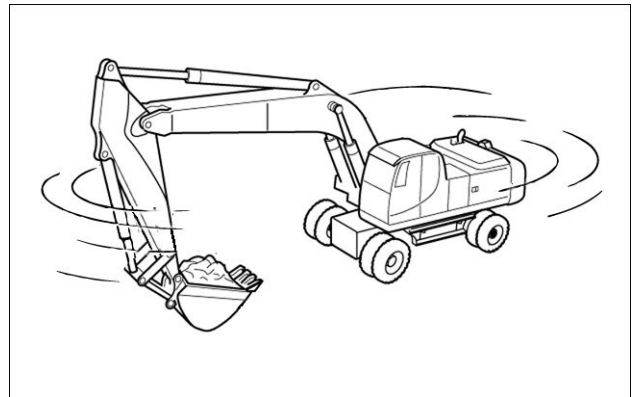
Operate arm to a near level position and bring the bucket to a dumping position. If sand and soil do not fall out, move the bucket lever right and left a few.



WE0123 5

Stop swing motion early

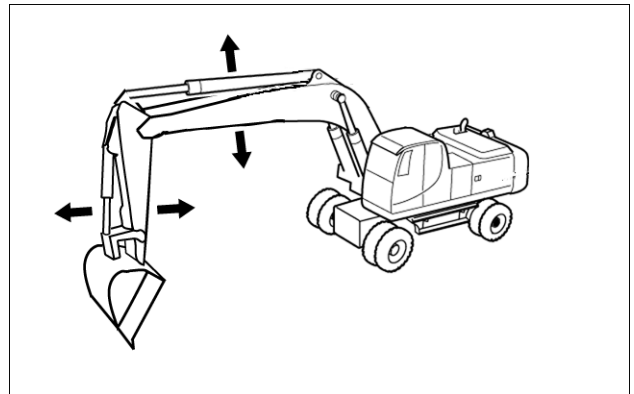
To stop slewing action, release the swing lever before you get to your final point of digging or dumping.



WE0124 6

Grading

Position the arm slightly forward of its vertical position with the bucket fully rolled back, as shown. Retract the arm and at the same time slightly lift the boom. Once the arm moves past its vertical position, slightly lower the boom to allow the bucket to obtain a smooth surface.



WE0125 7

Smoothing ground surface

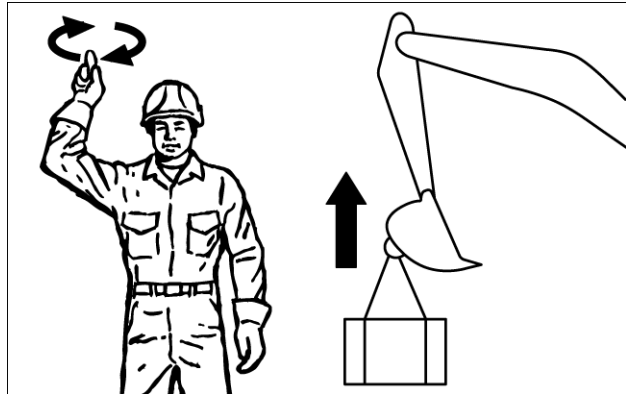
If the front of the machine lifts when the blade digs, gradually raise the dozer blade for an even leveled cut. Keep in mind that a full blade load can be handled easier than a partial load when doing finishing or leveling operations. Slope excavations can always be most effectively done by pushing dirt from the top downward. Pay attention to the dozer blade when dozing.

To finish a flat ground surface after digging or leveling, dump a full load of soil in front of the blade and operate the blade up and down in small strokes and simultaneously travel forward and backward. Finally, place the blade in low position and travel in low (TURTLE) speed in reverse over the ground surface to smooth. Be careful not to back drag the blade over any rocky surface to prevent damage to the blade.

Hand signals

Raise load vertically

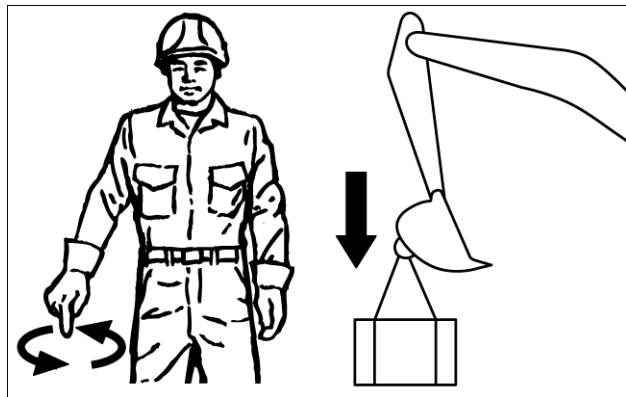
Face machine operator, raise right forearm vertical, with index finger pointing up and move hand in a small circular motion.



NH0081 1

Lower load vertically

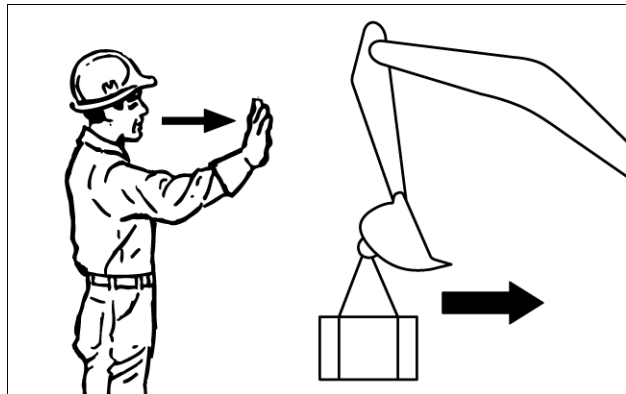
Face machine operator, extend right arm down, point index finger down and move hand in a small circular motion.



NH0082 2

Move load In horizontally

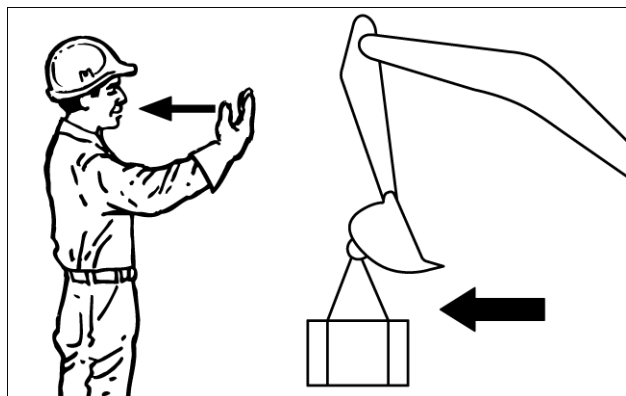
Face machine operator, extend right arm toward operator with hand facing operator and move hand in direction of movement required.



NH0083 3

Move load Out horizontally

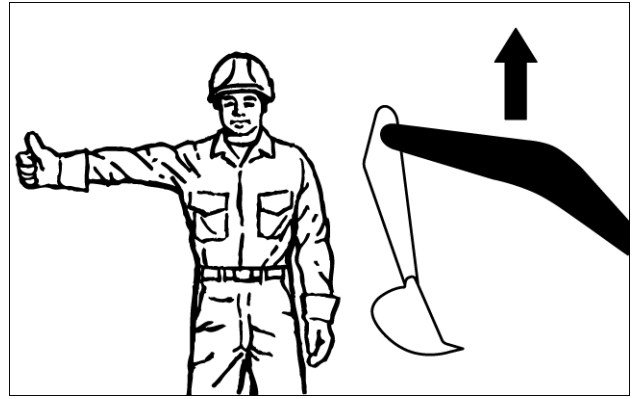
Face machine operator, extend right arm toward operator with back of hand facing operator and move hand in direction of movement required.



NH0084 4

Raise boom

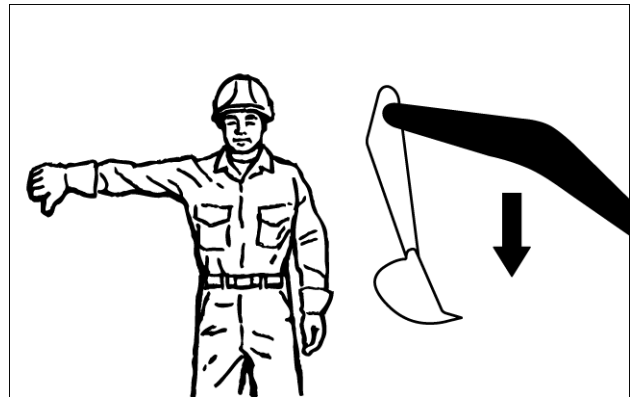
Face machine operator, extend right arm out horizontally from shoulder, make a fist with thumb up.



NH0085 5

Lower boom

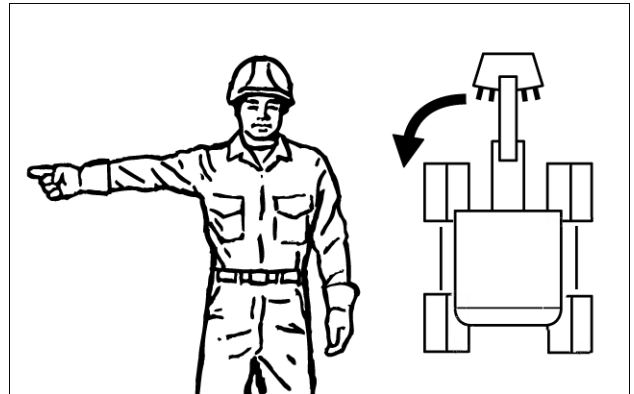
Face machine operator, extend right arm out horizontally from shoulder, make a fist with thumb down.



NH0086 6

Swing left

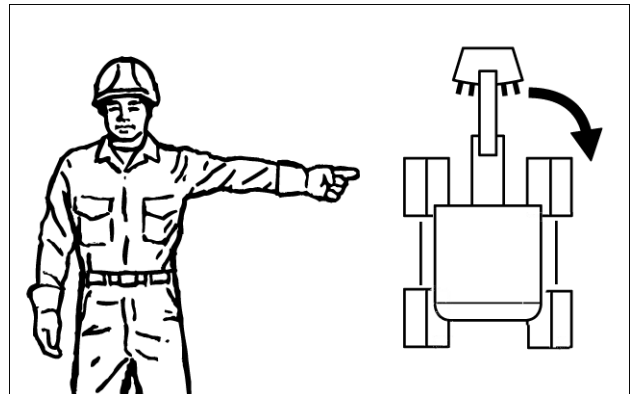
Face machine operator, extend right arm out horizontally from shoulder, make a fist with index finger pointing in swing direction.



WE0087 7

Swing right

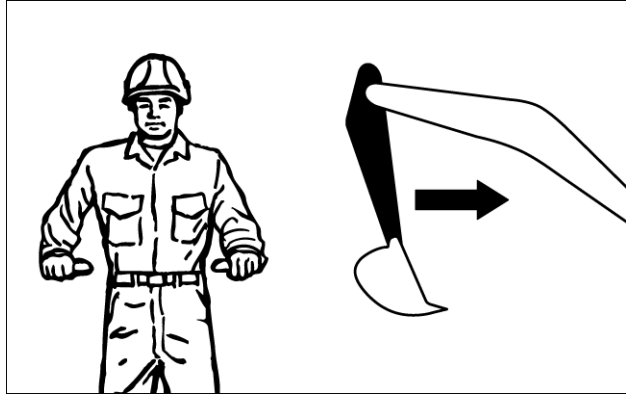
Face machine operator, extend left arm out horizontally from shoulder, make a fist with index finger pointing in swing direction.



WE0088 8

Arm In

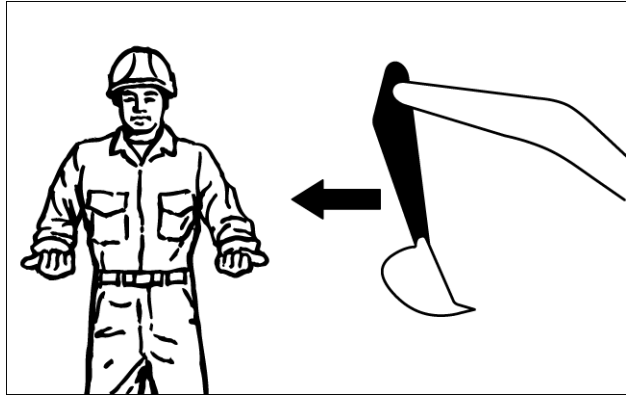
Face machine operator, bend at elbows with arms facing operator, make fists and point thumbs in toward each other.



NH0089 9

Arm Out

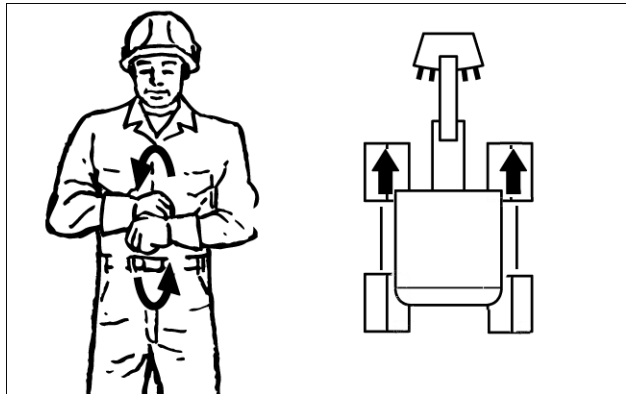
Face machine operator, bend at elbows with arms facing operator, make fists and point thumbs out away from each other.



NH0090 10

Travel forward

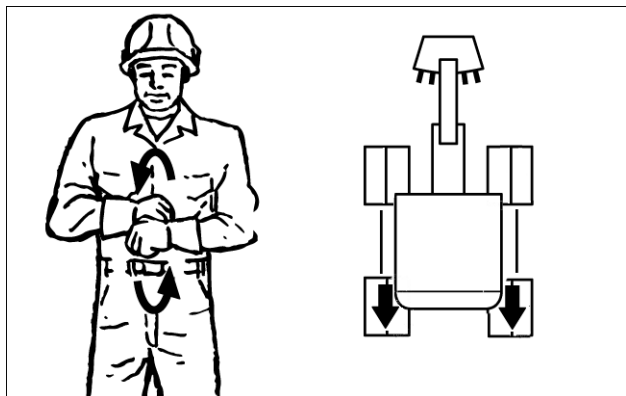
Face machine operator, bend both elbows in, make fists and rotate fists one over the other in a reverse circular motion.



WE0093 11

Travel reverse

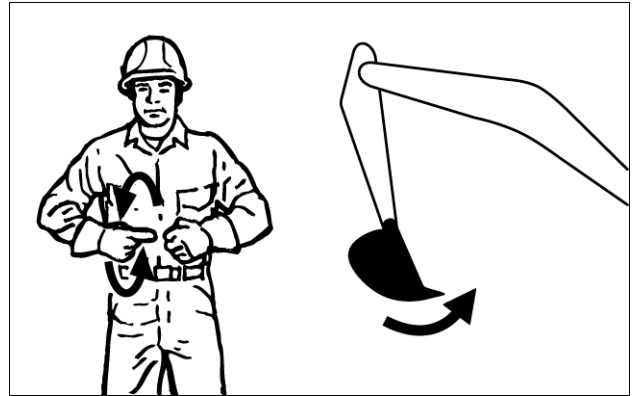
Face machine operator, bend both elbows in, make fists and rotate fists one over the other in a forward circular motion.



WE0094 12

Close bucket

Face machine operator, hold left hand in, closed and stationary, hold right hand in, make a fist with index finger pointing toward left hand and move right hand in a small reverse circular motion.



NH0095 13

Open bucket

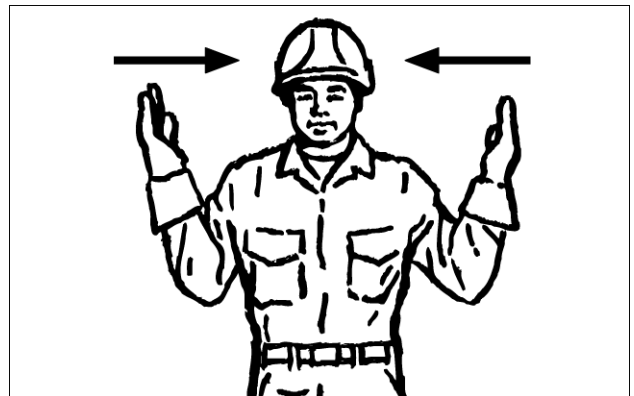
Face machine operator, hold left hand in, open and stationary, hold right hand in, make a fist with index finger pointing toward left hand and move right hand in a small forward circular motion.



NH0096 14

Move this much

Face machine operator, raise both forearms up, hands open and facing each other, move hands in laterally indicating how far to go.



NH0099 15

Move slowly

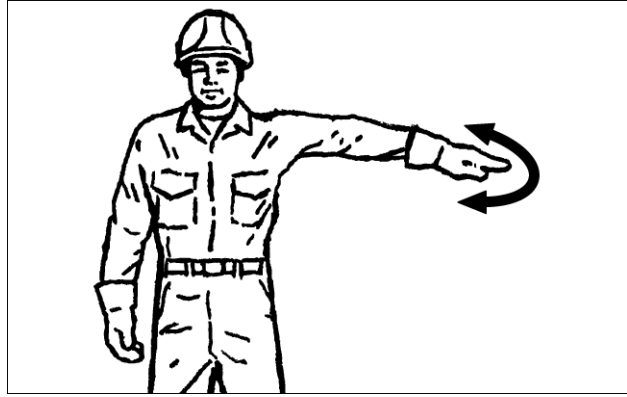
Face machine operator, raise left arm out horizontally toward right shoulder with hand open and facing down, point right index finger up toward open left hand and rotate right hand in a reverse circular motion. (Raise load slowly is illustrated).



NH0100 16

Stop

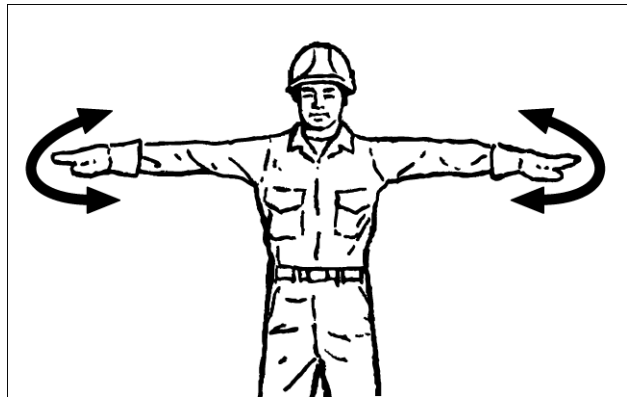
Face machine operator, raise left arm out horizontally from shoulder with hand open and facing down, move arm in a horizontal motion back and forth.



NH0101 17

Emergency stop

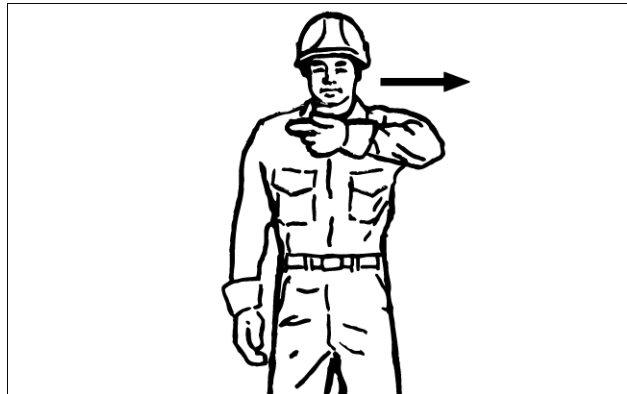
Face machine operator, raise both arms out horizontally from shoulders with hands open and facing down, move arms in a horizontal motion back and forth.



NH0102 18

Stop engine

Face machine operator, right arm at side, draw left thumb or index finger across throat.



NH0103 19

Machine operation in adverse weather conditions

Operation in extreme cold

- Follow procedures on page 4-13 (Starting the engine in cold conditions) as starting engine may be difficult due to extremely cold temperatures.
- Use an engine oil, hydraulic oil and diesel fuel designed for use in cold climates.
- Keep batteries fully charged.
- During the engine WARM-UP phase do not increase the engine rpm to prevent premature wear or damage to pumps, motors and other components.

ATTENTION: *in extremely cold climates, covering the radiator is a method to aid the machine warm-up. If necessary to maintain operating temperatures, cover the outer edges of the radiator, leaving an opening in the center part of the cover - thus avoiding fan overloading. Keep a close watch on the instrument cluster for warning icons during operation. It may be necessary to use a coolant heater, fuel heater, engine heater jacket, and/or additional battery power to aid engine starting.*

- Keep batteries terminals free of ice and snow. Ice and snow could cause the terminals to short circuit and cause extensive damage to the machine systems. Check the batteries electrolyte (acid) level frequently and fill as necessary with distilled water. If the machine will be left outside overnight, it is recommended to remove the batteries and store in a warm area.
- Make certain that the engine coolant mixture is sufficient to keep the machine safe. Take into consideration wind chill factors when mixing coolant ratios.

ATTENTION: *mix coolant to a protection temperature of 5 °C lower than the machine will experience during operation, storage or transport.*

Operation in extreme heat

- Use an engine oil, hydraulic oil and fuel oil designed for use in hot climates.
- Keep batteries fully charged.
- Clean radiator, oil cooler and debris screen often to prevent damage or overheating of the machine. Do not allow dirt and debris to accumulate in the radiator fins, oil cooler fins or debris screen.
- Keep all belts properly tensioned.
- Make certain that the engine coolant mixture is sufficient to keep the machine safe.

- If the machine becomes overheated, idle the machine to help cool the engine, turn the engine off and check coolant level. After filling to proper level the machine continues to over heat, stop engine, allow to cool, drain and flush entire cooling system and refill with the proper mixture of fresh, clean coolant.
- Check the batteries electrolyte (acid) level frequently and fill as necessary with distilled water.
- Keep a close watch on the instrument cluster for warning icons during operation. Avoid unnecessary low speed running of the engine during operation. During slow, or no work periods, place engine speed throttle to low idle: (first position).

Operation in high altitudes

- Due to low atmospheric pressure at high altitudes, a decrease in engine power will be experienced. Be aware of this fact when placing machine under heavy load in high altitude climates.
- Keep close watch on the coolant temperature meter to avoid overheating of the engine.

Operation in sandy and dusty areas

- Check the engine air filter elements frequently in sandy or dusty conditions.
- If the engine air filter icon appears on the instrument cluster, clean or change filters immediately regardless of time intervals.
- Service fuel filter, water separator, and all hydraulic filters frequently.

Operation at seashore or salty climate

- Thoroughly wash machine daily to help avoid corrosion of machined areas, electrical components and cylinder rods.
- Frequently check all mounting hardware for proper tightness. Torque to proper value to aid in preventing salt from entering the machine systems.

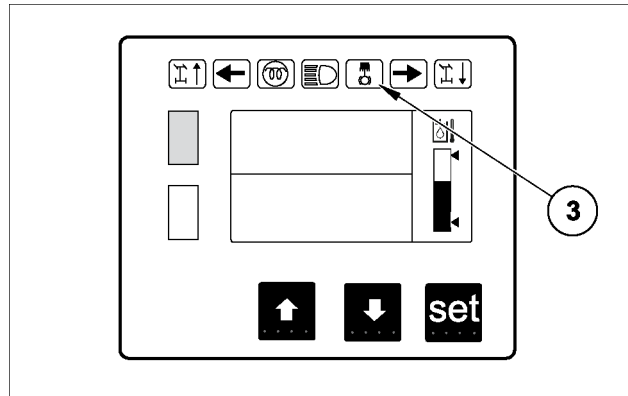
Operation in Humid Climate

- In climates with high humidity, thoroughly wash the machine daily and coat all bare surfaces with an oil based lubricant to help prevent corrosion.

Emergency release of upper structure holding brake

When the error occurs the lamp **(3)** light on and there is a red warning in the cluster in combination with an intermittent loud acoustic. On the cluster appears the explanation of warning.

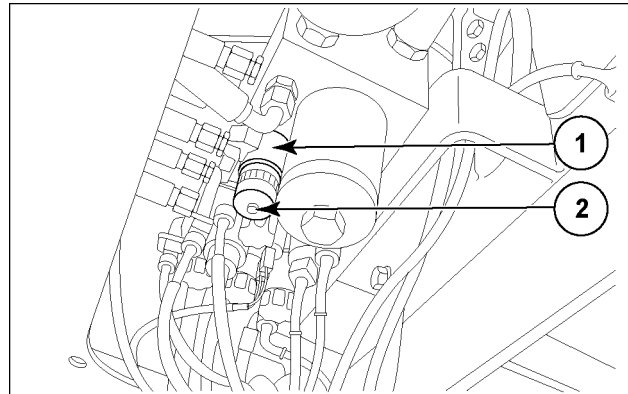
The pilot pressure needed for releasing the upper structure holding brake is controlled by means of a solenoid valve. In the event of solenoid failure, the upper structure holding brake can be released with the emergency release device.



WE0055N1 1

The solenoid valve **(1)** is installed in the frame behind the cab.

- Remove the base-plate of the maintenance opening below the valve stack.
- Screw the setscrew **(2)** to the stop using an Allen key. The upper structure holding brake is released and the upper structure can turn freely.
- After removal of the fault, screw the setscrew back out to the stop.



F34124N2 2

ATTENTION: The upper structure slewing is free to move as soon as the upper structure holding brake is released with the emergency release. When working on slopes or in an inclined position of the excavator, the upper structure can continue to slew uncontrolled if the slewing movement is not stopped by countering.

To avoid dangerous situations, the emergency release function should be used only in exceptional cases. Have any faults of the upper structure holding brake repaired immediately.

7 - MAINTENANCE

GENERAL INFORMATION

Foreword

⚠ DANGER

Improper operation or service of this machine can result in an accident.

Do not operate this machine or perform any lubrication, maintenance, or repair on it until you have read and understood the operation, lubrication, maintenance, and repair information.

Failure to comply will result in death or serious injury.

D0010A

⚠ WARNING

Maintenance hazard!

Before you start servicing the machine, attach a **DO NOT OPERATE** warning tag to the machine in a visible area.

Failure to comply could result in death or serious injury.

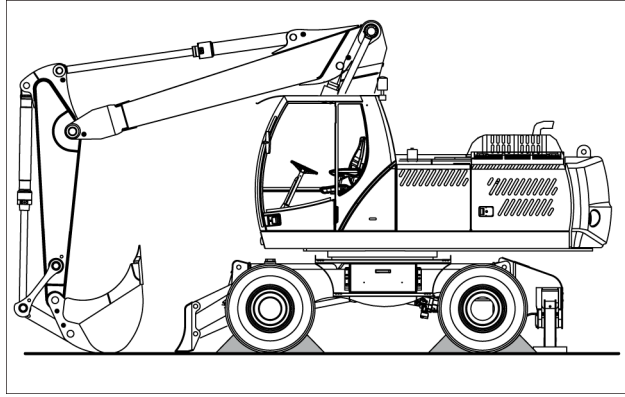
W0004A

ATTENTION: *if you use the machine under particularly severe conditions (dusty or corrosive atmosphere, etc.) reduce the intervals between maintenance operations.*

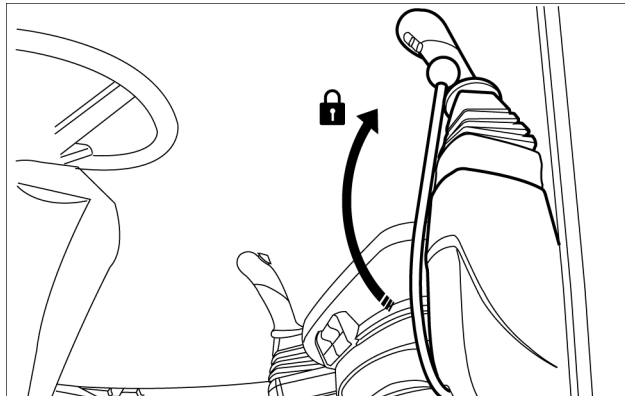
PREPARING THE MACHINE FOR MAINTENANCE

Before performing the maintenance procedures detailed in the following chapters, always perform the following operations if not otherwise specified:

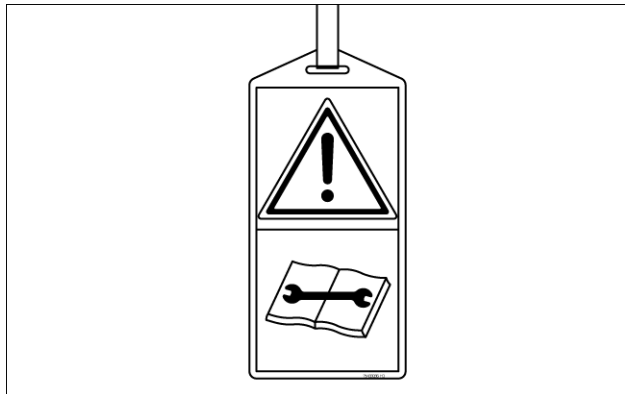
- Park the machine on a level surface.
- Lower the blade and the stabilizers to the ground.
- Lock the upper structure.
- Apply the parking brake.
- Turn the rotary dial to 1st detent (LOW IDLE) and shut off the engine.
- To allow all cylinders to release pressure set the starter switch key again to position "I" move both hydraulic control hand levers and the pedal in all directions. Press the brake pedal to discharge the accumulators of brake system.
- Rest the bucket to the ground.
- Place the safety lever in **LOCK** position.
- Set the starter switch key to position "0" and pull it out.
- Place some wedges under the wheels so as to prevent the machine from moving
- Attach a "DO NOT OPERATE" tag. This tag can be applied to the left control lever, safety lever or cab door.



F00340N 1



F00341N 2



SP0043 3

SERVICING PERSONNEL

Inspection and servicing personnel must have the necessary know-how on the inspection and servicing of this or comparable machines.

The necessary know-how can be acquired in several days' instruction, for instance by a specialist fitter or by attending a training course.

CHECKING THE HOUR METER

ATTENTION: A condition for the Manufacturer to take over the costs of the warranty service, is the regular performance of all inspection, maintenance and repair operations prescribed, as instructed by this Operator's Manual and the use of genuine spares.

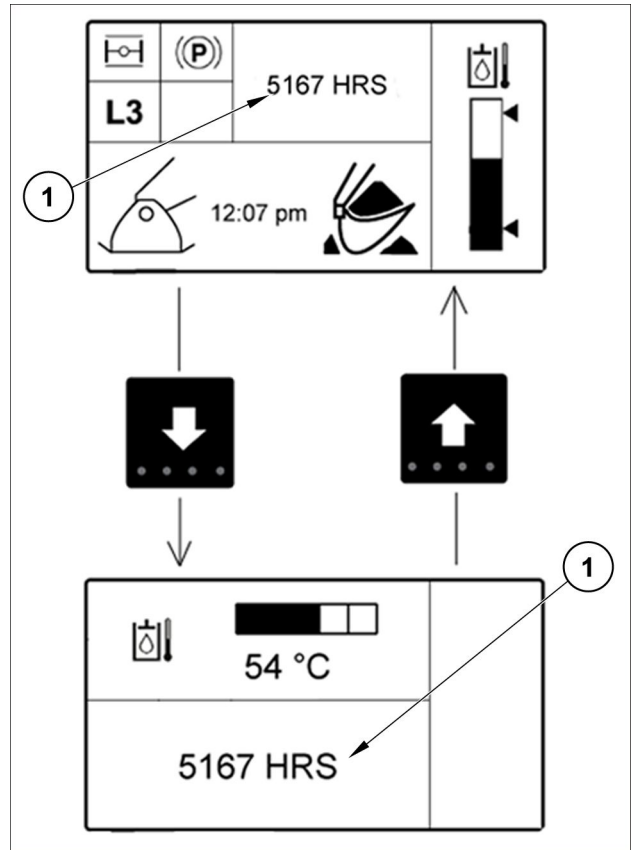
During the warranty period, all inspection works, maintenance and repair, with exception for the daily and weekly maintenance, have to be performed by the After-sales service or by an authorized workshop.

The maintenance intervals indicated in this manual are valid for normal use conditions. If the use conditions are more severe, the intervals are shortened accordingly.

The working hours (1) necessary to determine the maintenance intervals, are shown on the multi-function display inside of the cab.

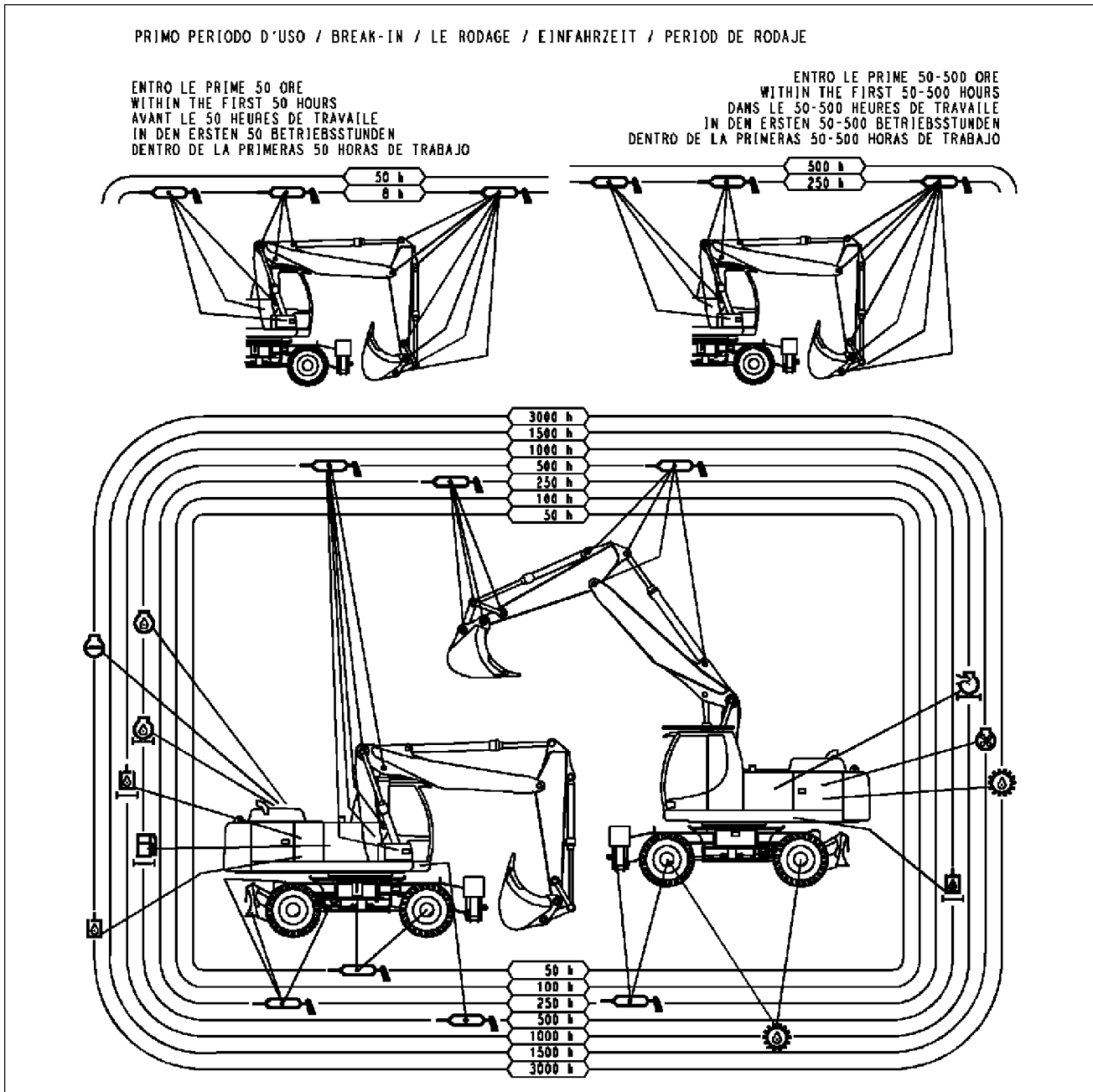
Turn the starter switch in I position: the display shows the Engine hours, clock and hydraulic oil temperature. By means of the arrow buttons it is possible to change the indications showed: the hydraulic oil temperature and the engine hours are displayed

At machine start, the multi-function display shows besides an indication of the expiry and next interval type.














F00342N 4

Maintenance summary decal



W00900N 1

- | | | | |
|---|--------------------------------------|---|---|
|  | Lubricate |  | Replace alternator/fan belt/compressor belt |
|  | Replace axle oil |  | Replace engine oil |
|  | Replace hydraulic oil |  | Replace air filter |
|  | Replace hydraulic return oil filters |  | Clean pilot hydraulic oil filter |
|  | Replace fuel filter |  | Replace engine coolant |
|  | Replace engine oil filter | | |

Break-in period

Your machine will last longer and give better and more economical performance if you pay particular attention to the engine during the first **20** hours of operation.

During this period:

- Keep a close watch on the instrument panel.
- Operate the machine at normal speeds.
- Do not run the engine too much at stalling speeds (with the wheels turning slowly or stopped and the engine at full speed).

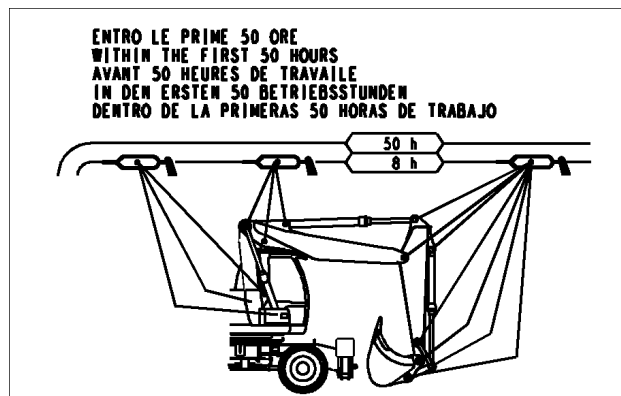
Within the first 50 hours

Within the first **50** hours it is necessary to perform the following operations:

- Lubricate the bucket links every **8** hours: to lubricate the bucket links perform the operations described on page 7-16.
- Lubricate boom and arms every **8** hours: to lubricate the boom and arms perform the operations described on page 7-21.

To ensure an adequate lubrication, let the engine run at idle speed for 1 minute at low idle before increasing the rpm.

Maintain the engine at the normal operating temperature. Do not run the engine at idle speed for long periods.

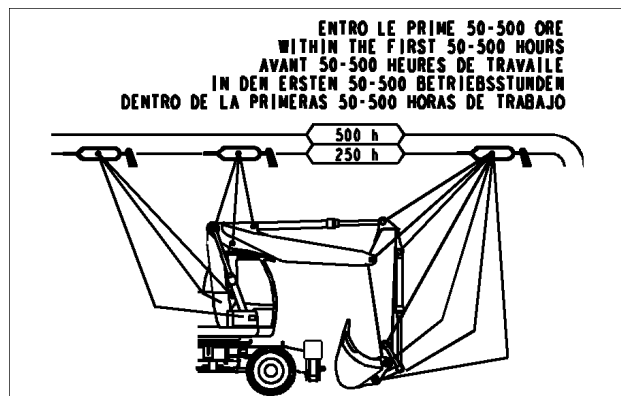


F00901N 1

Within the first 500 hours

Within the first **500** hours it is necessary to perform the following operations:

- Lubricate the bucket links every **250** hours: to lubricate the bucket links perform the operations described on page 7-16.
- Lubricate boom and arms every **250** hours: to lubricate the boom and arms perform the operations described on page 7-21.



F00902N 2

In addition to the operations shown in the Maintenance Programme

Every **10** hours or daily

- Check the engine oil (see page **4-3**).

- Check the hydraulic oil level (see page **4-1**).
- Check the tightness of the wheel nuts (see page **4-9**).
- Check the windshield washer fluid level (see page **4-5**).

MAINTENANCE CHART

Maintenance Chart

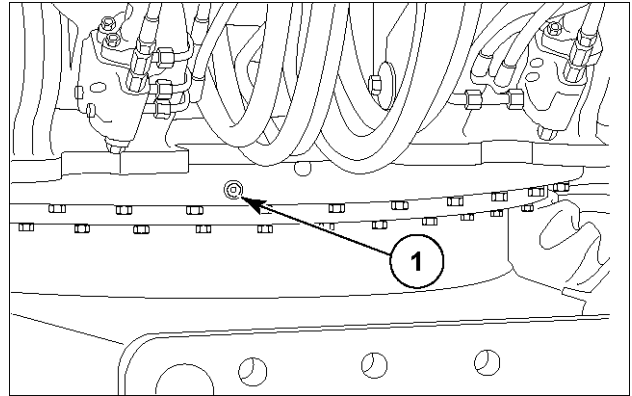
Interval	Page no.	Maintenance action	No. of pts.	Maintenance actions																
				Grease	Check	Cleaning	Lubricate	Drain fluid	Replace	Change fluid	Filling									
Every 50 hours	7-8	Swing bearing		X																
	7-8	Front axle grease fittings		X																
	7-9	Swing reduction unit oil				X														
	7-10	Cab outside air filter					X													
	7-11	Air conditioning					X													
	7-12	Engine cooling system					X													
	7-13	Wheels and tires					X													
	7-14	Lights					X													
Every 250 hours	7-16	Bucket grease fittings							X											
	7-17	Blade and stabilizers joints		X																
	7-18	Steering trunnion pins and cardan shaft		X																
	7-18	Floating axle locking cylinders contact faces							X											
	7-19	Engine air filter: outer element							X											
	7-20	Fuel tank									X									
Every 500 hours	7-21	Attachment		X																
	7-23	Fuel filters																	X	
	7-24	Engine oil and filter																	X	
	7-26	Differential and planetary oil					X													
	7-27	Gearbox oil					X													
	7-27	Rear axle fluid level					X													
	7-28	Cab outside air filter																	X	
	7-29	Swing bearing teeth					X													
	7-30	Tightening torques						X												
	7-34	Engine belts						X												
Every 1000 hours	7-35	Fuel pre-filter																		X
	7-36	Engine air filters																		X
	7-37	Differential and planetary oil																		X
	7-38	Gearbox oil																		X
	7-38	Rear axle fluid																		X
	7-39	Hydraulic oil return filters																		X
	7-40	Hydraulic reservoir breather																		X
	7-41	Pilot control filter																		X
	7-42	Swing reduction unit oil																		X
Every 1500 hours	7-43	Alternator drive belt																		X
	7-44	Air conditioning compressor drive belt																		X
Every 3000 hours	7-45	Hydraulic oil																		X
	7-47	Engine coolant																		X
Electrical system	7-49	Fuses and relays																		X
Fluids and lubricants	7-54	Fluids and lubricants																		X
	7-55	Fluids and lubricants																		X

Every 50 hours

Swing bearing

To grease the slewing ring, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Inject grease of the specified type (See "Fluids and lubricants" at the end of this chapter) through the grease fitting **(1)**.
- Start the engine, raise the bucket approximately 20 cm from the ground and swing the upper structure by **45 °**.
- Lower the bucket to the ground.
- Repeat the procedure above three times. Grease should be injected until it is seen coming out of the seals. Do not inject excess grease.

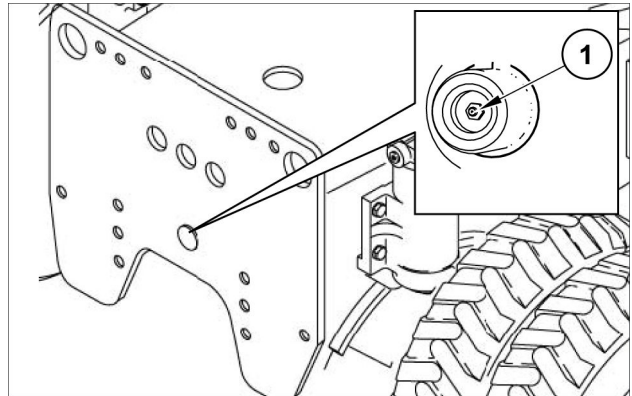


F00426N1 1

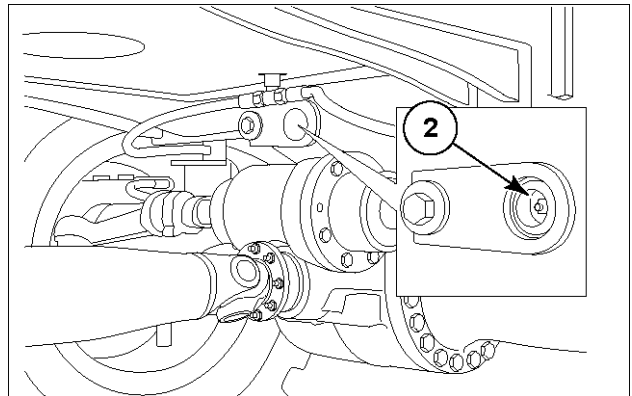
Front axle grease fittings Axles Floating Pins

To grease the axles floating pins proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Inject grease of the specified type (See "Fluids and lubricants" at the end of this chapter) through the grease fitting **(1)** and **(2)**.
- Grease should be injected until it is seen coming out of the seals. Do not inject excess grease.



F00366N 1



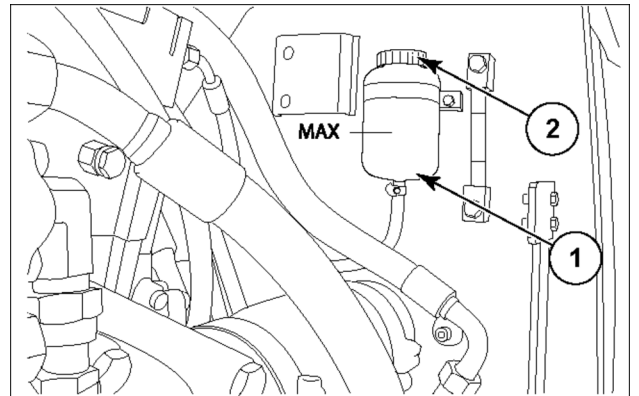
F00367N1 2

Swing reduction unit oil

Check oil level

To check the hydraulic oil level of slewing gearbox, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the hydraulic pump compartment panel and check the oil level in the expansion tank **(1)**. The level must be at least **1 - 2 cm** from the bottom of the tank. If necessary, top up oil.
- Unscrew the screw plug **(2)** and fill in the new oil in the expansion tank **(1)**, until the level the level is in the middle of the tank.
- Tighten the screw plug **(2)**.
- After a short time, check the level in the expansion tank **(1)**. If necessary, top up the oil.



F00423N1 1

Cab outside air filter

Cleaning

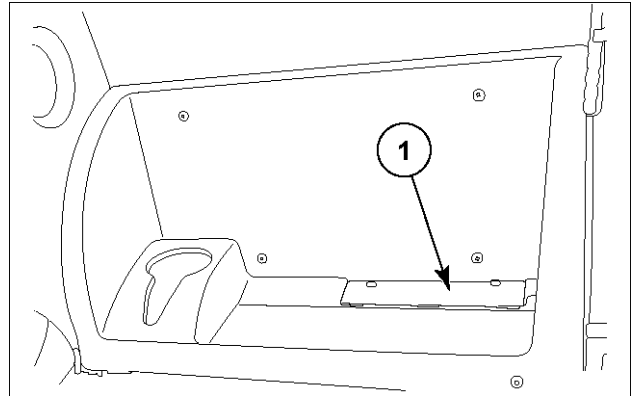
⚠ CAUTION

Eye injury hazard!
Wear protective goggles when using compressed air.
Failure to comply could result in minor or moderate injury.

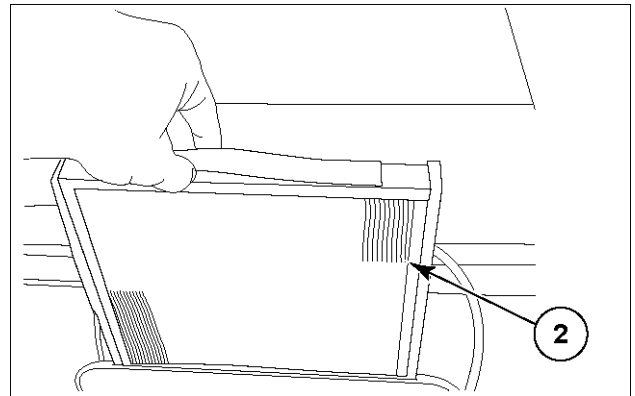
C0035A

To clean the cab outside air filter, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Move the operator's seat fully forward and lower the backrest.
- Remove the panel (1).
- Lift vertically the outside air filter (2) and check its condition. In case it is found dirty, proceed with its cleaning.
- Reposition outside air filter (2) in its seat.
- Reinstall the panel (1).
- Reposition the operator's seat.



F00424N2 1



F00425N1 2

ATTENTION: clean the outside air filter exclusively with compressed air. Replace it every **10** cleaning operations or every 2 years.

ATTENTION: the normal maintenance interval requires the inspection every **250** hours. Under particular ambient conditions (very dusty area) it is recommended to reduce the interval.

Air conditioning

Cleaning

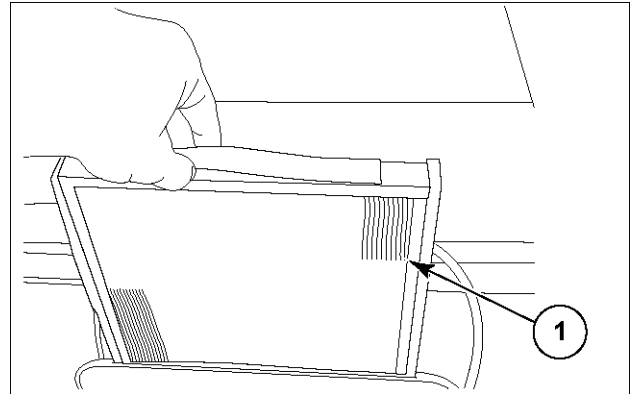
⚠ CAUTION

Eye injury hazard!
Wear protective goggles when using compressed air.
Failure to comply could result in minor or moderate injury.

C0035A

To clean the air recirculation filter, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Move the operator's seat fully forward and lower the backrest. The filter **(1)** is on the left side of operator's seat.
- Lift vertically the air recirculation filter **(1)** and check its condition. In case it is found dirty, proceed with its cleaning.
- Reposition the air recirculation filter **(1)** in its seat.
- Reposition the operator's seat.



F00425N2 1

ATTENTION: clean the air recirculation filter exclusively with compressed air. Replace it every **10** cleaning operations or every 2 years.

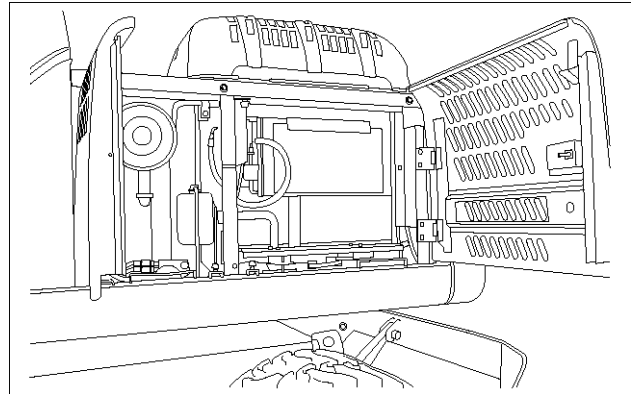
ATTENTION: the normal maintenance interval requires the inspection every **500** hours. Under particular ambient conditions (very dusty area) it is recommended to reduce the interval.

Engine cooling system

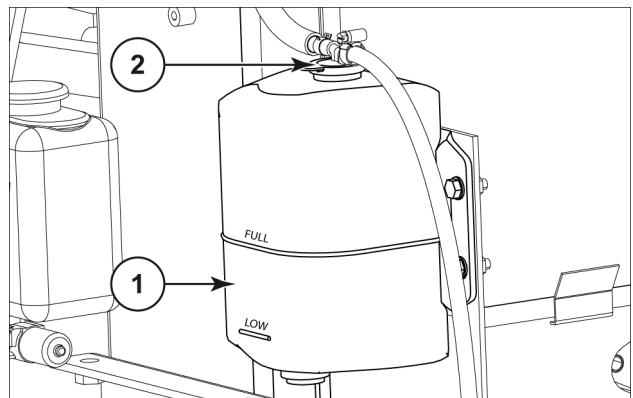
Check

To check the engine coolant level, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the radiator and air cleaner compartment panels and lock them in open position.
- Check the coolant level on expansion tank **(1)**. Level must be checked with cold engine and it must be between the **FULL** and **LOW** reference marks.
- In case the level is insufficient, remove the filler cap **(2)** and top up the level, through the filler neck, until it reaches the **FULL** mark.
- Install the filler cap **(2)** and close the radiator and air cleaner compartment panels.



F00350N1 1



NHC0342 2

Wheels and tires

⚠ WARNING

Explosion hazard!

When inflating tires, use a clip-on air chuck with a gauge, remote valve, and hose long enough to allow you to stand to one side and NOT in front of or over the wheel assembly. Keep others out of the DANGER AREA. Never inflate a tire beyond the maximum allowable pressure printed on the tire.

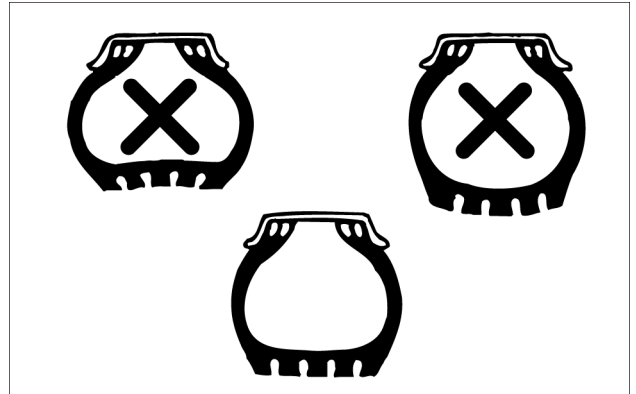
Failure to comply could result in death or serious injury.

W0059A

Check

To check the tires pressure, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Check the tires pressure with a suitable inflating tool equipped with self-locking nozzle and pressure gauge.
- If the pressure results to be lower than expected, proceed to the inflation.
For recommended pressures see chapter "Specifications".



F5640N 1

ATTENTION: Inflate tires only with normal compressed air. Never use flammable gas: danger of explosions! Check pressure only with cold tires; when tires are warm, the pressure values detected are higher. Watch the tire and the pressure gauge of the inflating equipment permanently during the inflation and never exceed the prescribed tire pressures. Always inflate tires to the prescribed pressure:

- excessive tires pressure means poor handling properties off the road and a risk of bursting tires;
- insufficient pressure means increased wear on the tires and inadequate stability of the machine.

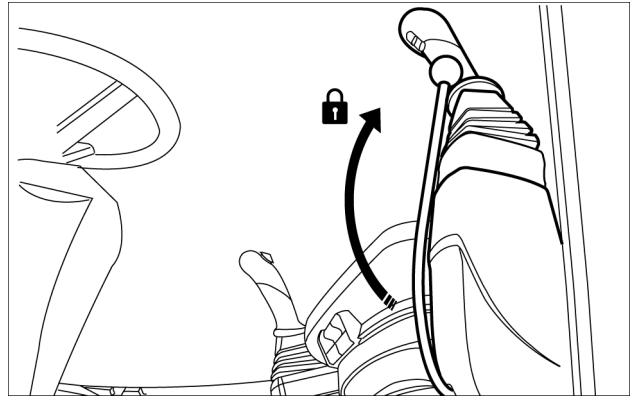
NOTE: Before inflating the tires, check the tires, rims and rim parts for damage, penetrated foreign objects and proper fitting.

Lights

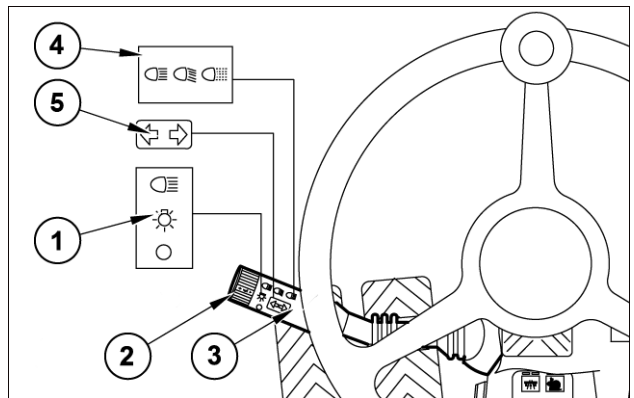
Check

To check the operation of all lights, proceed as follows:

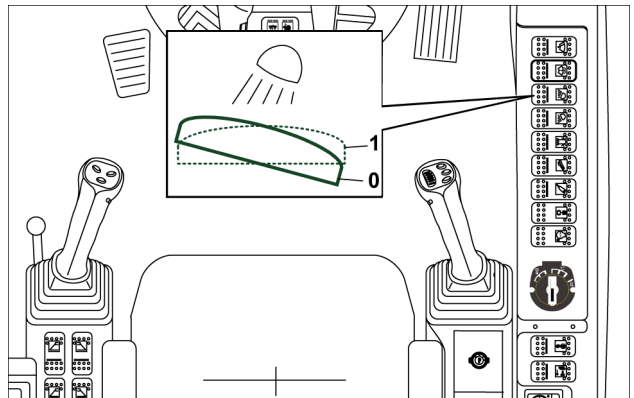
- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position and place the safety lever in **LOCK** position.
- Check the lighting of parking lights and of low beams (1), by turning the ring (2). Push the lever (3) downwards to check the lighting of upper beams, in middle position for low beams and upwards for flash lamp (4).
- Push the lever (3) downwards and forwards to check the lighting of turn signal lights (5).
- Press the switch face without symbol to check the operation of front work lights (6).



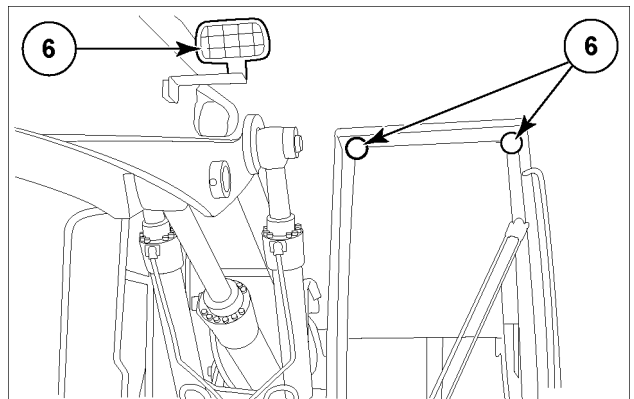
F00341N 1



F00057M 2

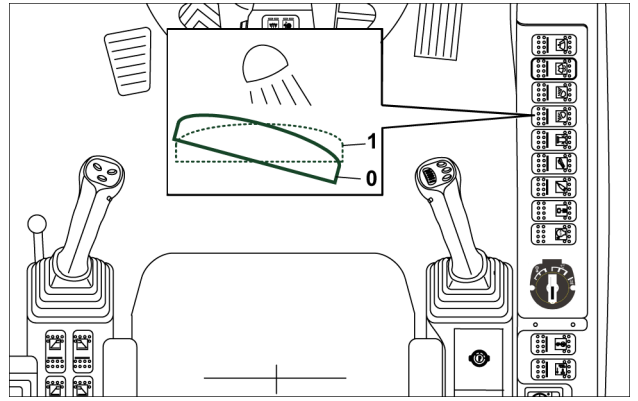


F00304N1 3

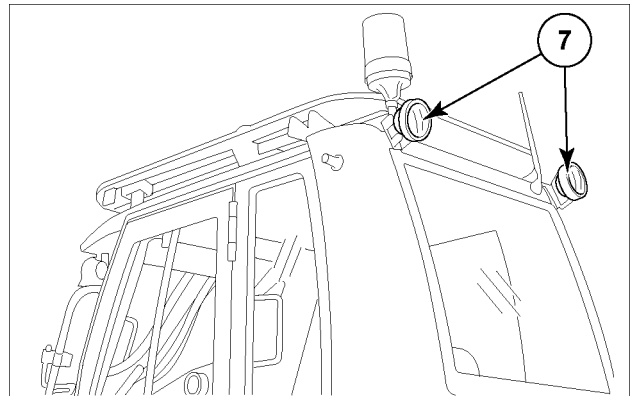


F00333M 4

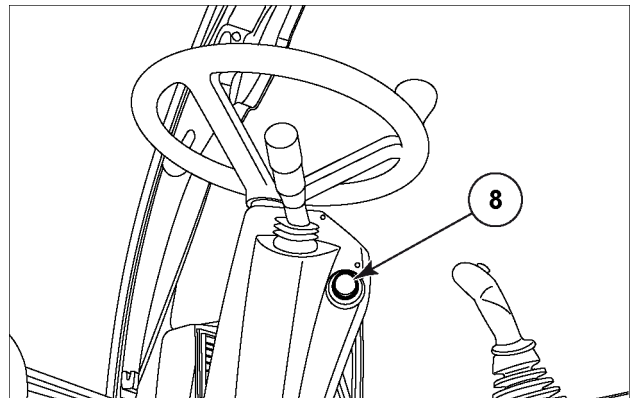
- Press the switch face without symbol to check the operation of rear work lights (7).
- Push the warning light button (8) and the turn signal lights will blink together.
- Press the lock lever (9) on the left side of the pedal (10) to release the brake and then press the pedal (10) to check the lighting of brake lights.



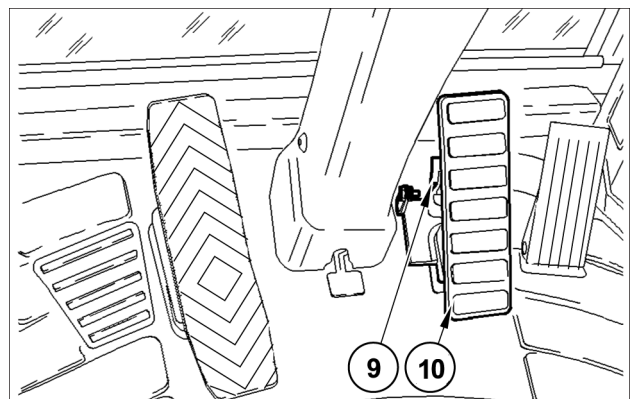
F00305N1 5



F00327M 6



F00906M1 7



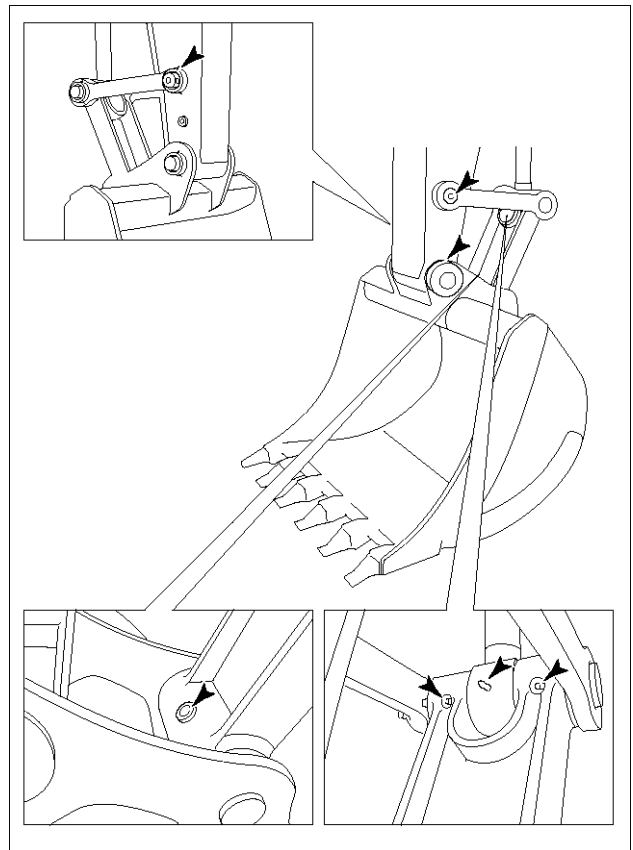
F34053M 8

Every 250 hours

Bucket grease fittings

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Using a grease gun, inject grease of the specified type (see the Maintenance chart) in the grease point of the links shown.

NOTE: it is recommended to lubricate every 10 working hours if the machine has been operated in water or mud.

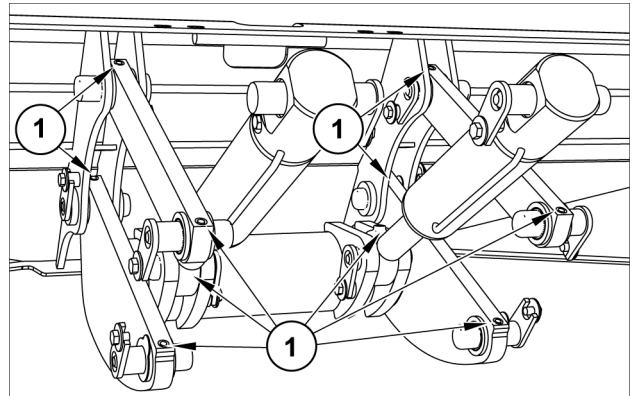


NHC02881 1

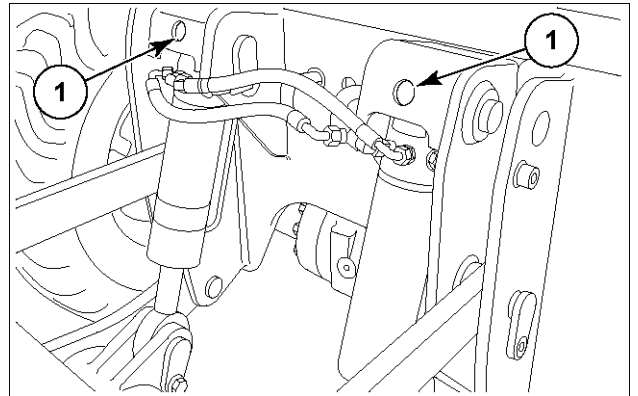
Blade and stabilizers joints

To grease the Blade and stabilizer pins proceed as follows:

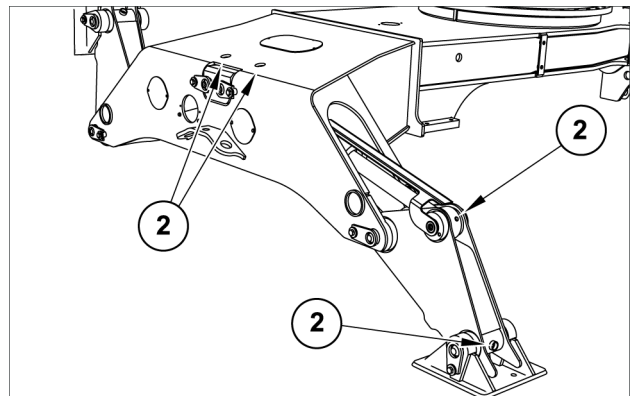
- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Inject grease of the specified type (See "Fluids and lubricants" at the end of this chapter) through the grease fittings **(1)**(Quantity 12 fittings) and **(2)** (Quantity 10 fittings).
- Grease should be injected until it is seen coming out of the seals. Do not inject excess grease.



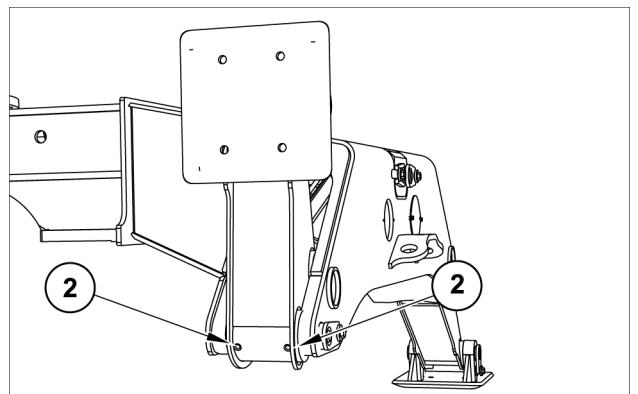
F00371N1 1



F00372N1 2



F00376N 3

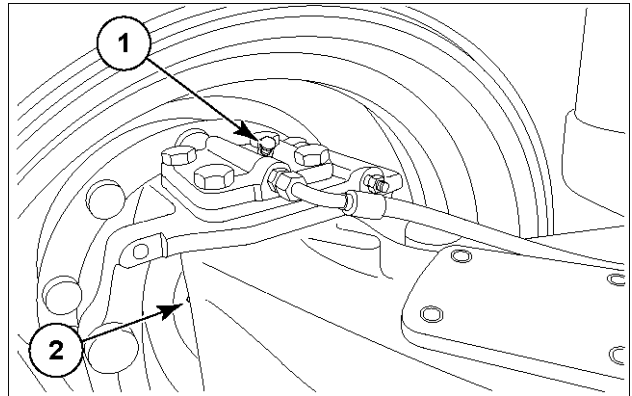


F00374N 4

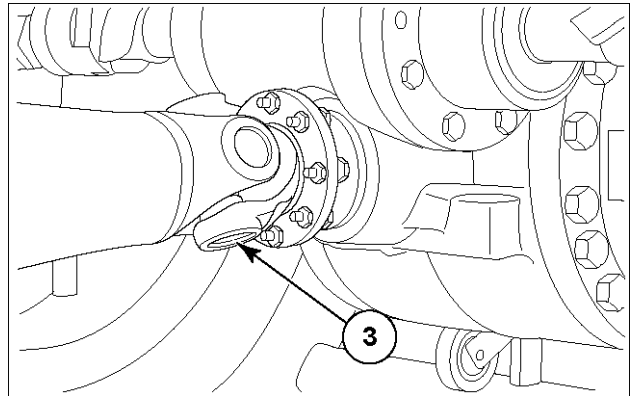
Steering trunnion pins and cardan shaft

To grease the steering trunnion pins and cardan shaft proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Remove the protection cap from the grease nipple.
- Inject grease of the specified type (See "Fluids and lubricants" at the end of this chapter) through the grease fittings **(1)** (Quantity 4 fittings), **(2)** (Quantity 2 fittings) and **(3)** (Quantity 2 fittings if one cardan shaft installed; If there are two cardan shaft is necessary greasing 4 fittings).
- Grease should be injected until it is seen coming out of the seals. Do not inject excess grease.
- Put protective cap onto the grease nipple.



F00377N1 1

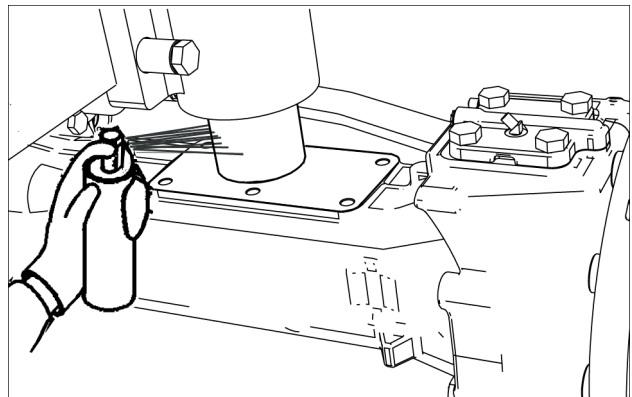


F00378N1 2

Floating axle locking cylinders contact faces

To lubricate the floating axle locking cylinder contact face proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the pistons ends and the upper faces of the gliding element.
- Spray some lubricant between the cylinder rod and the gliding element.
- Repeat this operation also with the other cylinder of the floating axle.



F00380N 1

Engine air filter: outer element

Cleaning

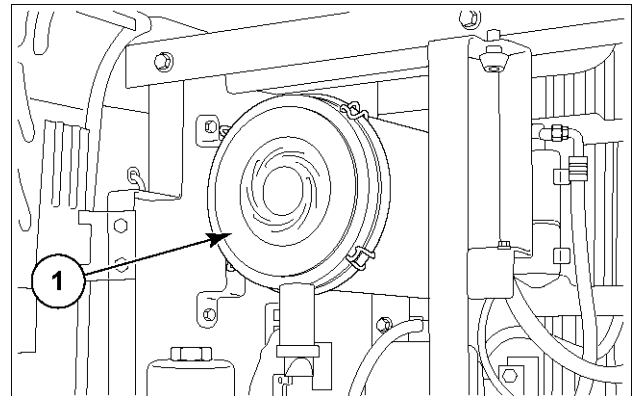
⚠ CAUTION

Eye injury hazard!
Wear protective goggles when using compressed air.
Failure to comply could result in minor or moderate injury.

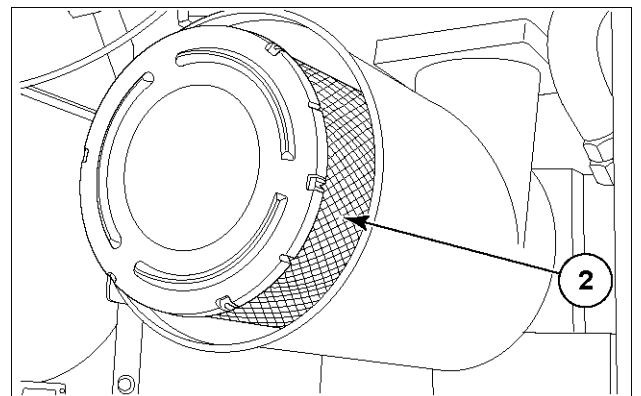
C0035A

To clean the outer element of the engine air filters, proceed as follows:

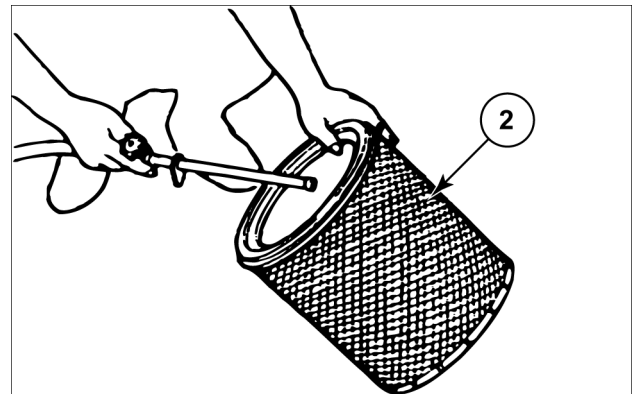
- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the air filters compartment panel and lock it in open position.
- Release the hooks **(1)** and remove the filters cover.
- Extract outer element **(2)** and clean it using compressed air. Direct the air jet from the inside to the outside of the filter.
- Reinstall the outer element **(2)** making sure that it is properly positioned.
- Reinstall the filters cover securing it with the hooks **(1)**.
- Close the air cleaner compartment panel.



F00389N1 1



F00390N1 2



NHC0349 3

Fuel tank

Draining condensation

⚠ WARNING

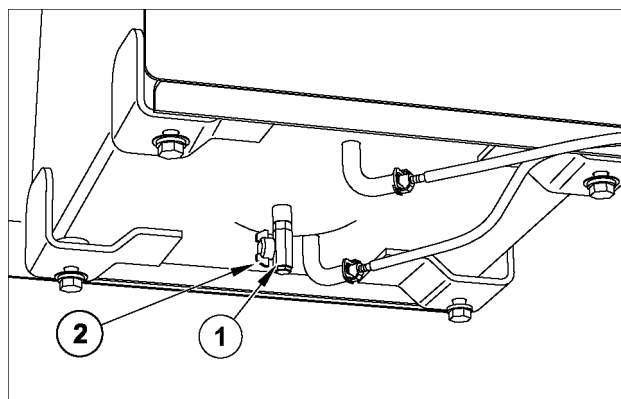
Fuel vapors are explosive and flammable. Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

W0904A

To drain the condensation inside the fuel tank, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Get under the turret in correspondence with the fuel tank and remove the guard.
- Remove plug (1) from draining valve. Slowly open the cock (2) and let condensation and deposits drain into a suitable container until only clean fuel comes out.
- Once the draining operation is over, close cock (2), reinstall plug (1) and the guard.
- Bleed air from the fuel system (see 7-23)

NOTE: when the temperature is above 0 °C, draining can be done before engine start-up. When working with temperatures below 0 °C, the tank should be drained at the end of work, after engine stop, as water might freeze and not drain properly.



N00436M 1

Every 500 hours

Attachment

Monoblock version

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Use a grease gun to pump grease of the prescribed type (see Fluids and lubricants at the end of this chapter) into the lubrication stations indicated in the figures 1 and 2:
7 grease fittings located between the boom cylinders.

1A: Right boom cylinder bottom

2A: Right boom lower boss

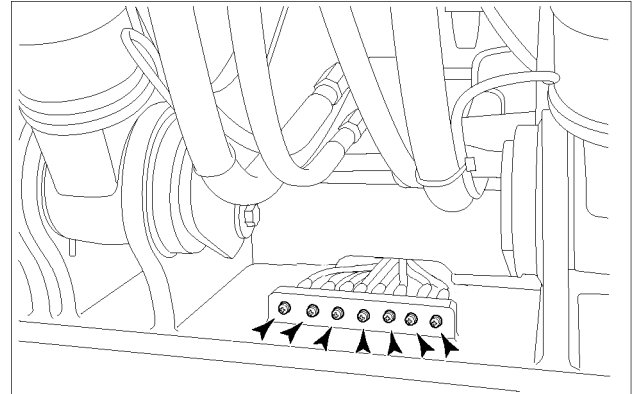
3A: Left boom lower boss

4A: Arm cylinder bottom

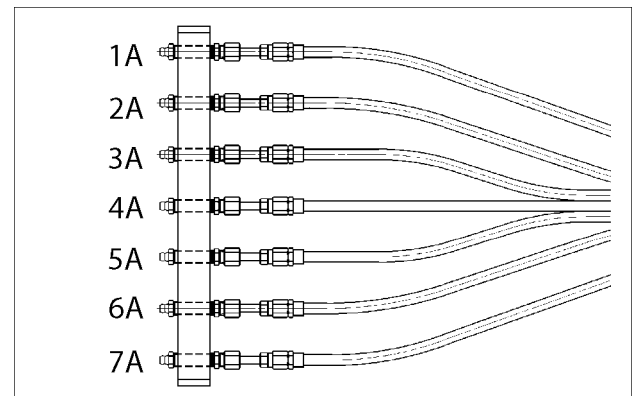
5A: Right boom cylinder rod

6A: Left boom cylinder rod

7A: Left boom cylinder bottom



F00363N3 1

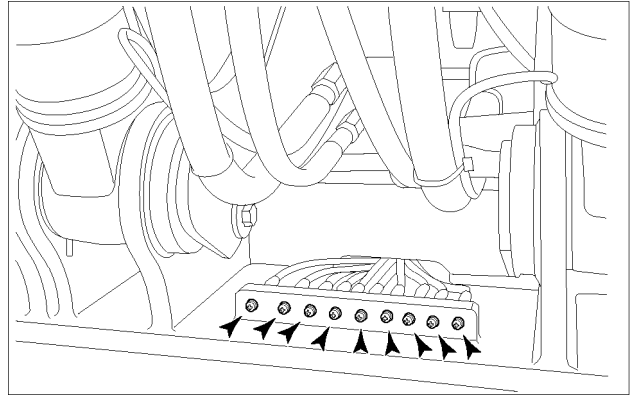


W0005N_1 2

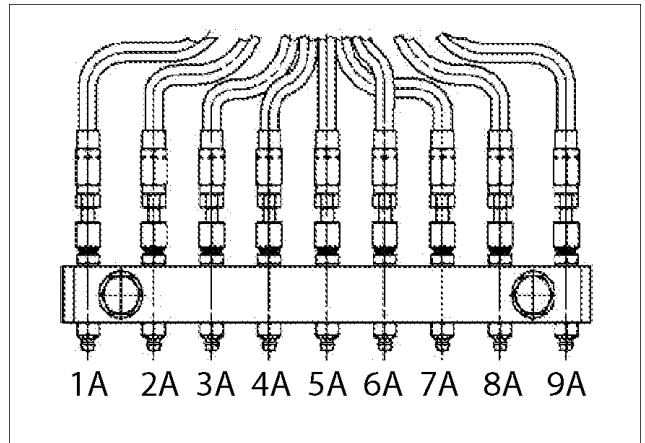
Triple articulation version

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Use a grease gun to pump grease of the prescribed type (see Fluids and lubricants at the end of this chapter) into the lubrication station indicated in the figures 1, 2, 3 and 4:
9 grease fittings located between the boom cylinders + 4 grease fittings located at bottom of second boom.
1A: Right boom cylinder bottom
2A: Left first boom lower boss
3A: Right first boom lower boss
4A: Positioning cylinder bottom
5A: Right boom cylinder rod
6A: Left boom cylinder rod
8A: Right first boom upper boss
7A: Left first boom upper boss
9A: Left boom cylinder bottom
1B: Left second boom boss
2B: Positioning cylinder rod
3B: Arm cylinder bottom
4B: Right second boom boss

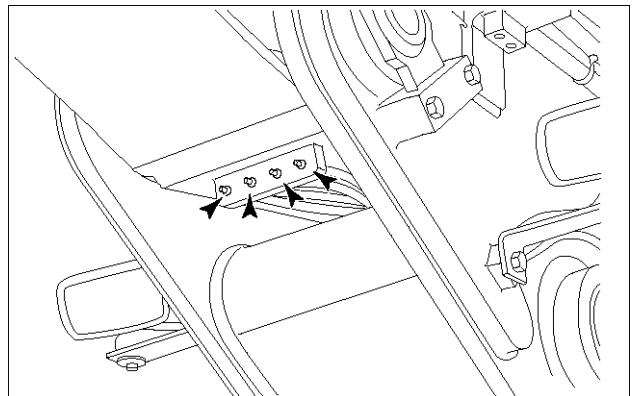
NOTE: with triple articulation version machines, position the boom so that it becomes easy to reach the 4 grease fittings located on the arm.



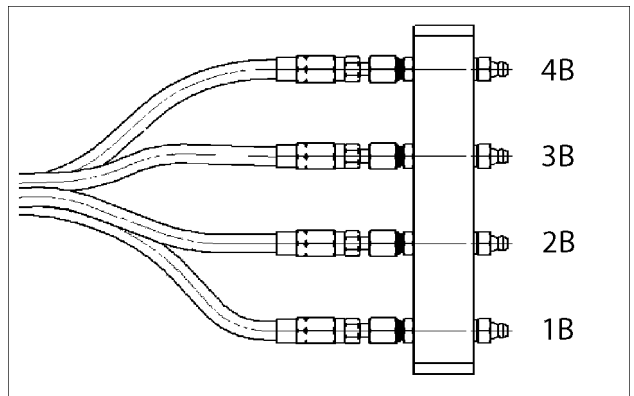
F00363N2 3



W0005N 4



F00364N1 5



W0006N 6

Fuel filters

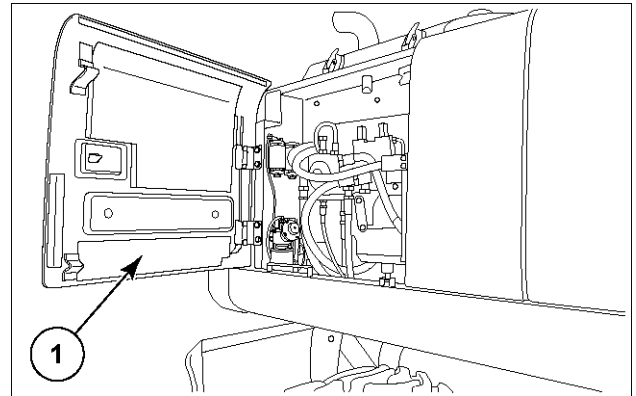
⚠ WARNING

Fuel vapors are explosive and flammable. Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

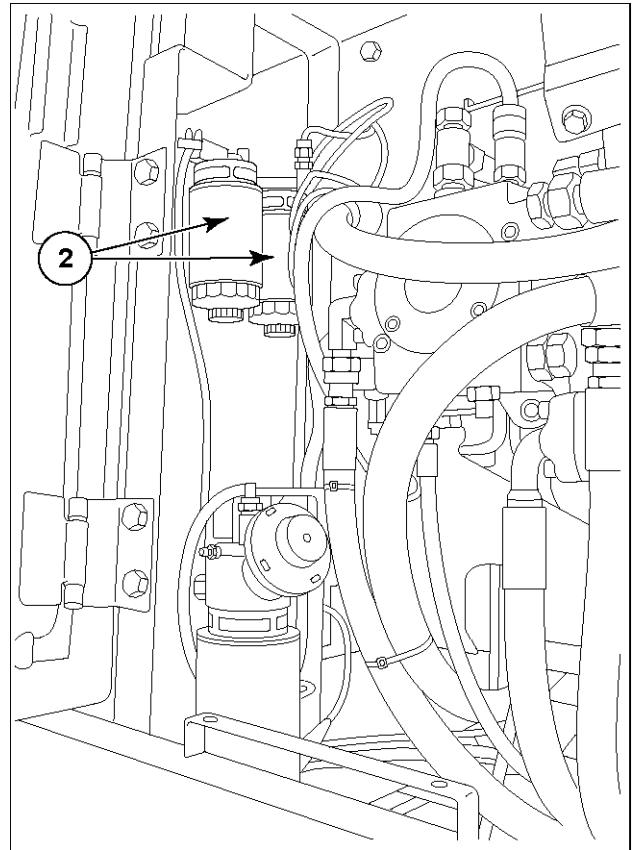
W0904A

To replace the fuel filter, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the hydraulic pump compartment panel (1) and lock it in open position.
- Clean the area around filters (2).
- Remove the filters (2) using a filter wrench.
- Fill the new filters with clean fuel and hand tighten it until the gasket contacts the support body. Tighten further the filter turning it half a turn.



F00384N1 1

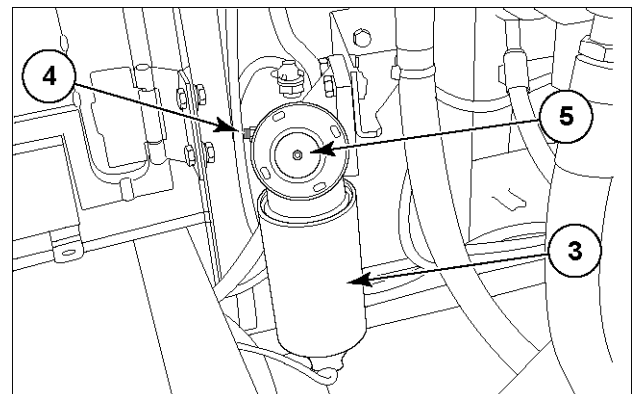


F00385N1 2

Bleeding air from the system

Bleed the air in the fuel system operating as follows:

- On the fuel pre-filter (3), loosen bleeding screw (4) then actuate repeatedly the priming pump (5) until from the loosen connection of screw (4) a minimal quantity of fuel free from air bubbles gets out.
- Tighten bleeding screw (4).



F00385N1 3

Engine oil and filter

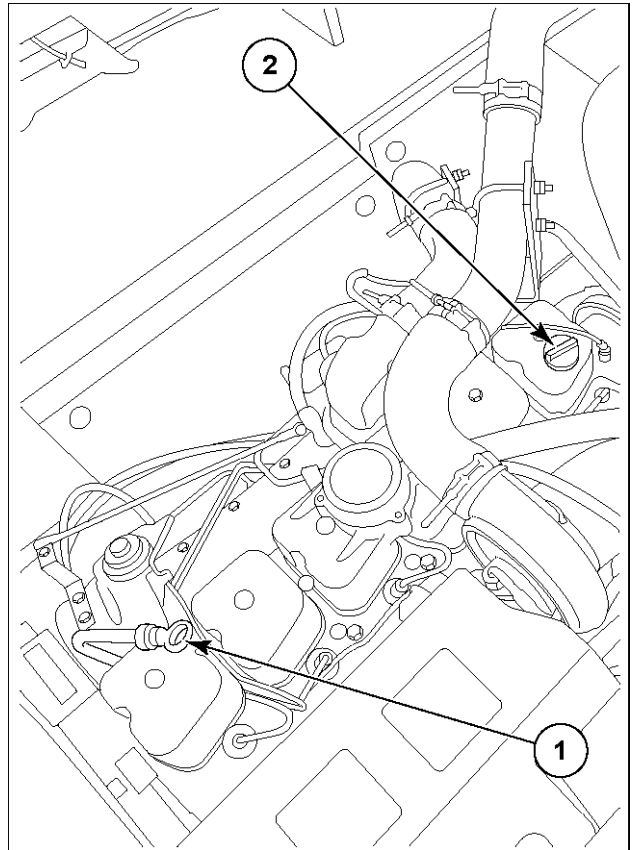
⚠ WARNING

Inhalation hazard!
Make sure there is proper ventilation before starting the engine.
Failure to comply could result in death or serious injury.

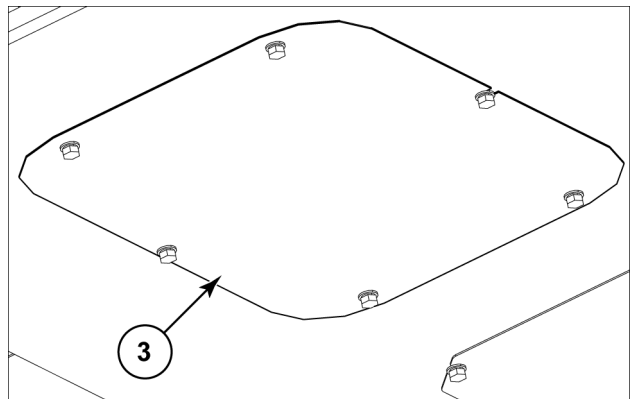
W0928A

To replace the engine oil and filter, proceed as follows:

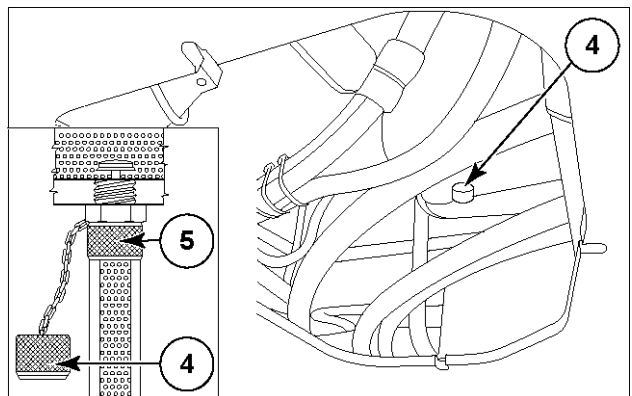
- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the engine hood and lock it in open position.
- Extract dipstick (1) and remove the filler cap (2). These two operations provide a faster draining of the oil.
- Get under the turret and remove the panel (3) unscrewing its relevant screws using a **19 mm** wrench.
- Loosen manually plug (4).
- Tighten manually the draining pipe (5) (provided with the machine) on valve body (7) and let the oil drain into an appropriate container.
- Once the draining operation is over, remove the draining pipe (5), install plug (4) on valve body and guard (3).



F00348N1 1



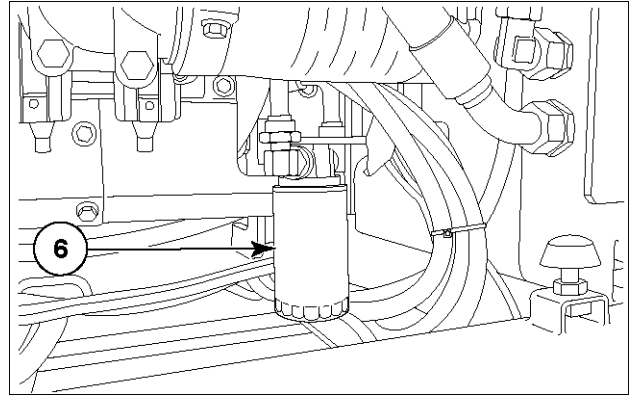
NHC0340 2



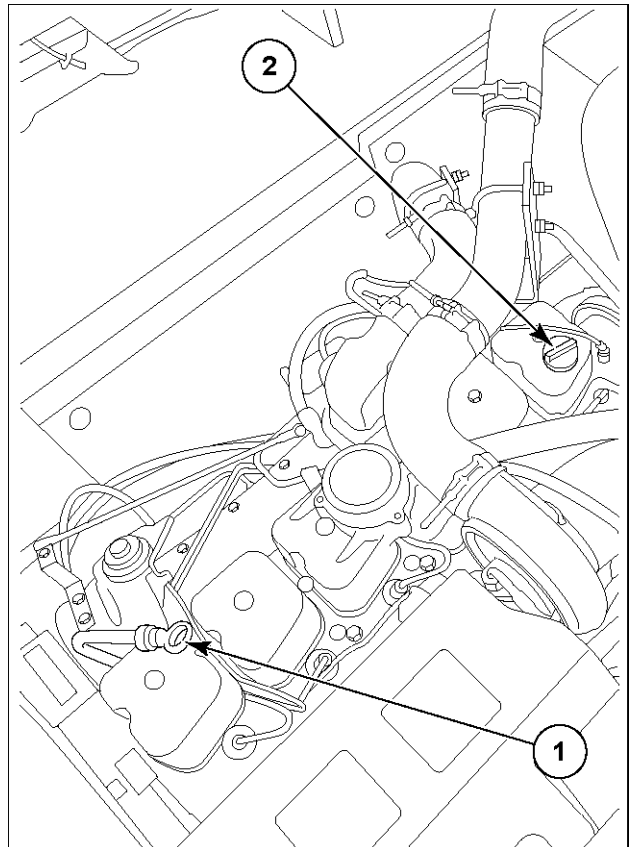
F00387N1 3

- Open the hydraulic pump compartment panel and lock it in open position.
- Clean the contact area and around the filter **(6)** and remove it using a filter wrench.
- Lubricate the gasket of the new filter with new engine oil.
- Hand tighten the new filter until the gasket touches the support, then tighten the new filter further $\frac{3}{4}$ turn using a filter wrench.
- Close the hydraulic pump compartment panel.
- Pour oil into the engine through filler neck until the maximum level indicated on dipstick **(1)** is reached, then tighten the filler cap **(2)** and insert the dipstick.
- Start the engine, let it run a few minutes then stop it. Use dipstick **(1)** to check again the level and top up in the event it has changed with respect to the previous check.

NOTE: handle and dispose the exhausted engine oil and filters in accordance with current regulations. Use only authorized disposal procedures and, in case of doubts, contact the appropriate authorities.



F00388N1 4



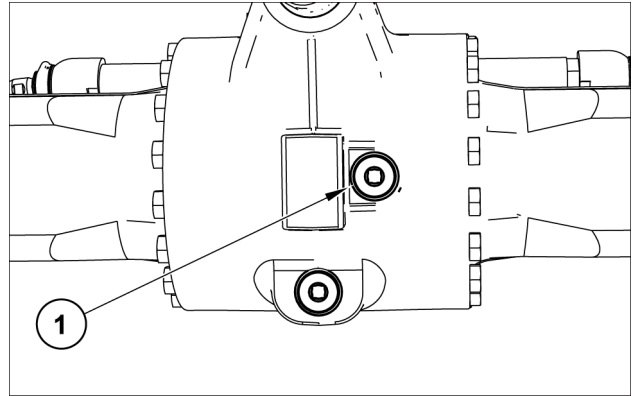
F00348N1 5

Differential and planetary oil

Differential - oil check

To check the differential oil level, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the area around screw plug **(1)**.
- Unscrew the screw plug **(1)** slowly, until the inner pressure is completely released, then completely unscrew the plug **(1)**.
- The oil level must be flush with the hole lower edge.
- If necessary, top up oil through the screw plug **(1)**.
- Provide screw plug **(1)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)

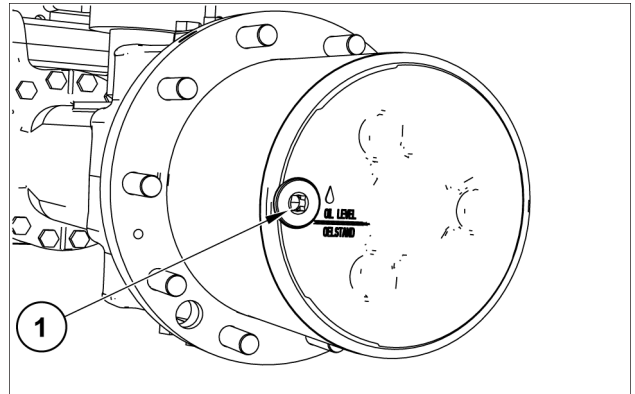


F00397N 1

Side gearboxes - oil check

To check the side gearboxes oil level, proceed as follows:

- Set screw plug **(1)** for oil check into the shown positions.
- Clean the area around screw plug **(1)**.
- Unscrew the screw plug **(1)** slowly, until the inner pressure is completely released, then completely unscrew the plug **(1)**.
- The oil level must be flush with the hole lower edge.
- If necessary, top up oil through the screw plug **(1)**.
- Provide screw plug **(1)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)

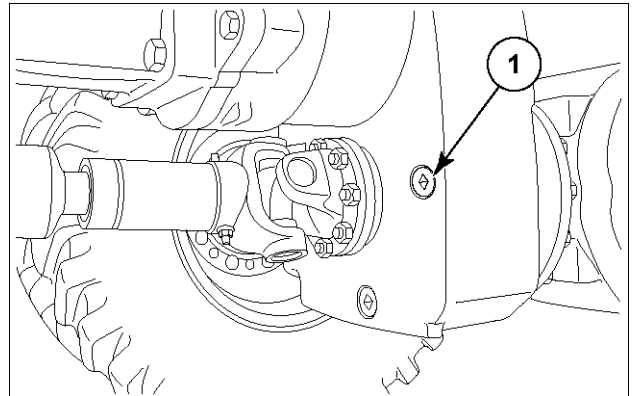


F00394N 2

Gearbox oil

To check the gearbox oil level, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the area around screw plug (1).
- Unscrew the screw plug (1) slowly, until the inner pressure is completely released, then completely unscrew the plug (1).
- The oil level must be flush with the hole lower edge.
- If necessary, top up oil through the screw plug (1).
- Provide screw plug (1) with a new O-ring and mount it. (Tightening torque = **50 N·m**)



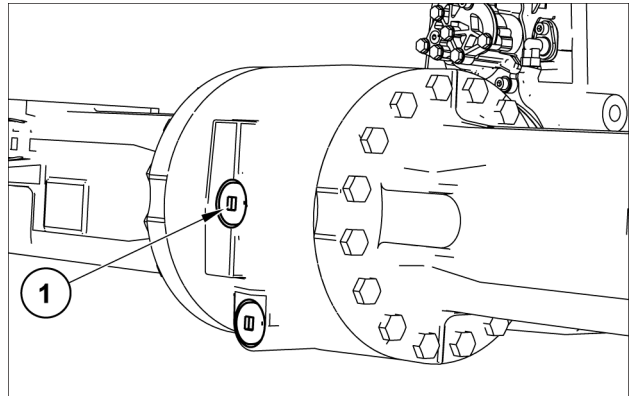
F00398N1 1

Rear axle fluid level

Differential - fluid check

To check the fluid level of rear axle, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the area around screw plug (1).
- Unscrew the screw plug (1) slowly, until the inner pressure is completely released, then completely unscrew the plug (1).
- The oil level must be flush with the hole lower edge.
- If necessary, top up oil through the screw plug (1).
- Provide screw plug (1) with a new O-ring and mount it. (Tightening torque = **50 N·m**)



F00399N 1

Cab outside air filter

Replace

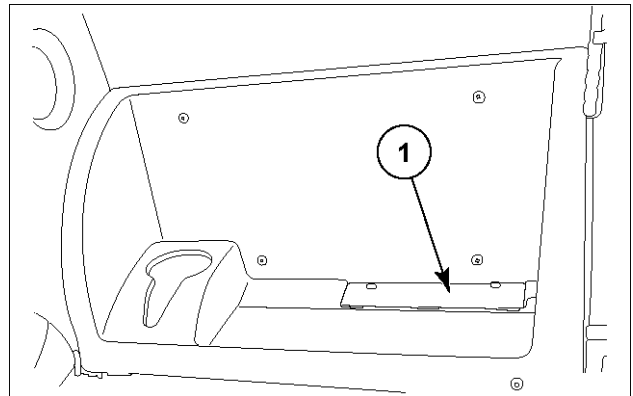
⚠ CAUTION

Eye injury hazard!
Wear protective goggles when using compressed air.
Failure to comply could result in minor or moderate injury.

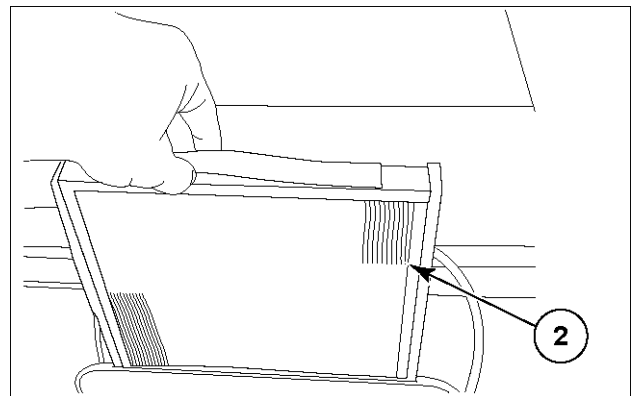
C0035A

To replace the cab outside air filter, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Move the operator's seat fully forward and lower the backrest.
- Remove the panel (1).
- Lift vertically the outside air filter (2) and check its condition. In case it is found dirty, proceed with its cleaning.
- Reposition outside air filter (2) in its seat.
- Reinstall the panel (1).
- Reposition the operator's seat.



F00424N2 1



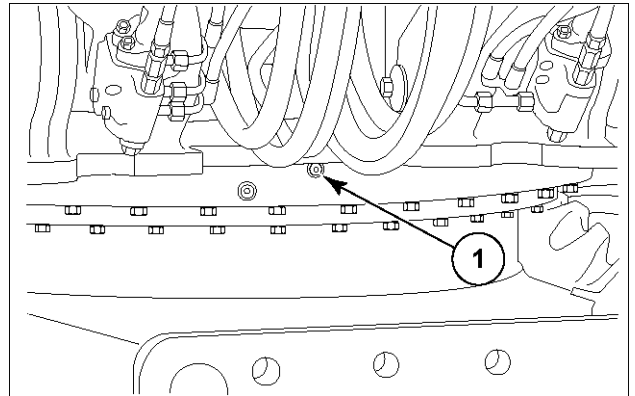
F00425N1 2

ATTENTION: the normal maintenance interval requires the replacement every **1000** hours. Under particular ambient conditions (very dusty area) it is recommended to reduce the interval.

Swing bearing teeth

To grease the slewing ring, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Inject grease of the specified type (See "Fluids and lubricants" at the end of this chapter) through the grease fitting **(1)**.
- Start the engine, raise the bucket approximately 20 cm from the ground and swing the upper structure by **45 °**.
- Lower the bucket to the ground.
- Repeat the procedure above three times. Grease should be injected until it is seen coming out of the seals. Do not inject excess grease.



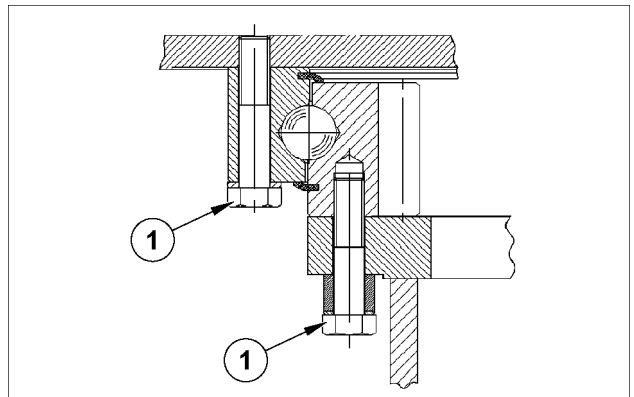
F00427N1 1

Tightening torques

	Notes	Tightening torques WX188	Tightening torques WX168
Bolts slewing ring	Apply loctite #262 equivalent	627 - 513 N·m (462.5 - 378.4 lb ft)	324.5 - 270.5 N·m (239.3 - 199.5 lb ft)
Swing gear box	Screw M16X90-10.9	250 N·m (184.4 lb ft)	250 N·m (184.4 lb ft)
Engine bracket	Capscrew M12x35 std 10312 Capscrew M12x45 std 10312	115 N·m (84.8 lb ft)	115 N·m (84.8 lb ft)
Engine mount	Capscrew M18 x 140 std 10312	225 N·m (166 lb ft)	225 N·m (166 lb ft)
Fuel tank	Screw 16X40 std 10312	216 N·m (159.3 lb ft)	216 N·m (159.3 lb ft)
Hydraulic tank	Screw 16X40 std 10312	216 N·m (159.3 lb ft)	216 N·m (159.3 lb ft)
Counterweight	—	1300 - 1000 N·m (958.8 - 737.6 lb ft)	1300 - 1000 N·m (958.8 - 737.6 lb ft)
Cab mounting	Screw M16x55-10.9	264 N·m (194.7 lb ft)	264 N·m (194.7 lb ft)
Battery bracket	—	15.5 N·m (11.4 lb ft)	15.5 N·m (11.4 lb ft)

Bolts slewing ring (1) :

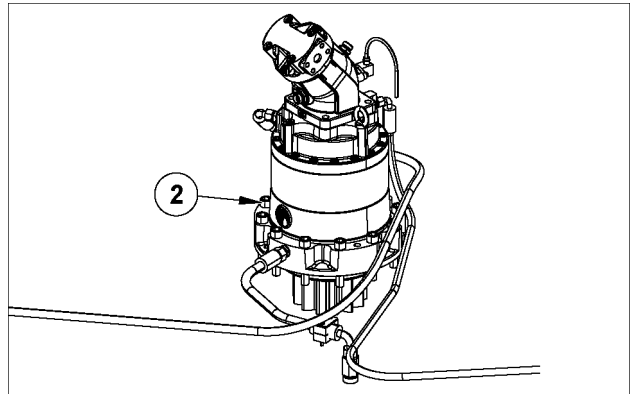
- **WX188 = 627 - 513 N·m (462.5 - 378.4 lb ft)**
- **WX168 = 324.5 - 270.5 N·m (239.3 - 199.5 lb ft)**



WE0130 1

Swing gear box (2):

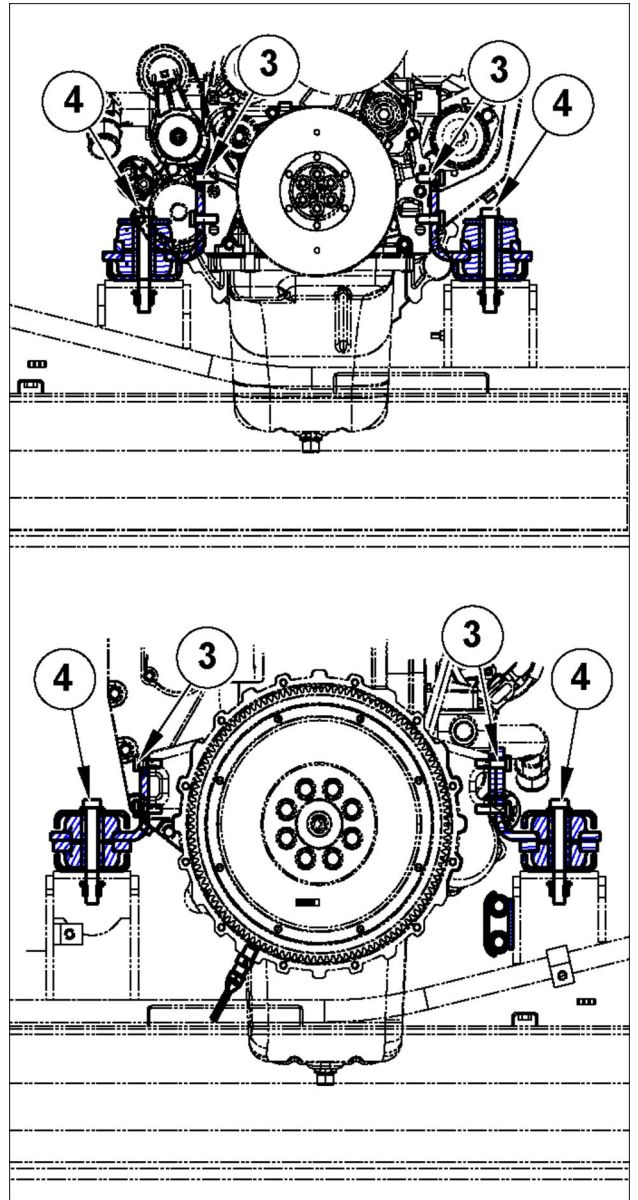
- **WX168 / WX188 = 250 N·m (184.4 lb ft)**



WE0131 2

Engine bracket and engine mount (3) and (4) :

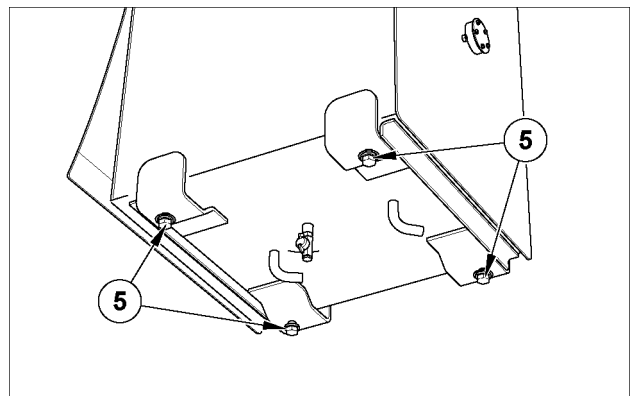
- **WX168 / WX188 — Engine bracket = 115 N·m (84.8 lb ft)**
- **WX168 / WX188 — Engine mount = 225 N·m (166 lb ft)**



WE0132 3

Fuel tank (5) :

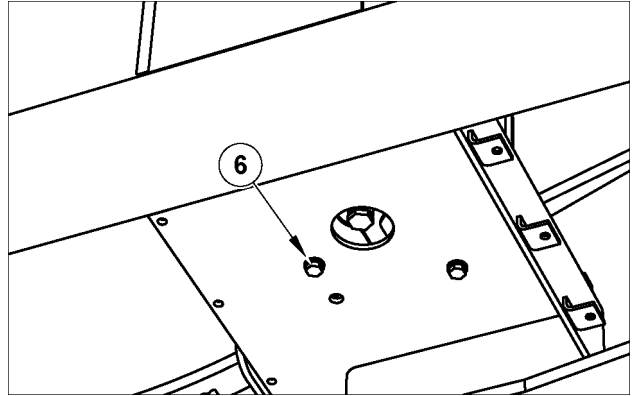
- **WX168 / WX188 = 216 N·m (159.3 lb ft)**



WE0133 4

Hydraulic tank (6) :

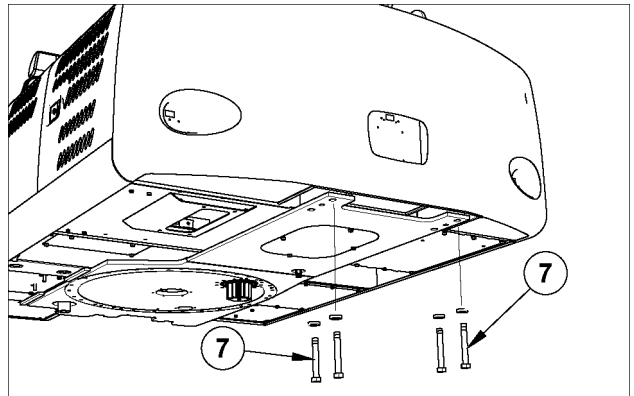
- **WX168 / WX188 = 216 N·m (159.3 lb ft)**



WE0134 5

Counterweight (7):

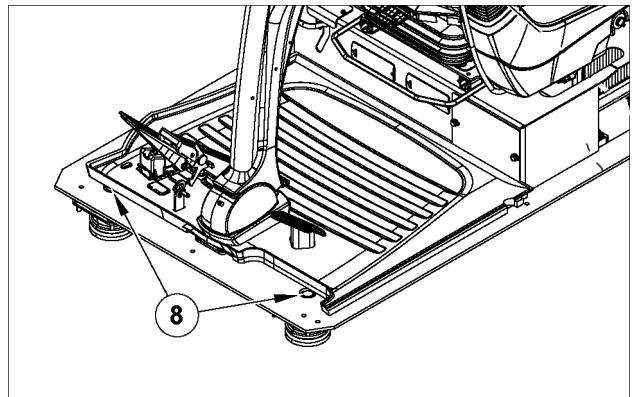
- **WX168 / WX188 = 1300 - 1000 N·m (958.8 - 737.6 lb ft)**



WE0135 6

Cab mounting (8) :

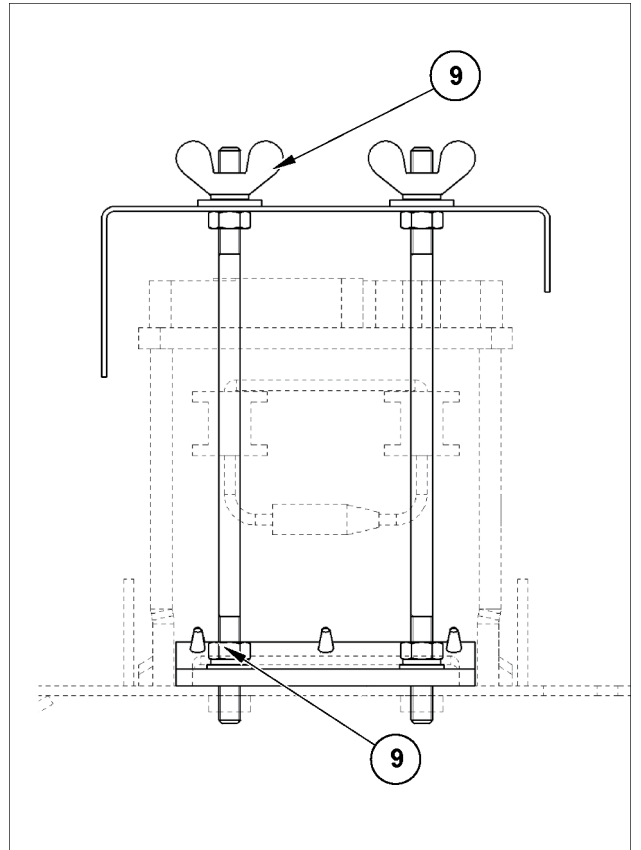
- **WX168 / WX188 = 264 N·m (194.7 lb ft)**



WE0136 7

Battery (9) :

- **WX168 / WX188 = 15.5 N·m (11.4 lb ft)**



WE0137 8

Engine belts

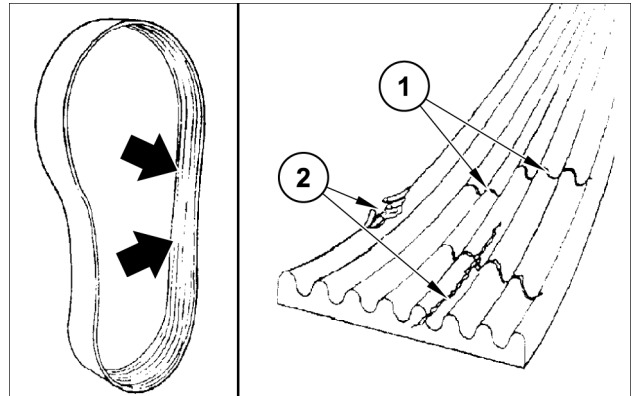
⚠ WARNING

Rotating parts!
The engine is running. Keep clear of rotating fans and belts.
Failure to comply could result in death or serious injury.

W0275A

Proceed with the check of the engine belts operating as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool-off.
- Open the engine hood and lock it in open position.
- Carry out a visual check of all engine belts. Transversal cracks **(1)**, parallel to the belt width are allowed. Longitudinal cracks **(2)** parallel to the belt length are not allowed. In this case the belt has to be replaced. The belt must be replaced also in case of frayed edges or if it is losing pieces.
- Check that the belts have no shiny or worn out spots. In this case the belt is loose or it slips. In this case tighten the belt and/or change it.



F34302 1

Every 1000 hours

Fuel pre-filter

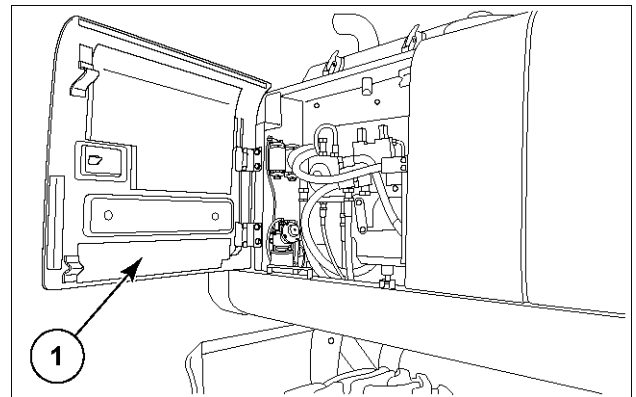
⚠ WARNING

Fuel vapors are explosive and flammable. Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

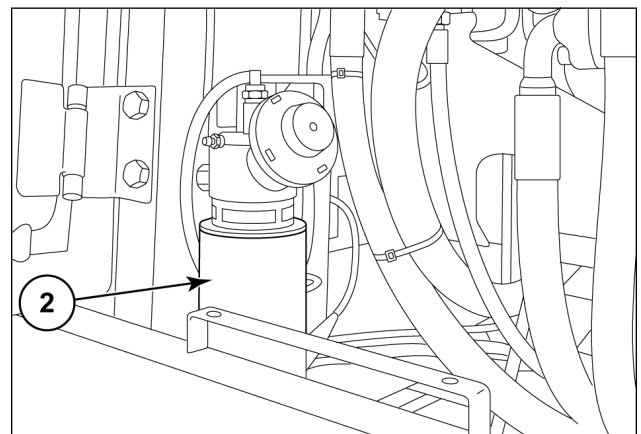
W0904A

To replace the fuel pre-filter, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the hydraulic pump compartment panel (1) and lock it in open position.
- Clean the area around pre-filter (2).
- Remove the pre-filter (2) using a filter wrench.
- Fill the new pre-filter with clean fuel and hand tighten it until the gasket contacts the support body. Tighten further the pre-filter turning it half a turn.



F00384N1 1

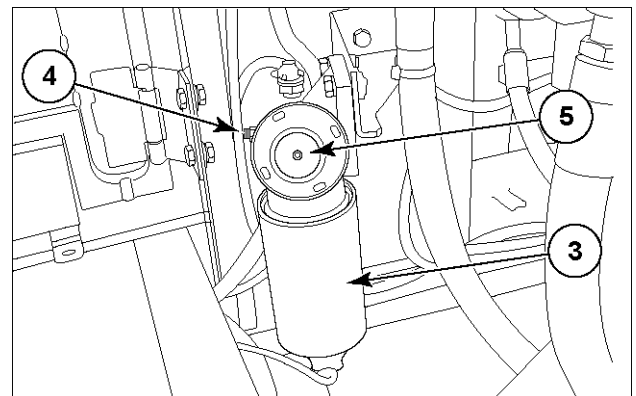


F00386N1 2

Bleeding air from the system

Bleed the air in the fuel system operating as follows:

- On the fuel pre-filter (3), loosen bleeding screw (4) then actuate repeatedly the priming pump (5) until from the loosen connection of screw (4) a minimal quantity of fuel free from air bubbles gets out.
- Tighten bleeding screw (4).



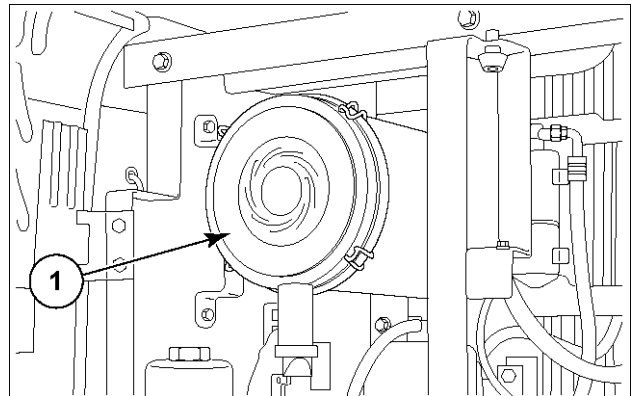
F00383N1 3

Engine air filters

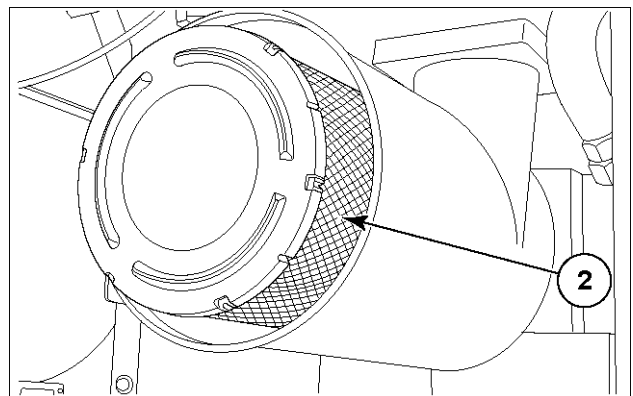
Replacement

To change the engine air filters, proceed as follows:

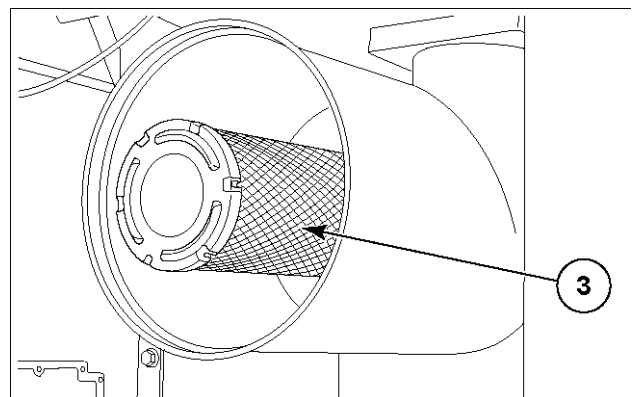
- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Open the air filters compartment panel and lock it in open position.
- Release the hooks **(1)** and remove the filters cover.
- Extract outer element **(2)** and inner element **(3)**.
- Clean inside the filters canister.
- Install a new inner element and a new outer element making sure that they are properly seated.
- Reinstall the filters cover securing it with the hooks **(1)**.
- Close the air filters compartment panel.



F00389N1 1



F00390N1 2



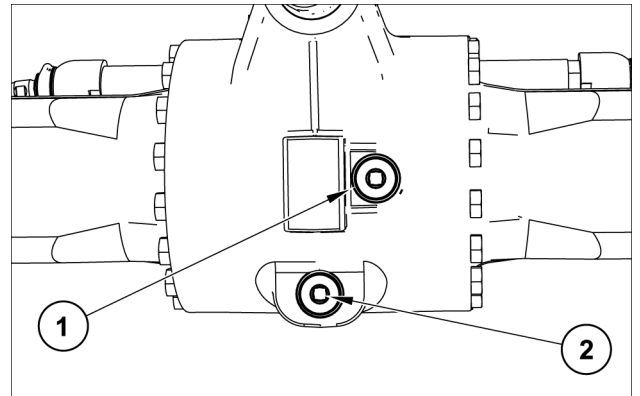
F00391N1 3

Differential and planetary oil

Differential - oil replacement

To change the differential oil , proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the area around screw plugs **(1)** and **(2)**.
- Place a container under the screw plug **(2)** to collect old oil.
- Unscrew the screw plug **(1)** slowly, until the inner pressure is completely released, then completely unscrew the plug **(1)**.
- Unscrew the screw plug **(2)**.
- Oil flows out of the screw plug **(2)**.
- Provide screw plug **(2)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)
- Screw up the screw plug **(2)**.
- Fill new oil through the screw plug **(1)** hole. The oil level must be flush with the hole lower edge.
- Provide screw plug **(1)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)

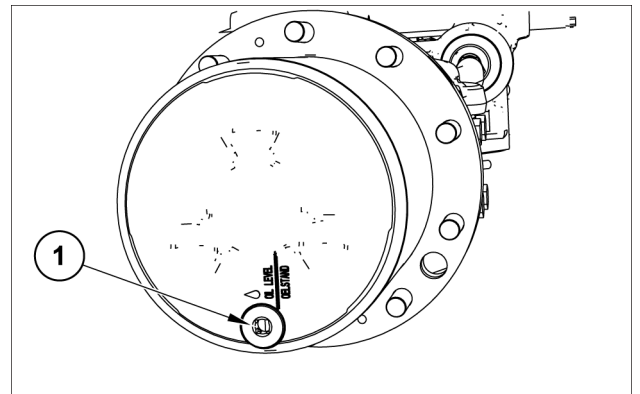


F00392N 1

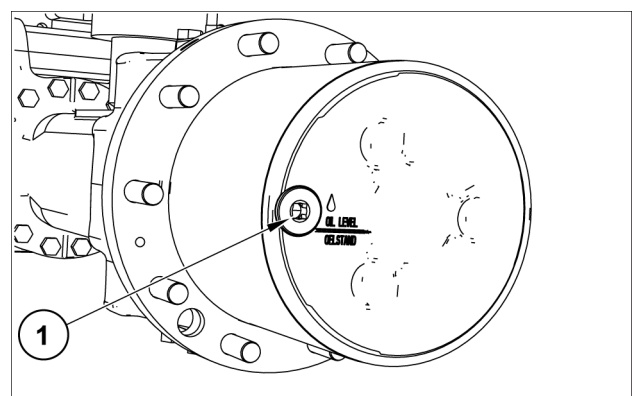
Side gearboxes- oil replacement

1. To change the side gearboxes oil, proceed as follows:

- Set screw plug **(1)** for oil drain into the shown positions.
- Clean the area around screw plug **(1)**.
- Place a container under the screw plug **(1)** to collect old oil.
- Unscrew the screw plug **(1)** slowly, until the inner pressure is completely released, then completely unscrew the plug **(1)**.
- Oil flows out of the screw plug **(1)**.
- Screw up the screw plug **(1)**.
- Then rotate the side gearbox to **90 °** clockwise
- Fill new oil through the screw plug **(1)** hole. The oil level must be flush with the hole lower edge.
- Provide screw plug **(1)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)



F00395N 2

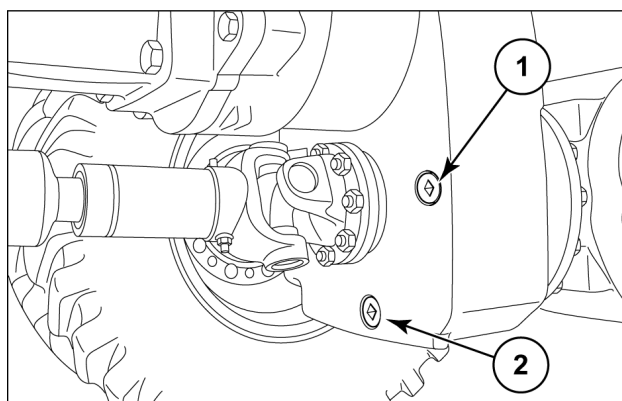


F00394N 3

Gearbox oil

To change the gearbox oil , proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the area around screw plugs **(1)** and **(2)**.
- Place a container under the screw plug **(2)** to collect old oil.
- Unscrew the screw plug **(1)** slowly, until the inner pressure is completely released, then completely unscrew the plug **(1)**.
- Unscrew the screw plug **(2)**.
- Oil flows out of the screw plug **(2)**.
- Provide screw plug **(2)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)
- Screw up the screw plug **(2)**.
- Fill new oil through the screw plug **(1)** hole. The oil level must be flush with the hole lower edge.
- Provide screw plug **(1)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)



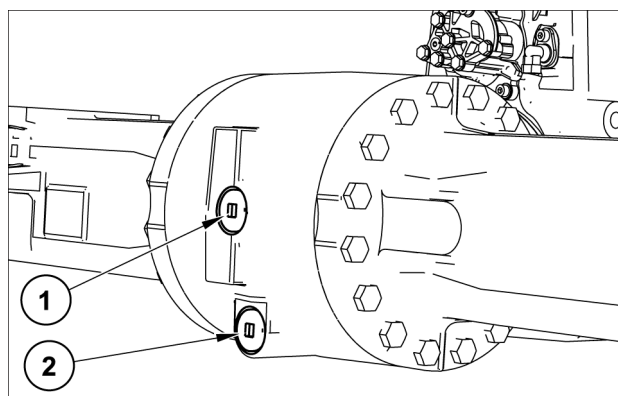
F00396N1 1

Rear axle fluid

Differential - fluid replacement

To change the differential fluid, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Clean the area around screw plugs **(1)** and **(2)**.
- Place a container under the screw plug **(2)** to collect old oil.
- Unscrew the screw plug **(1)** slowly, until the inner pressure is completely released, then completely unscrew the plug **(1)**.
- Unscrew the screw plug **(2)**.
- Oil flows out of the screw plug **(2)**.
- Provide screw plug **(2)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)
- Screw up the screw plug **(2)**.
- Fill new oil through the screw plug **(1)** hole. The oil level must be flush with the hole lower edge.
- Provide screw plug **(1)** with a new O-ring and mount it. (Tightening torque = **50 N·m**)



F00393N 1

Hydraulic oil return filters

⚠ WARNING

Burn hazard!

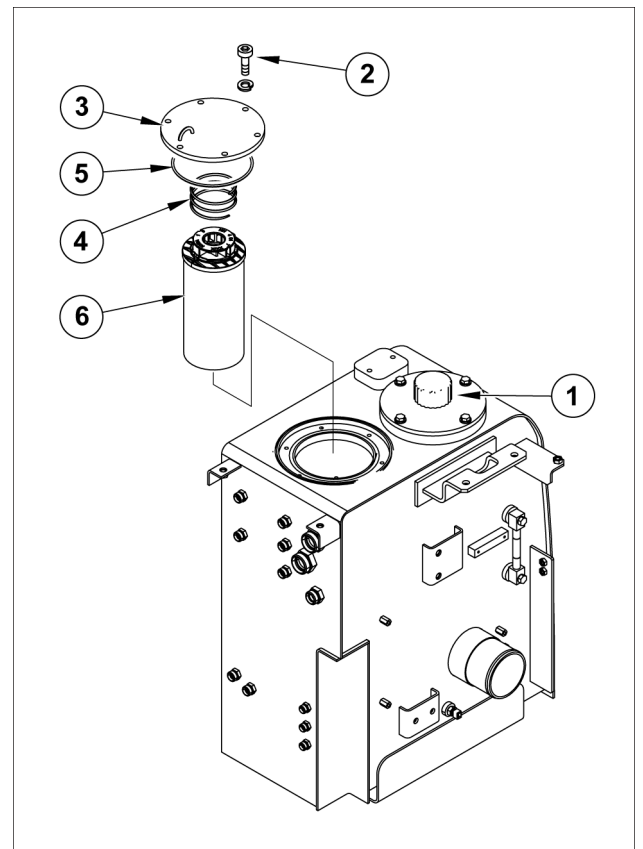
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).

Failure to comply could result in death or serious injury.

W0241A

To change the hydraulic return filters, proceed as follows:

- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool off.
- Clean the upper side of the hydraulic oil tank to prevent dirt to contaminate the hydraulic system.
- Release the pressure inside the hydraulic tank through the bleeding valve (1) located on the tank.
- Loosen securing screws (2) and remove cover (3) with spring (4) and gasket (5).
- Wait until the oil in the filter chamber has returned down to the oil tank.
- Take out the return filter (6) and replace it with a new one.
- Reassemble the cover (3) with a new gasket (4) and spring (5).
- Tighten screws (2) to the prescribed torque. Tightening torque: **30 N·m +/- 5**.

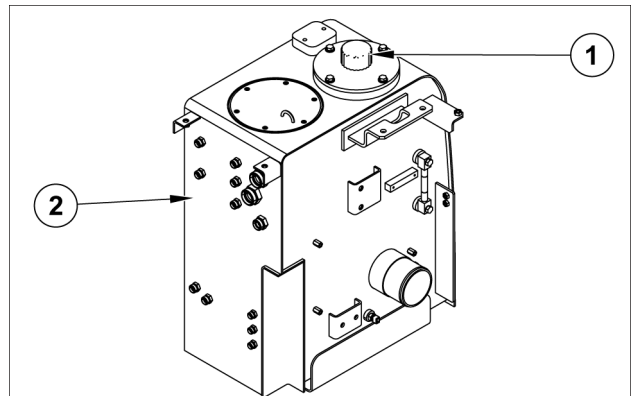


F00413N 1

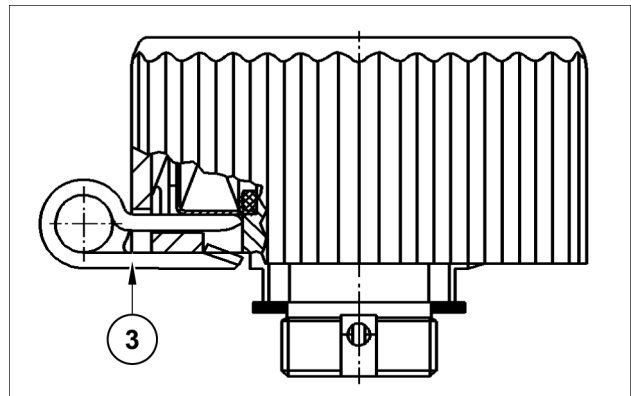
Hydraulic reservoir breather

To replace the hydraulic tank breather, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Release the pressure inside the hydraulic tank through the bleeding valve **(1)** located on the tank **(2)**.
- Insert the locking pin **(3)** and unscrew the valve with great care within the pressure inside the hydraulic tank is released.
- Unscrew the valve completely and replace it.
- Insert the locking pin **(3)** into the new bleeding valve and tighten manually.
- Take out the locking pin and store it for instance in the keys bunch for a future use.



F00412N 1



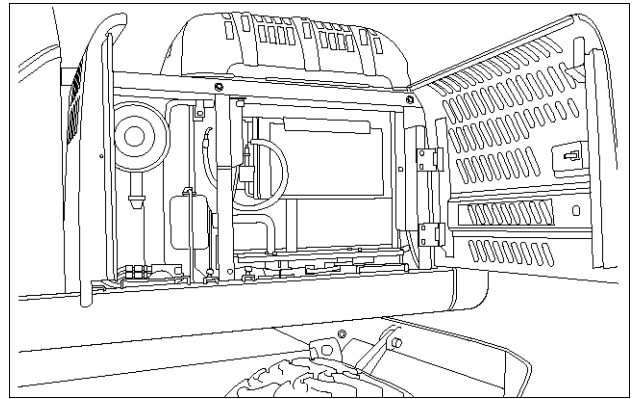
F34315N 2

Pilot control filter

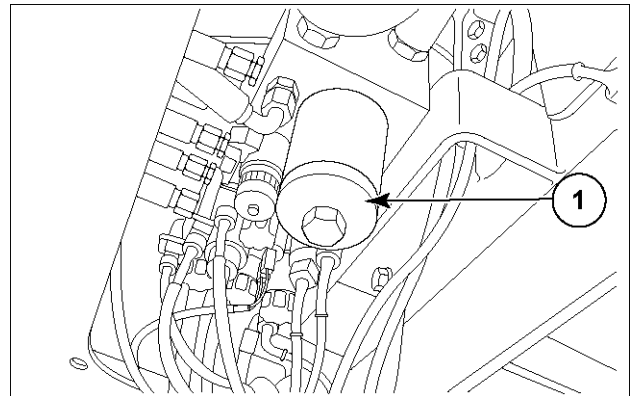
To replace the pilot control filter proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Relieve the pressure from the hydraulic system.
- The filter of the pilot control is built-in in the valve block, installed in the air filter compartment. For the access to the pilot control filter is necessary to remove the base-plate for maintenance below the air filter compartment.
- Unscrew the filter body **(1)** and extract it downwards. Do not let hydraulic oil flow out.
- Rotate and extract the filter cartridge. Clean the filter body and the sealing surfaces of the valve block.
- Insert the new filter and turn it to lock it.
- Tighten the filter body **(1)** on the valve block.
- Once the hydraulic system is operating, check the tightness of the filter.

NOTE: Discard used filters according to environment legislation.



F00381N1 1



F00382N1 2

Swing reduction unit oil

Oil replacement

⚠ WARNING

Burn hazard!

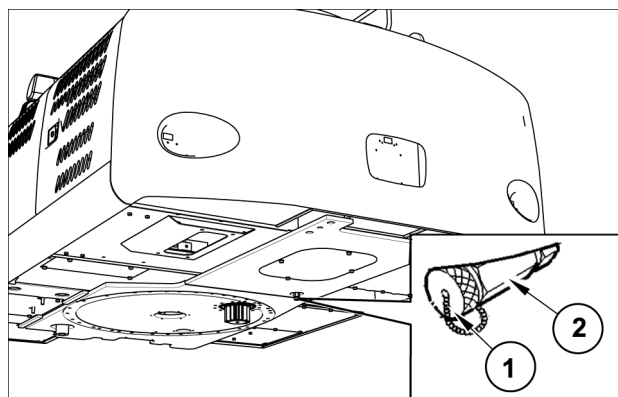
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).

Failure to comply could result in death or serious injury.

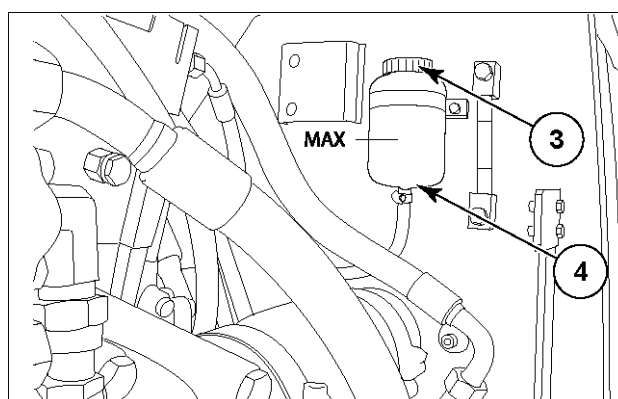
W0241A

To change the hydraulic oil of slewing gearbox, proceed as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool off.
- Prepare a collecting container for used oil.
- Unscrew the screw plug (3).
- Unscrew the protective cap (1) from the drain sleeve (2).
- Drain oil through the drain hose. Once the used oil has been drained, screw the protective cap (1) on the drain sleeve (2).
- Open the hydraulic pump compartment panel and fill in the new oil in the tank (4), until the level is in the middle of the tank.
- Tighten the screw plug (3).
- After a short time, check the level in the tank (4). If necessary, top up the oil.



F00422N 1



F00421N1 2

Every 1500 hours

Alternator drive belt

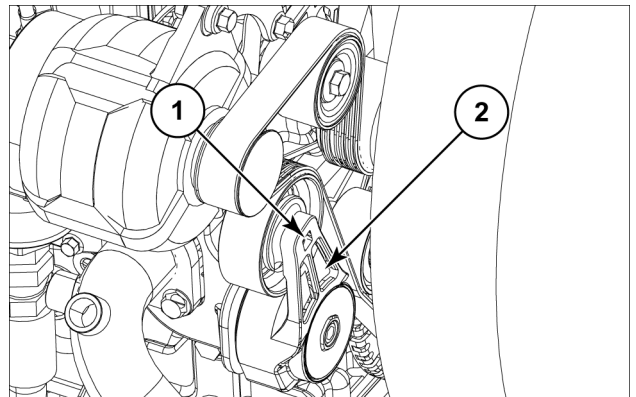
⚠ WARNING

Rotating parts!
The engine is running. Keep clear of rotating fans and belts.
Failure to comply could result in death or serious injury.

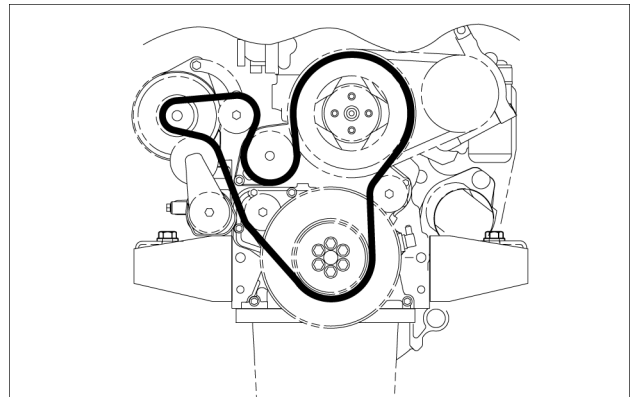
W0275A

Proceed with the replacement of the fan-alternator belt operating as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool-off.
- Open the engine hood and lock it in open position.
- Remove the cover grid.
- Unscrew the fixing fan screws and remove the fan.
- Insert a square wrench into seat **(1)** and pull in the direction indicated by the arrow to move tensioner **(2)** and free the belt.
- Proceed with the installation of the new belt, making sure that it is arranged as indicated in the figure.
- Tighten the fan screws to **5.5 - 6.5 N·m (48.7 - 57.5 lb in)**
- install the cover grid and close the engine hood.



NHC0328 1

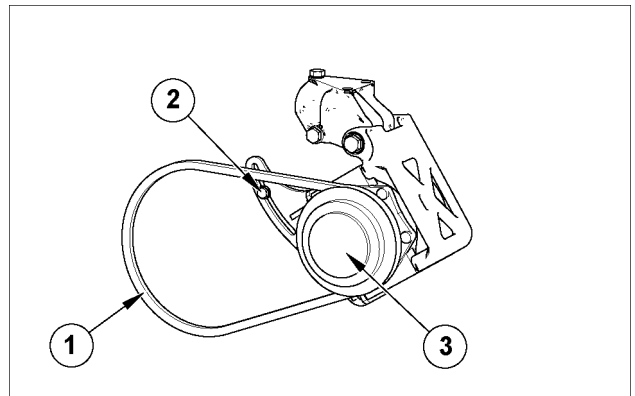
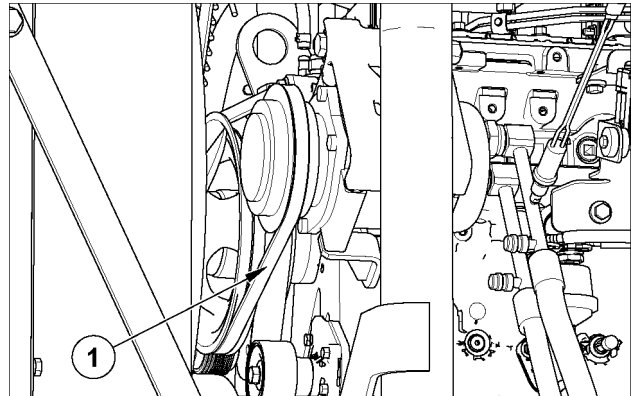


NHC0329 2

Air conditioning compressor drive belt

Proceed with the replacement of the compressor drive belt operating as follows:

- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool-off.
- Open the engine hood and lock it in open position.
- remove the cover grid.
- Unscrew the fan screw and remove the fan.
- Loosen the screw (2) and move the compressor assembly (3) in order to release the fan belt (1).
- Remove the belt (1).
- Proceed with the installation of the new belt, making sure that it is arranged in right way.
- To adjust the belt tension push the belt with a force of **38 N (8.5 lb)** and check that the belt bends of **3 mm (0.12 in)**.
- Tighten the fan screws to **5.5 - 6.5 N·m (48.7 - 57.5 lb in)**
- Install the cover grid and check the air conditioning functionality.
- Close the engine hood.



Every 3000 hours

Hydraulic oil

Replacement

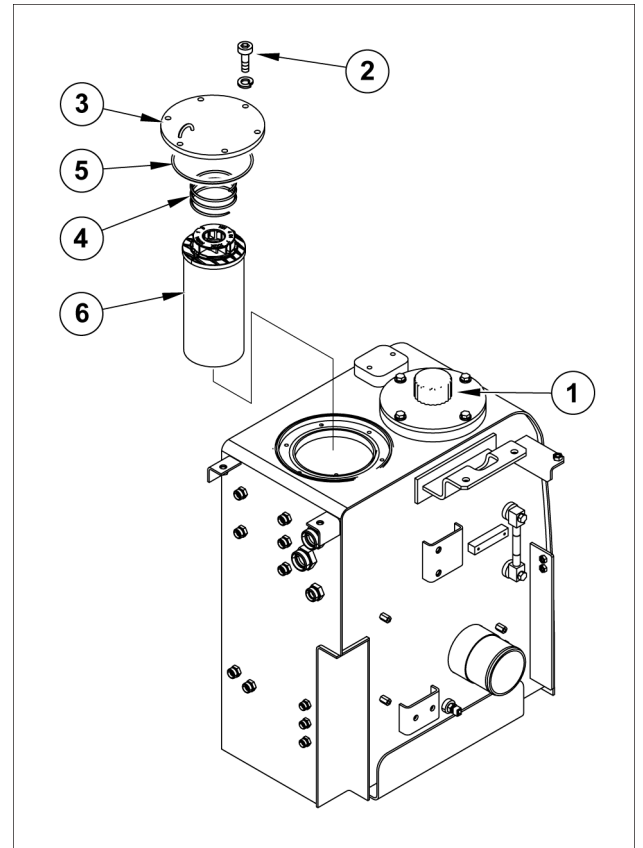
⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

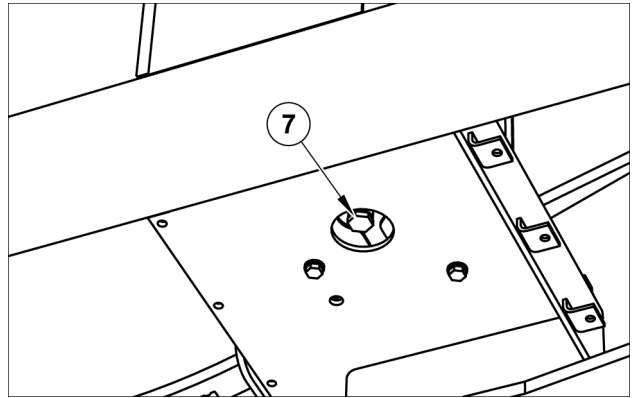
To change the hydraulic oil, proceed as follows:

- Position the machine on a flat surface with the turret swung **90 °** to facilitate the access whit attachment extended.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool off.
- Clean the upper side of the hydraulic oil tank to prevent dirt to contaminate the hydraulic system.
- Release the pressure inside the hydraulic tank through the bleeding valve **(1)** located on the tank. Remove the bleeding valve.
- Loosen securing screws **(2)** and remove cover **(3)**, spring **(4)** and gasket **(5)**.
- Remove the hydraulic oil return filters cover **(6)**.
- Suck the oil from the tank using an appropriate pump.

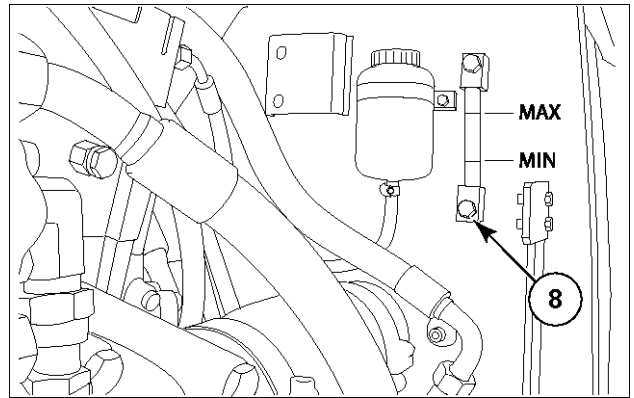


F00413N 1

- Get under the turret and remove draining plug (7) thus letting the residual oil draining into a container.
- Clean, install and tighten draining plug (7). Tightening torque: **108 N·m +/- 10**.
- Replace the hydraulic oil return filters as described on page 7-39.
- Pour through the return filter oil of a prescribed type, grade and quantity (see "Fluids and lubricants" at the end of this chapter) until the level is included between the marks **MIN** and **MAX** on level gauge (8) located inside the hydraulic pumps compartment.
- Install cover (3) and a new gasket (5). Tighten the screws (2). Tightening torque: **50 N·m +/- 5**.
- Do not install the blending valve (1).

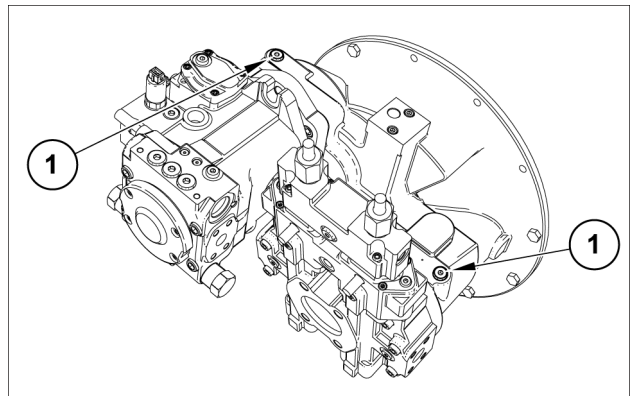


F00416N 2

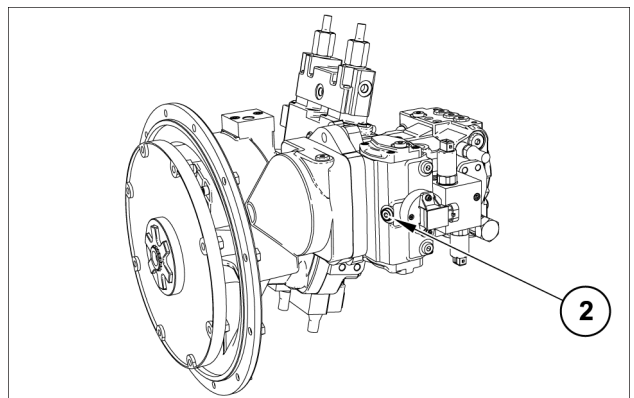


F00414N1 3

- Bleed air from the hydraulic system.
- Unscrew the bleeding plugs (1) on the working pump and the other plug (2) of the slewing pump on the regulator side, in front of the flange.
- Tighten the bleeding plugs (1) and (2) as soon as hydraulic oil starts to flow out from the hole without air bubbles.
- Start the engine and let it run and middle speed for about two minutes.
- Repeatedly extend and retract all hydraulic cylinders, until movements are regular and smooth (with no shocks and knocks).
- Repeatedly slew the upper structure by reversing the slewing direction.
- Extend the attachment and stop the engine.
- Check the hydraulic level on the level gauge. If the level is too low fill the hydraulic oil through the hole of blending valve.
- Install the blending valve.
- Unscrew the bleeding plugs on the pumps.
- Tighten the bleeding plugs as soon as hydraulic oil starts to flow out from the hole without air bubbles.



F00418N 4



F00419N 5

Engine coolant

Draining of coolant

⚠ CAUTION

Burn hazard!

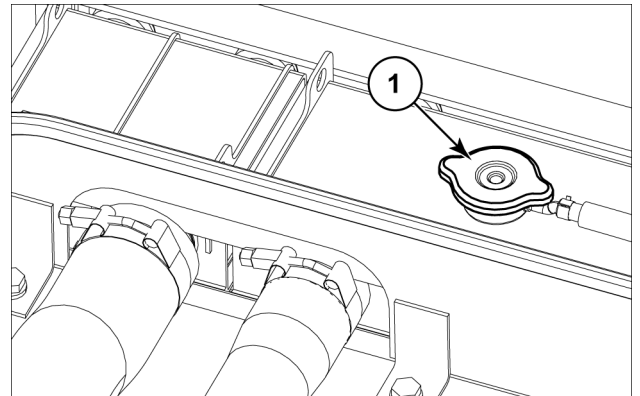
Hot coolant can spray out if you remove the filler cap while the system is hot. After the system has cooled, turn the filler cap to the first notch and wait for all pressure to release before proceeding.

Failure to comply could result in minor or moderate injury.

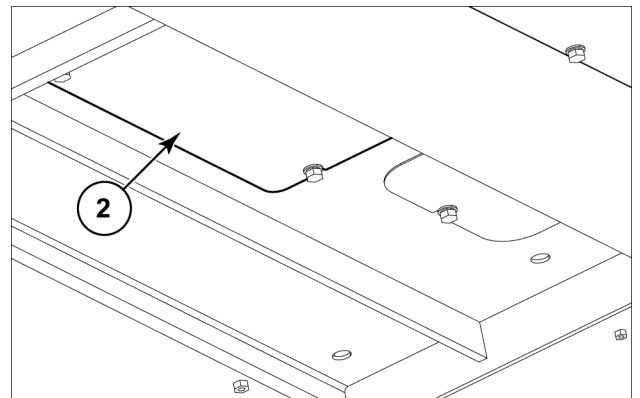
C0043A

Drain the engine coolant operating as follows:

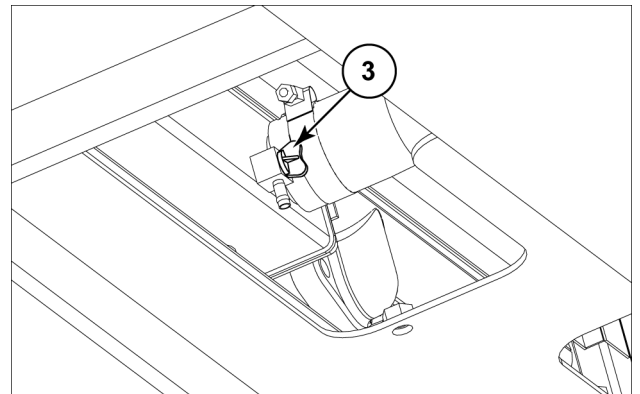
- Position the machine on a flat surface with the turret swung **90 °** to facilitate the access.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.
- Wait for the machine to cool off then open the engine hood and the radiator and filter compartment doors, locking them in open position.
- Loosen slightly radiator cap **(1)** to bleed completely the pressure inside the radiator, then loosen the cap and remove it.
- Get under the turret and remove the panel **(2)** under the radiator.
- Open draining valve **(3)** and let the coolant drain into a container of appropriate capacity. Once the operation is over, retighten the valve.
- Inspect carefully the sleeves checking that they are trouble free (replace them if required) and tighten the clamps if slacken. Check the there are no leakages from the radiator, damages or accumulation of dirt.



NHC0284 1



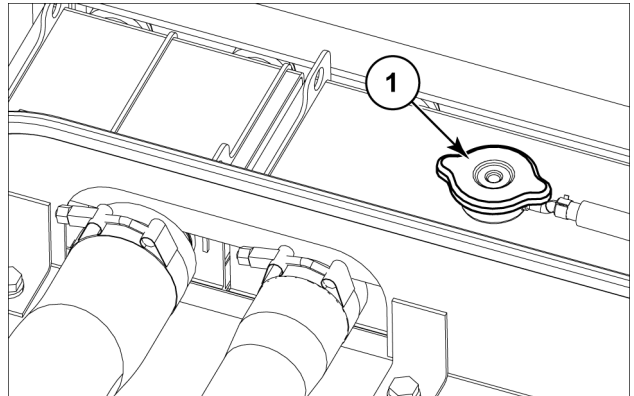
NHC0353 2



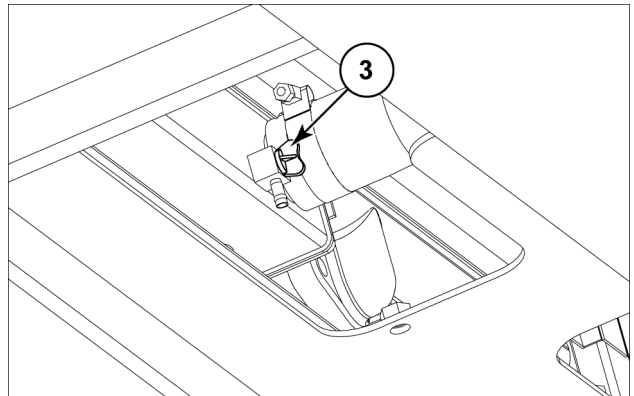
NHC0285A 3

Flushing and filling the cooling system

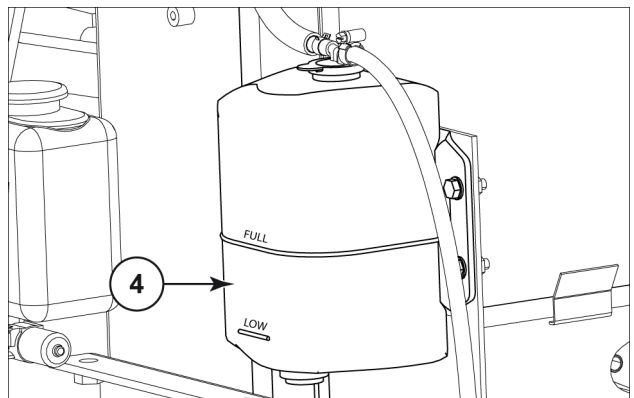
- Fill through radiator filler neck, clean water and a cleaning flushing agent until the radiator is fully filled, then tighten radiator cap **(1)**.
- Start the engine and let it run at a speed slightly over idle, until the coolant temperature meter, located on the instrument cluster, reaches the white range. Then, let the engine operate for about **10 min.**
- Stop the engine and let it cool-off.
- Drain the water and detergent following the procedure described here above.
- Then refill the cooling system with fresh water only and flush the system again. Repeat this operation until the water drained is clean.
- Make sure that draining valve **(3)** is closed and fill the system using the prescribed coolant liquid (see "Fluids and lubricants" at the end of this chapter) through the radiator filler neck until it is fully filled.
- Install radiator cap **(1)** and complete the filling of expansion tank **(4)**.
- Close the engine hood. Get under the turret and reinstall the panel securing it with its relevant screws.
- Start the engine and let it operate several minutes.
- Stop the engine, let it cool-off and check the coolant level in expansion tank **(4)**. The coolant level must be between the marks **FULL** and **LOW**. In the event the coolant is insufficient, top-up.
- Close the radiator compartment panel.



NHC0284 4



NHC0285A 5



NHC0354 6

Electrical system

Fuses and relays

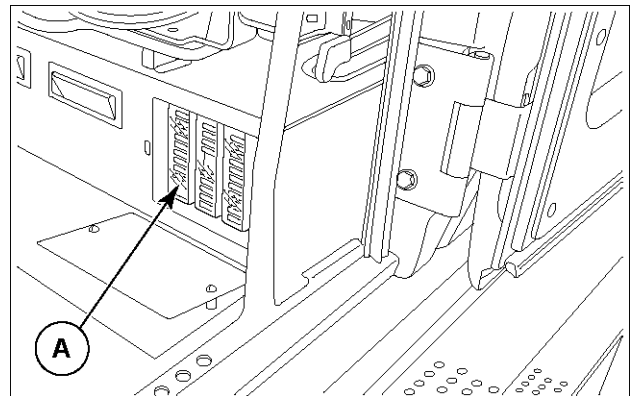
Replace the relays

To replace the relays, proceed as follows:

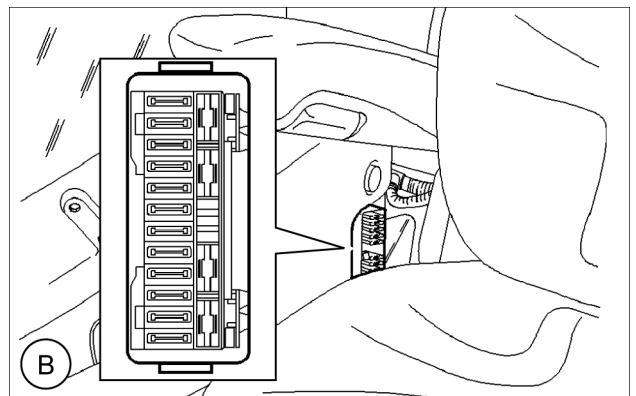
- Park the machine on a level surface.
- Rest the bucket to the ground.
- Deactivate the Auto-Idle function, turn the engine speed throttle to **LOW IDLE** position, stop the engine, extract the starter key and place the safety lever in **LOCK** position.

The fuses are located in four fuse boxes. Three of them are placed under the operator seat on left side (**A**). The last fuse box (**B**) is placed on the right side of the cab under the control panel.

ATTENTION: make sure that the starter key is in **OFF** when replacing fuses. Install fuses with correct capacity to prevent damages from an overload of the electrical system.

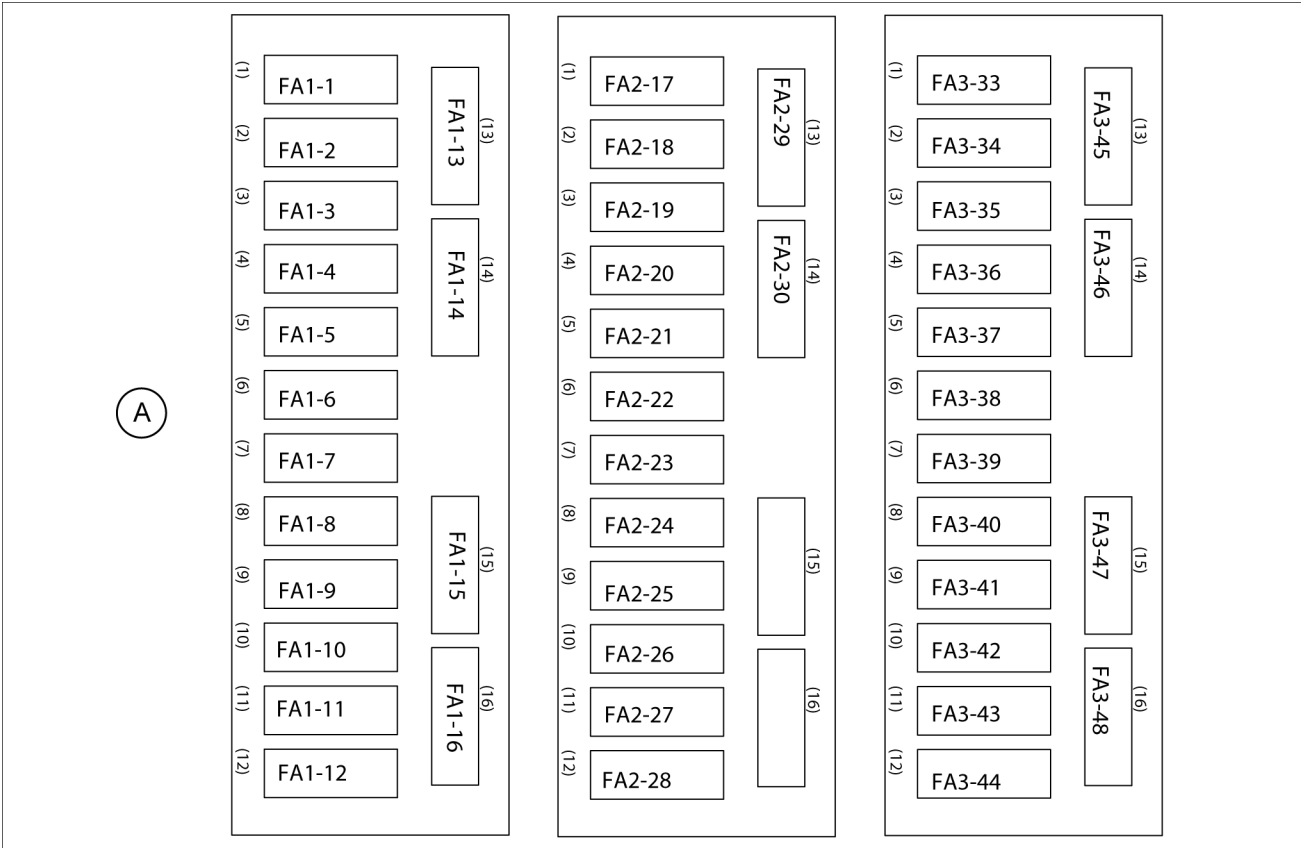


F00410N1 1



F44202N 2

7 - MAINTENANCE

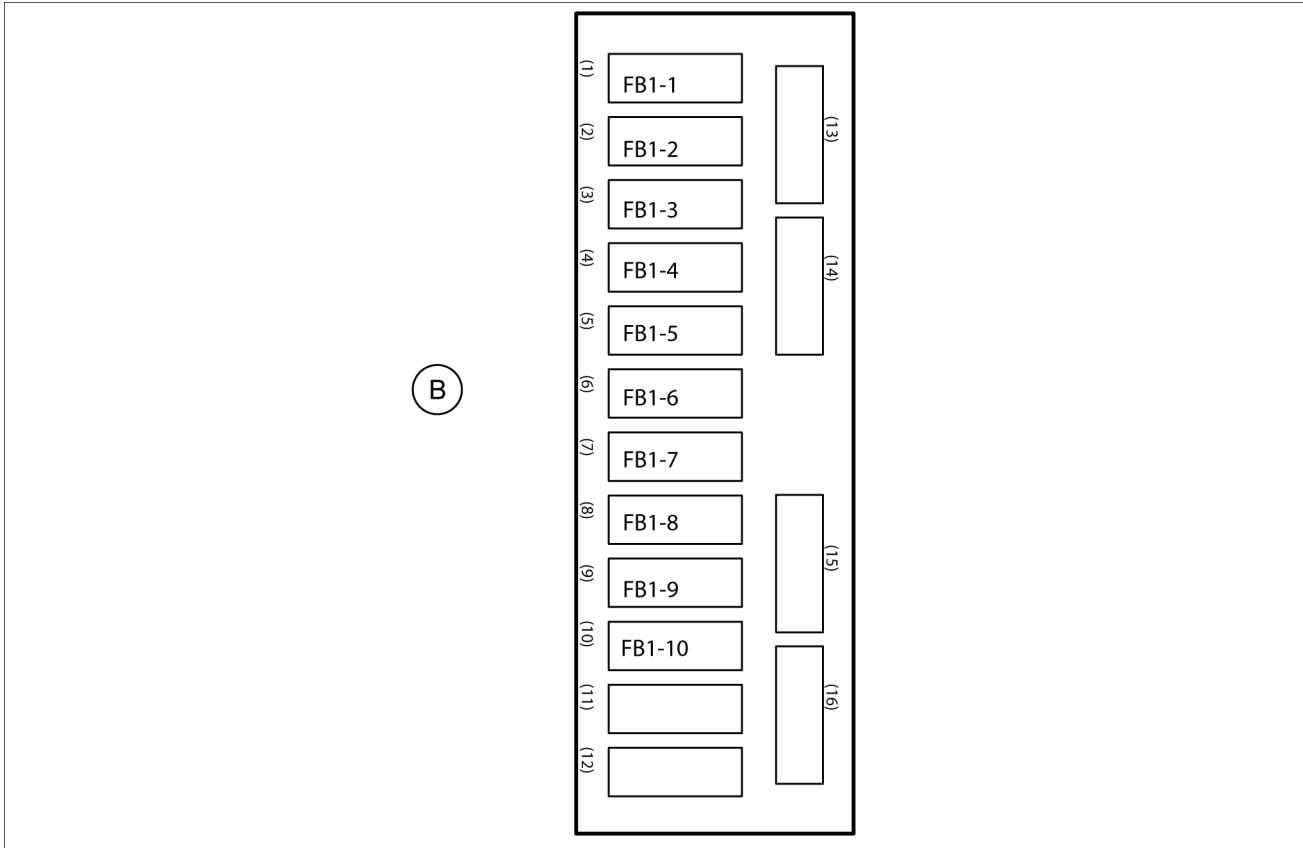


F00401N 3

7 - MAINTENANCE

FUSES BOX (A)		
FUSE number	PROTECTED CIRCUIT	RATING (A)
FA1-1	Power Relay (Pull-In Current), Central Unit, Engine Stop	5
FA1-2	Start-Relay, Grid Heater Controller	5
FA1-3	Power Supply Greasing Pump (Optional)	5
FA1-4	Horn	10
FA1-5	Engine Room Light	5
FA1-6	Switch off Servo Control, Pressure Switches Safety Travel, Safety Working Hydraulic, Safety Swing	5
FA1-7	Switch Hazard Warning	7.5
FA1-8	Generator (Exciting Voltage), Switch Parking Brake	5
FA1-9	Compressor Driver Seat (Optional)	10
FA1-10	Stabilizer/Front Blade (Optional)	5
FA1-11	Power Supply Travel Pedal	1
FA1-12	Power Supply Joystick Left and Right	1
FA1-13	Flasher Light Left	5
FA1-14	Flasher Light Right	5
FA1-15	Power Supply Grid-Heater-Controller (15)	5
FA1-16	Power Supply Rear Camera	3
FA2-17	Working Lights Boom	7.5
FA2-18	Parking Light Left, Tail Light Left, Position Light Boom	5
FA2-19	Parking Light Right, Tail Light Right	5
FA2-20	Initiator Swing, Water in Fuel Sensor	5
FA2-21	Relais K-FH Disconnect Filterheater During Cranking	5
FA2-22	Highbeam	7.5
FA2-23	Headlight	7.5
FA2-24	Diagnostic Plug CAN1, CAN2	5
FA2-25	Relay Interior Light Drivers Cab	10
FA2-26	Interface X33A:B7D (Reserve)	2
FA2-27	Interface X33A:B7D (Reserve)	5
FA2-28	Ignition Switch	15
FA2-29	Switch Hazard Warning	7.5
FA2-30	Blower/Compressor Air Conditioner	15
FA2-31	Reserve	-
FA2-32	Reserve	-
FA3-33	Power Supply UCM	10
FA3-34	Power Supply UCM	10
FA3-35	Power Supply UCM	10
FA3-36	Power Supply UCM, Power Supply Codeplugs	10
FA3-37	Power Supply UCM	10
FA3-38	Power Supply UCM	10
FA3-39	Power Supply UCM	10
FA3-40	Power Supply UCM	10
FA3-41	Power Supply UCM	10
FA3-42	Reserve	10
FA3-43	Reserve	10
FA3-44	Power Supply UCM	10
FA3-45	Power Supply UCM	10
FA3-46	Power Supply UCM	10
FA3-47	Power Supply UCM	10
FA3-48	Power Supply UCM	10

7 - MAINTENANCE



F00402N 4

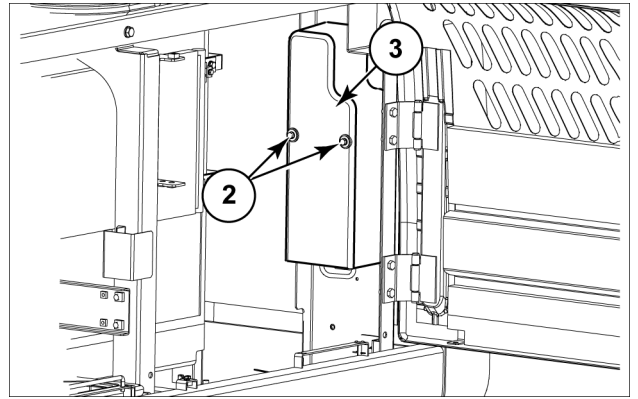
FUSES BOX (B)

FUSE number	PROTECTED CIRCUIT	RATING (A)
FB1-1	Warning Beacon	10
FB1-2	Working Lights Operator's Cab Rear (Option)	10
FB1-3	Working Lights Operator's Cab Front	10
FB1-4	Wisher and Washer	10
FB1-5	Interior Light	5
FB1-6	Power supply Transmator 24V/12V, Radio and Power outlet	7.5
FB1-7	Power Supply Display (C4)	2
FB1-8	Valve Frequency or Quick Coupler	5
FB1-9	Search Light Rocker Switches	5
FB1-10	Swing Brake	5
FB1-11	Reserve	-
FB1-12	Reserve	-
FB1-13	Reserve	-
FB1-14	Reserve	-
FB1-15	Reserve	-
FB1-16	Reserve	-

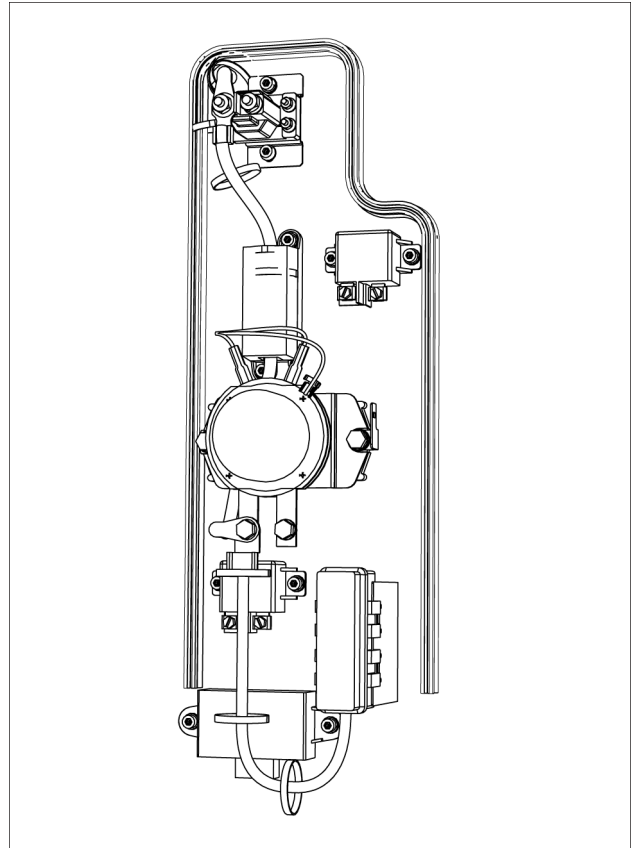
High amperage fuses

To reach the high amperage fuses, open the radiator compartment panel, remove screws (2) and remove the protection cover (3).

ATTENTION: make sure that the starter key is in **OFF** when replacing fuses. Install fuses with correct capacity to prevent damages from an overload of the electrical system.



NHC0347 5



F00411N 6

FUSE number	PROTECTED CIRCUIT	RATING (A)
FUSE 1	Fuse powering	60
FUSE 2	Fuse powering	60
FUSE 3	Alternator	100
FUSE 4	Starter relay, heated fuel filters, relay	60
MEGA FUSE		150
RELAY BATTERY		100

Fluids and lubricants

Fluids and lubricants WX168

COMPONENT TO BE FILLED	QUANTITY	AKCELA	MANUFACTURER SPECIFICATIONS	INTERNATIONAL SPECIFICATIONS
Engine	8 - 15 l (2.1 - 4.0 US gal)	No. 1 Engine Oil 15W-40	MS 1121	API CI 4 ACEA E7
Swing gear	4.2 l (1.1 US gal)	Transaxle Fluid 80W-140	MS 1317	API GL 4 SAE 80 W140
Radiator (1)	11 l (2.9 US gal)	Premium Organic Antifreeze	-	ASTM D 3306
Fuel tank	274 l (72.4 US gal)	-	-	EN 590
Front steering axle body	9.5 l (2.5 US gal)	Transaxle Fluid 80W-140	MS 1317	API GL4 SAE 80W-140
Rear rigid axle body	12 l (3.2 US gal)			
Font steering and rear rigid axles final drive	2.5 l (0.7 US gal) x 4			
Rear rigid axle gear box	2.5 l (0.7 US gal)	No. 1 Engine Oil 15W-40	MS 1121	API CI 4 ACEA E7
Hydraulic oil tank (2)	160 l (42.3 US gal)	AW Hydraulic Fluid 68 HV	MS 1216	DIN 51524 HVLP68 ISO VG 68
Air conditioning	820 g +/- 50 (28.9 oz +/- 1.8)	-	-	R134a
Windscreen washer	1.5 l (0.4 US gal)	TUTELA PROFESSIONAL SC35	-	-
Grease — Ball bearing	13.5 kg (29.8 lb)	Moly Grease	251H EP-M	NLGI2
Grease — Undercarriage	-	-	-	DIN 51825 — KLP2K 30
Grease — Attachment	-	Premium EP-2	-	NLGI2

NOTE: (1) Cooling system total volume: ~ 22 l (5.8 US gal). Water 11 l (2.9 US gal) / Antifreeze 11 l (2.9 US gal).

NOTICE: (2) Hydraulic system total volume: ~ 230 l (60.8 US gal) . If the machine was filled with biodegradable hydraulic oil **PANOLIN HLP SYNTH 46** (option), take note that this oil cannot be mixed with mineral hydraulic oil. Add hydraulic additive for **Panolin**: 3 l (0.8 US gal)

Temperature operating ranges

	AKCELA	Viscosity	Environment temperature range
Engine	No.1 Engine oil	SAE 15W-40	-15 °C - +40 °C
		SAE 10W-30	-25 °C - +25 °C
Swing gear	Transaxle Fluid 80W-140	SAE 80W-140	-25 °C - +45 °C
Hydraulic system	AW Hydraulic Fluid 68 HV	ISO VG 68	-25 °C - +45 °C

Fluids and lubricants WX188

COMPONENT TO BE FILLED	QUANTITY	AKCELA	MANUFACTURER SPECIFICATIONS	INTERNATIONAL SPECIFICATIONS
Engine	8 - 15 l (2.1 - 4.0 US gal)	No. 1 Engine Oil 15W-40	MS 1121	API CI 4 ACEA E7
Swing gear	4.2 l (1.1 US gal)	Transaxle Fluid 80W-140	MS1317	API GL 4 SAE 80 W140
Radiator (1)	11 l (2.9 US gal)	Premium Organic Antifreeze	-	ASTM D 3306
Fuel tank	274 l (72.4 US gal)	-	-	EN 590
Front steering axle body (2.5 m (8.2 ft))	9.5 l (2.5 US gal)	Transaxle Fluid 80W-140	MS 1317	API GL4 SAE 80W-140
Front steering axle body (2.75 m (9.0 ft))	10.4 l (2.7 US gal)			
Rear rigid axle body (2.5 m (8.2 ft))	12 l (3.2 US gal)			
Rear rigid axle body (2.75 m (9.0 ft))	12.4 l (3.3 US gal)			
Font steering and rear rigid axles final drive	2.5 l (0.7 US gal) x 4			
Rear rigid axle gear box	2.5 l (0.7 US gal)	No. 1 Engine Oil 15W-40	MS 1121	API CI 4 ACEA E7
Hydraulic oil tank (2)	160 l (42.3 US gal)	AW Hydraulic Fluid 68 HV	MS 1216	DIN 51524 HVLP68 ISO VG 68
Air conditioning	820 g +/- 50 (28.9 oz +/- 1.8)	-	-	R134a
Windscreen washer	1.5 l (0.4 US gal)	TUTELA PROFESSIONAL SC35	-	-
Grease — Ball bearing	13.5 kg (29.8 lb)	Moly Grease	251H EP-M	NLGI2
Grease — Undercarriage	-	-	-	DIN 51825 — KLP2K 30
Grease — Attachment	-	Premium EP-2	-	NLGI2

NOTE: (1) Cooling system total volume: ~ 22 l (5.8 US gal). Water 11 l (2.9 US gal) / Antifreeze 11 l (2.9 US gal).

NOTICE: (2) Hydraulic system total volume: ~ 235 l (62.1 US gal). If the machine was filled with biodegradable hydraulic oil **PANOLIN HLP SYNTH 46** (option), take note that this oil cannot be mixed with mineral hydraulic oil. Add hydraulic additive for **Panolin**: 3 l (0.8 US gal)

Temperature operating ranges

	AKCELA	Viscosity	Environment temperature range
Engine	No. 1 Engine Oil	SAE 15W-40	-15 °C - +40 °C
		SAE 10W-30	-25 °C - +25 °C
Swing gear	Transaxle Fluid 80W-140	SAE 80W-140	-25 °C - +45 °C
Hydraulic system	AW Hydraulic Fluid 68 HV	ISO VG 68	-25 °C - +45 °C


8 - TROUBLESHOOTING

ALARM(S)

Display fault codes Diagnostic indication on the display

When a fault occurs, the multifunction display (1) shows on the upper section a diagnostic code (for example. 7000), at the same time two lamps one yellow (2) and one red (3) light up; according to the fault they can light up either singularly or together. According to the fault seriousness, also an acoustic warning can be released.

Red faults

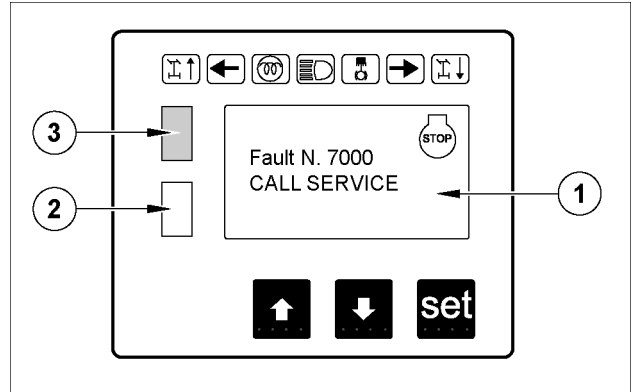
- Serious faults: red lamp light on with a continuous sound. The person's safety and/or the operation of the machine's main assemblies are endangered. The symbol  appear on cluster. It means that is necessary put in parking position the machine and stop the engine immediately. Call the Service Assistance or your Dealer.

Yellow faults

- Fault insignificant for the safety of persons and for machine operation: yellow lamp light on with a single sound by first activation of the error. These faults have to be cleared as soon as possible, contacting the service. In the majority of cases though, the full machine functionality remains unchanged.

In some particular cases, some faults can occur concurrently.



















In such a case, the relevant diagnostic codes are indicated, by alternating one after the other in the usual visualization.











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8 - TROUBLESHOOTING

Red faults

Fault code	Symbol	Function involved	Action
7000		Engine	CALL SERVICE
7001		Steering	CALL SERVICE
7002		Service brake	CALL SERVICE
7005		Display	CALL SERVICE
7008		User interface	CALL SERVICE
7010		Engine	CALL SERVICE
7041		UCM controller	CALL SERVICE
7048		Engine	CALL SERVICE
7060		Park Brake	CALL SERVICE
7071		Oscillating Axle	CALL SERVICE
8007		Engine	CALL SERVICE
8026		Power limitation	CALL SERVICE
9004		UCM	CALL SERVICE
9005			
9006			
9007			
9008			
9009			
9115			
9133			
9147			
9710		Swing Function	CALL SERVICE
9713			
9716			
9720			
9723			
9726			
9768		Low flow	CALL SERVICE
9769			
9773			
9774			
9783		Travel	CALL SERVICE
9784			
9788			
9789			
9798		Stab / blade	CALL SERVICE
9799			
9803			
9804			
9813		Boom	CALL SERVICE
9814			
9818			
9819			

8 - TROUBLESHOOTING

Fault code	Symbol	Function involved	Action
9828		Bucket	CALL SERVICE
9829			
9833			
9834			
9843		Dipper	CALL SERVICE
9844			
9848			
9849			
9858		Positioning	CALL SERVICE
9859			
9863			
9864			
9873		Breaker shears	CALL SERVICE
9874			
9878			
9879			
9888		Low flow secondary	CALL SERVICE
9889			
9893			
9894			
9903		Hammer (option)	CALL SERVICE
9913		Grab rotation (option)	CALL SERVICE
9918			
13002		Cluster	CALL SERVICE

8 - TROUBLESHOOTING

Yellow faults

Fault code	Function involved	Description
7006	Swing	Electrical Failure on Swing Brake Rocker Switch
7007		
7009	Engine	Electrical failure on engine sensor.
7011	Engine	Calibration not complete. Engine speed control not optimized.
7013	Engine	Air filter contaminated.
7016	Engine	Electrical failure on engine actuator. Reduce engine power.
7017		
7019	Attachment/hammer	Electrical failure on hammer. Limited functionality on hammer/shear.
7021	Engine	Electrical failure on alternator. Reduce battery charging performance.
7037	Park brake	Electro hydraulic failure. Park brake cannot be disengaged.
7038	Park brake	Electro hydraulic failure. Park brake cannot be engaged.
7040	Park brake	Electrical failure on park brake switch. Travel function not available.
7050	Travel	Electrical failure on transmission. Only 1st gear available.
7051		
7052	Travel	Electrical failure on transmission. Only 2st gear available.
7055		
7056		
7057	Travel	Electrical failure on transmission. Only 1st gear available.
7061	Park Brake	Electrical failure on park brake. Park Brake engaged.
7062	Park Brake	Electrical failure on park brake. Machine in safe state: park brake engaged.
7063		
7065	Park Brake	Electrical failure on park brake. Limited travel speed.
7066		
7067	Oscillating axles	Electrical failure on oscillating axle. Oscillating axle cannot be unlock.
7068		
7069		
7070		
7072	Travel	Electrical failure on speed sensor. Limited Oscillating axle functionality and gear shift auto mode not available.
7073		
7080	Fuse	Check Fuse FA1 OR Electrical Failure
7081		Check Fuse FA3.34 OR Electrical Failure
7082		Check Fuse FA1 OR Electrical Failure
7083		Check Fuse FA3.35 OR Electrical Failure
7084		Check Fuse FA3.45 OR Electrical Failure
7085		Check Fuse FA3.34 OR Electrical Failure
7086		Check Fuse FA3.47 OR Electrical Failure
7087		Check Fuse FA3.37 OR Electrical Failure
7088		Check Fuse FA3.38 OR Electrical Failure
7089		Check Fuse FA3.39 OR Electrical Failure
7090		Check Fuse FA3.40 OR Electrical Failure
7091		Check Fuse FA3.41 OR Electrical Failure
7092		Check Fuse FA3.42 OR Electrical Failure
7093		Check Fuse FA3.36 OR Electrical Failure
7094		Check Fuse FA3.43 OR Electrical Failure
8000	Engine	Electrical failure on engine coolant temperature sensor. Limited engine power.
8002	Temperature sensor	Electrical failure on hydraulic oil temperature sensor. Limited engine power.
8003	Temperature sensor	Electrical failure on engine coolant temperature sensor. Limited engine power.
8005	Temperature sensor	Electrical failure on hydraulic oil temperature sensor. Limited engine power.
8006	Temperature sensor	Engine coolant temperature too high.
8008	Temperature sensor	Hydraulic oil temperature too high.
8009	Temperature sensor	Hydraulic oil temperature too high. Reduce attachment performance.

8 - TROUBLESHOOTING

Fault code	Function involved	Description
8011	Power limitation	Electrical failure on valve. Reduced hydraulic power.
8017	UCM	UCM controller failure. Safe state mode, machine not operable.
8021	Calibration	Calibration not complete. Reduced engine performance.
8022		
8027	Engine	Electrical failure on throttle. Reduced engine power.
8028		
9010	UCM	UCM controller failure. Safe state mode, machine not operable.
9052		
9053		
9054		
9056		
9070		
9113		
9114		
9116		
9117		
9121		
9122		
9138		
9146		
9149		
9150		
9151	CAN interface	CAN interface failure. Limited machine functionality (standard attachment, swing and travel operable).
9153		
9154		
9161	CAN interface	CAN interface failure. Main machine functionality not available (attachment, swing and travel).
9163		
9164		
9171	CAN interface	Machine not fully operable.
9181		
9191	CAN interface	CAN interface failure. Display is offline.
9205	CAN interface	CAN interface failure. Switch pad C53 is offline (standard travel limitation).
9207	CAN interface	CAN interface failure. Switch pad C54 is offline (hoist and swing limitation).
9209	CAN interface	CAN interface failure. Switch pad C55 is offline (woody opt. not available).
9211	CAN interface	CAN interface failure. Switch pad C56 is offline (high flow not available).
9231	Display	Swing brake indicator lamp failure.
9232	Display	Travel forward indicator lamp failure.
9234	Display	Travel reverse indicator lamp failure.
9275	Connector for codified	Wrong brand coding plug
9276	Connector for codified	Electrical failure on code plug XC3. Max travel speed is limited to 20 kph.
9277		
9278	Connector for codified	Plug control not available. Maximum travel speed limitation.
9281	Connector for codified	Electrical failure on code plug XC1. Attachment and swing not operable.
9282	Connector for codified	Electrical failure on code plug XC1.
9283	Connector for codified	Plug control pattern not available Attachment and swing not operable.
9286	Connector for codified	Electrical failure on code plug XC2. Breaker shears and positioning not operable.
9287		
9288	Connector for codified	Plug control pattern not available Attachment and swing not operable.

8 - TROUBLESHOOTING

Fault code	Function involved	Description
9291	Connector for codified	Electrical Failure on Digital Input Limited functionality on attachment
9292		
9293		
9294		
9295		
9296		
9297		
9298		
9299		
9301		
9302		
9309		
9310		
9312	Right hand control failure. Pushbutton 1 not operable. Limited functionality on transmission.	
9313	Right Hand Control	Right hand control failure. Pushbutton 2 not operable. Limited functionality on transmission.
9314	Right Hand Control	Right hand control failure. Pushbutton 3 not operable. Limited functionality on Grab rotation.
9315	Right Hand Control	Right hand control failure. Pushbutton 4 not operable. Limited functionality on stabilizer/blade.
9316	Right Hand Control	Right hand control failure. Pushbutton 5 not operable. Limited functionality on transmission.
9319	Right Hand Control	Right hand control failure. Attachment and swing not operable.
9320		
9321		
9322		
9323		
9324		
9325		
9326		
9327		
9328		
9329		
9331	Left Hand Control	Left hand control failure. Attachment and swing not operable. .
9332		
9339		
9340		
9342	Left Hand Control	Left hand control failure. Pushbutton 1 not operable.
9343	Left Hand Control	Left hand control failure. Pushbutton 2 not operable. Mode Levelling not operable.
9344	Left Hand Control	Left hand control failure. Pushbutton 3 not operable. Limited functionality on Grab rotation.
9345	Left Hand Control	Left hand control failure. Pushbutton 4 not operable.
9346	Left Hand Control	Left hand control failure. Pushbutton 5 not operable. Horn not operable.
9349	Left Hand Control	Left hand control failure. Attachment and swing not operable.
9350		
9351		
9352		
9353		
9354		
9355		
9356		
9357		
9358		
9359		

8 - TROUBLESHOOTING

Fault code	Function involved	Description
9391	Pedal	Travel pedal failure. Travel function not operable.
9392		
9394		
9395		
9396		
9397		
9398		
9399		
9400		
9409		
9410		
9411		
9412	Pedal	Auxiliary pedal failure. Positioning cylinder not operable.
9413		
9414		
9415	Pedal	Auxiliary pedal failure. Hammer OR breaker shear not operable.
9416		
9417		
9511	Hydraulic safety system	Electrical failure on safety valve.
9512		Time-constrained availability of attachment and swing (6hrs).
9513	Hydraulic safety system	Safety lever failure. Time-constrained availability of attachment (6hrs).
9521	Hydraulic safety system	Electrical failure on safety valve.
9522		
9523	Hydraulic safety system	Electrical failure on safety valve. Time-constrained availability of attachment (6hrs).
9524	Hydraulic safety system	Electro hydraulic failure on safety valve
9525	Hydraulic safety system	Electro hydraulic failure on safety valve. Time-constrained availability of attachment (6hrs).
9531	Hydraulic safety system	Electrical failure on safety valve.
9532		
9533	Hydraulic safety system	Electrical failure on safety valve. Time-constrained availability of attachment (6hrs).
9534	Hydraulic safety system	Electro-hydraulic valve failure.
9535	Hydraulic safety system	Electro-hydraulic valve failure. Time-constrained availability of attachment (6hrs).
9536	Hydraulic safety system	Electrical failure on safety valve.
9537		
9538	Hydraulic safety system	Electrical failure on safety valve. Time-constrained availability of attachment (6hrs).
9539	Hydraulic safety system	Electro-hydraulic valve failure.
9540	Hydraulic safety system	Electro-hydraulic valve failure. Time-constrained availability of attachment (6hrs).
9611	Hydraulic (pump control)	Electrical failure on Pump 1 pilot valve. Limited travel and attachment functionality.
9612		
9613		
9618	Hydraulic (pump control)	Electrical failure on Pump 1 pilot valve. Reduced travel and/or attachment functionality.
9619		
9621	Hydraulic (pump control)	Electrical failure on Pump 2 pilot valve. Limited attachment functionality.
9622		
9623		
9628	Hydraulic (pump control)	Electrical failure on Pump 2. Reduced attachment functionality.
9629		
9651	Attachment (Overload function)	Electrical failure on attachment. Overload function disabled.
9652		
9653	Attachment (Load sensing control)	Electrical failure on attachment. Reduced attachment performance.
9654		

8 - TROUBLESHOOTING

Fault code	Function involved	Description
9655	Transmission	Electrical failure on transmission. AUTO gear shift mode disabled.
9656		
9711	Swing	Electrical failure on Swing Pilot Valve. Machine in safe state. Limited swing functionality.
9712		
9714	Swing	Electrical failure on Swing Pilot Valve. Machine in safe state. Swing Function not available.
9715	Swing	Electro-hydraulic failure on Swing Pilot Valve. Machine in safe state. Limited Swing Functionality.
9721	Swing	Electrical failure on Swing Pilot Valve. Machine in safe state. Limited swing functionality.
9722		
9724	Swing	Electrical failure on Swing Pilot Valve. Machine in safe state. Swing function not available.
9725	Swing	Electro-hydraulic failure on Swing Pilot Valve. Machine in safe state. Limited Swing Functionality.
9731	Swing	Electrical failure on swing brake valve. Park Brake engaged (safe state)
9732		
9733		
9741	Swing	Electrical failure on swing pump displacement sensor. Machine in safe state. Limited swing functionality
9742		
9743		
9745		
9746		
9747	Swing	Electrical failure on swing speed sensor. Machine in safe state. Reduced swing performance.
9748		
9749		
9750		
9753		
9754		
9755		
9756		
9757		
9759		
9760	Swing	Electrical failure on swing pressure sensor. Reduced swing performance.
9761		
9762	Attachment (Low flow)	Electrical failure on pilot valve. Limited Low flow functionality.
9766		
9767		
9771		
9272		
9776	Attachment (Low flow)	Control failure on pilot valve. Attachment function not available.
9781	Travel	Electrical failure on pilot valve. Limited travel functionality.
9782		
9786	Travel	Electrical failure on pilot valve. Limited travel functionality.
9787		
9791	Travel	Control failure on pilot valve. Travel function not available.
9796	Attachment (Stabilizer/ Blade)	Electrical failure on pilot valve. Limited Stabilizer/Blade functionality.
9797		
9801		
9802		
9806	Attachment (Stabilizer/ Blade)	Control failure on pilot valve. Attachment hydraulic not available.
9811	Attachment (Boom)	Electrical failure on pilot valve. Limited Boom functionality.
9812		
9816		
9817		
9821	Attachment (Boom)	Control failure on pilot valve. Boom function not available.

8 - TROUBLESHOOTING

Fault code	Function involved	Description
9826	Attachment (Bucket)	Electrical failure on pilot valve. Limited Bucket functionality.
9827		
9831		
9832		
9836	Attachment (Bucket)	Control failure on pilot valve. Attachment hydraulic not available.
9841	Attachment (Dipper)	Electrical failure on pilot valve. Machine in safe state. Limited Dipper functionality.
9842		
9846		
9847		
9851	Attachment (Dipper)	Control failure on pilot valve. Machine in safe state. Attachment hydraulic not available.
9856	Attachment (Positioning cylinder)	Electrical failure on pilot valve. Limited Positioning cylinder functionality.
9857		
9861		
9862		
9866	Attachment (Positioning cylinder)	Control failure on pilot valve. Attachment hydraulic not available.
9671	Attachment (Breaker shears)	Electrical failure on pilot valve. Limited Breaker shears functionality.
9872		
9876		
9877		
9881	Attachment (Breaker shears)	Control failure on pilot valve. Attachment hydraulic not available.
9886	Attachment (Low flow secondary)	Electrical failure on pilot valve. Limited Low flow functionality.
9887		
9891		
9892		
9896	Attachment (Low flow secondary)	Control failure on pilot valve. Attachment hydraulic not available.
9901	Attachment/Hammer (option)	Electrical failure on valve. Hammer function not available.
9902		
9911	Attachment/Grab rotation (option)	Electrical failure on valve. Limited Grab rotation functionality.
9912		
9916		
9917		
9936	Attachment/Flow circulation (option)	Electrical failure on valve. Flow circulation (option) not available.
9937		
9938		
9950	Calibration main valve	Calibration with wrong machine number.
9951	Calibration main valve	Calibration not completed.
9952	Calibration main valve	Calibration of main valve not complete. Reduced machine performance.
9954	Calibration main valve	Calibration of main pump not complete. Reduced machine performance.
9955	Calibration main valve	Calibration not complete. Reduced swing performance.
9959	Calibration main valve	Calibration not complete. Reduced auxiliaries attachment performance.
9960		
9961		
9962	Calibration main valve	Calibration of main pump not complete. Reduced machine performance.
9963		
9964		
9965		
9966	Calibration main valve	Calibration of main pump not complete. Reduced boom attachment performance.
9967	Calibration main valve	Calibration not complete. Reduced dipper attachment performance.

8 - TROUBLESHOOTING

Fault code	Function involved	Description
9970	Calibration main valve	Calibration not complete. Reduced swing performance.
9971		
9972		
9973		
9974		
9975		
9976		
9977		
9978		
9979		
9980		
9981	Calibration main valve	Calibration not complete. Reduced attachment performance.
9982		
9983		
9984		
9985		
9986		
9987		
9988	Calibration main valve	Calibration not complete. Reduced auxiliary attachment performance.
9989		
9990		
9991	Calibration main valve	Calibration not complete. Limited travel functionality.
9992	Calibration main valve	Calibration not complete. Limited stabilizer functionality.
9993	Calibration main valve	Calibration not complete. Limited boom functionality.
9994	Calibration main valve	Calibration not complete. Limited bucket functionality.
9995	Calibration main valve	Calibration not complete. Limited dipper functionality.
9996	Calibration main valve	Calibration not complete. Limited positioning cylinder functionality.
9997	Calibration main valve	Calibration not complete. Limited attachment functionality.
9998	Calibration main valve	Calibration not complete. Limited low flow functionality.
9999		
13001	Display	Display internal failure.

9 - SPECIFICATIONS

General specifications WX168

ENGINE	
Make	FPT
Model	667 TA/MEE
Type	Turbo charged, direct injection from rotary pump, internal EGR
Rated output power at 2000 RPM (ISO 14396)	105 kW (142.8 Hp)
Maximum torque at 1200 RPM	575 N·m (424.1 lb ft)
Number of cylinders	6
Total displacement	6700 cm³ (408.9 in³)
Bore x Stroke	104 mm (4.1 in) x 132 mm (5.2 in)

ELECTRICAL SYSTEM	
Voltage	24 V
Battery	2 x 12 V
Battery capacity	100 Ah
Alternator	70 A
Starter motor	4 kW (5.4 Hp)

HYDRAULIC SYSTEM	
PUMP: The hydraulic system is supplied by 3 pumps, a main double pump and an independent pump for slewing. The engine and the pumps are monitored and controlled by the "Engine Speed Control" selector located in cab.	
Maximum displacement	2 x 144 l/min (38.0 US gpm) + 81 l/min (21.4 US gpm)
Maximum input horsepower at 2000 RPM	103 kW (140.0 Hp)
MAXIMUM OPERATING PRESSURE	
Attachment	340 bar (4930.0 psi)
Travel	370 bar (5365.0 psi)
Swing	390 bar (5655.0 psi)
Power Boost	370 bar (5365.0 psi)
Pilot System	45 bar (652.5 psi)
CYLINDERS (Bore x Stroke)	
Boom	110 mm (4.3 in) x 80 mm (3.1 in) x 1170 mm (46.1 in) ± 1.8 mm (0.1 in)
Boom (triple articulation version only)	110 mm (4.3 in) x 80 mm (3.1 in) x 1020 mm (40.2 in) ± 1.8 mm (0.1 in)
Dipper	115 mm (4.5 in) x 80 mm (3.1 in) x 1245 mm (49.0 in) ± 1.8 mm (0.1 in)
Bucket	100 mm (3.9 in) x 70 mm (2.8 in) x 1025 mm (40.4 in) ± 1.8 mm (0.1 in)
Positioning (triple articulation version only)	155 mm (6.1 in) x 85 mm (3.3 in) x 745 mm (29.3 in) ± 3.15 mm (0.1 in)

TRAVEL	
Type	Transmission with clutch pack
Maximum travel speed at job	5 km/h (3.1 mph)
Maximum travel speed at job site (optional)	8.4 km/h (5.2 mph)
Maximum travel speed on the road	20 km/h (12.4 mph)
High speed on road (optional)	35 km/h (21.7 mph)
Maximum gradeability	57.4 % 30 °
Maximum traction force	92 kN (20682.4 lb)

9 - SPECIFICATIONS

SWING	
Type	The swing function is actuated by a closed hydraulic circuit, driving a mechanical gearbox with built-in automatic static brake.
SWING TORQUE	42400 N·m (31272.6 lb ft)
SWING SPEED	8.6 RPM

BRAKES	
Service brake	Wet, actives on all wheels.
Parking brake	Mechanical brake at springs actuation, active on transmission.

STEERING	
Turning circle diameter (with 10.00-20 twin wheels)	15.0 m (49.2 ft)
Power steering	OSPD 60/185
Displacement	60 - 185 cm³/rev (3.7 - 11.3 in³/rev)
Maximum steering pressure	190 - 200 bar (2755.0 - 2900.0 psi)
Shock valve adjustment	240 - 260 bar (3480.0 - 3770.0 psi)

WHEELS				
Type	Manufacturer	Type	Pressure	V (Max)
Twin	Mitas	10.00-20 PR 16 NB38	7.5 bar (108.8 psi)	35 km/h (21.7 mph)
	Bandenmarkt	Excavators 315/80 R 22.5	8.5 bar (123.3 psi)	35 km/h (21.7 mph)
Single	Mitas	600/40 - 22.5	6.25 bar (90.6 psi)	35 km/h (21.7 mph)
	Michelin	18 R19.5 XF	7.5 bar (108.8 psi)	35 km/h (21.7 mph)
	Alliance	620/40 - 22.5	7.0 bar (101.5 psi)	35 km/h (21.7 mph)

BUCKETS				
Width	Weight	Heaped capacity	SAE capacity	Number of teeth
600 mm (23.6 in)	330 kg (727.5 lb)	0.28 m³ (9.9 ft³)	0.32 m³ (11.3 ft³)	3
750 mm (29.5 in)	370 kg (815.7 lb)	0.36 m³ (12.7 ft³)	0.43 m³ (15.2 ft³)	3
900 mm (35.4 in)	410 kg (903.9 lb)	0.46 m³ (16.2 ft³)	0.54 m³ (19.1 ft³)	3
1000 mm (39.4 in)	440 kg (970.0 lb)	0.52 m³ (18.4 ft³)	0.62 m³ (21.9 ft³)	4
1100 mm (43.3 in)	470 kg (1036.2 lb)	0.58 m³ (20.5 ft³)	0.70 m³ (24.7 ft³)	5
1200 mm (47.2 in)	490 kg (1080.3 lb)	0.65 m³ (23.0 ft³)	0.77 m³ (27.2 ft³)	5

NOTE: For the other available bucket models address to Dealer.

General specifications WX188

ENGINE	
Make	FPT
Model	667 TA/MEE
Type	Turbo charged, direct injection from rotary pump, internal EGR
Rated output power at 2000 RPM (ISO 14396)	118 kW (160.4 Hp)
Maximum torque at 1200 RPM	670 N·m (494.2 lb ft)
Number of cylinders	6
Total displacement	6700 cm³ (408.9 in³)
Bore x Stroke	104 mm (4.1 in) x 132 mm (5.2 in)

ELECTRICAL SYSTEM	
Voltage	24 V
Battery	2 x 12 V
Battery capacity	100 Ah
Alternator	70 A
Starter motor	4 kW

HYDRAULIC SYSTEM	
PUMP: The hydraulic system is supplied by 3 pumps, a main double pump and an independent pump for slewing. The engine and the pumps are monitored and controlled by the "Engine Speed Control" selector located in cab.	
Maximum displacement	2 x 155 l/min (40.9 US gpm) + 81 l/min (21.4 US gpm)
Maximum input horsepower at 2000 RPM	103 kW (140.0 Hp)
MAXIMUM OPERATING PRESSURE	
Attachment	340 bar (4930.0 psi)
Travel	370 bar (5365.0 psi)
Swing	360 bar (5220.0 psi)
Power Boost	370 bar (5365.0 psi)
Pilot System	45 bar (652.5 psi)
CYLINDERS (Bore x Stroke)	
Boom	115 mm (4.5 in) x 80 mm (3.1 in) x 1170 mm (46.1 in) ± 1.8 mm (0.1 in)
Boom (triple articulation version only)	115 mm (4.5 in) x 80 mm (3.1 in) x 1020 mm (40.2 in) ± 1.8 mm (0.1 in)
Dipper	125 mm (4.9 in) x 90 mm (3.5 in) x 1290 mm (50.8 in) ± 1.8 mm (0.1 in)
Bucket	105 mm (4.1 in) x 75 mm (3.0 in) x 1025 mm (40.4 in) ± 1.8 mm (0.1 in)
Positioning (triple articulation version only)	155 mm (6.1 in) x 85 mm (3.3 in) x 745 mm (29.3 in) ± 3.15 mm (0.1 in)

TRAVEL	
Type	Transmission with clutch pack
Maximum travel speed at job	5 km/h (3.1 mph)
Maximum travel speed at job site (optional)	9 km/h (5.6 mph)
Maximum travel speed on the road	20 km/h (12.4 mph)
High speed on road (optional)	35 km/h (21.7 mph)
Maximum gradeability	64.0 % — 32.5 °
Maximum traction force	112 kN (25178.6 lb)

9 - SPECIFICATIONS

SWING	
Type	The swing function is actuated by a closed hydraulic circuit, driving a mechanical gearbox with built-in automatic static brake.
SWING TORQUE	53000 N·m (39090.8 lb ft)
SWING SPEED	9 RPM

BRAKES	
Service brake	Wet, actives on all wheels.
Parking brake	Mechanical brake at springs actuation, active on transmission.

STEERING	
Turning circle diameter (with 10.00-20 twin wheels)	14.3 m (46.9 ft)
Power steering	OSPD 60/185
Displacement	60 - 185 cm³/rev (3.7 - 11.3 in³/rev)
Maximum steering pressure	190 - 200 bar (2755.0 - 2900.0 psi)
Shock valve adjustment	240 - 260 bar (3480.0 - 3770.0 psi)

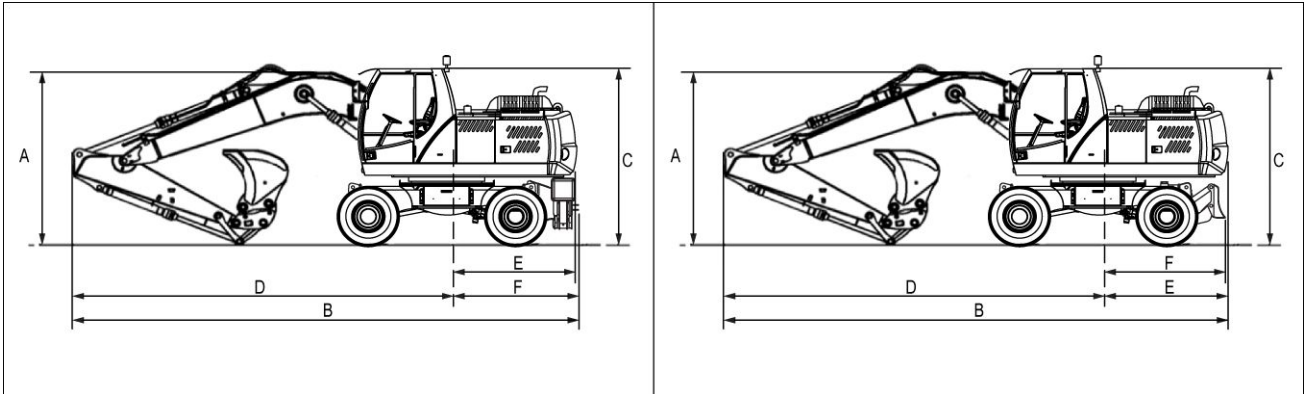
WHEELS				
Type	Manufacturer	Type	Pressure	V (max)
Twin	Mitas	10.00-20 PR 16 NB38	7.5 bar (108.8 psi)	35 km/h (21.7 mph)
		11.00-20 PR 16 NB38	7.25 bar (105.1 psi)	35 km/h (21.7 mph)
Single	Mitas	600/40 - 22.5	6.25 bar (90.6 psi)	35 km/h (21.7 mph)
	Michelin	18 R22.5 XF	7.5 bar (108.8 psi)	35 km/h (21.7 mph)
	Alliance	620/40 - 22.5	7.0 bar (101.5 psi)	35 km/h (21.7 mph)

BUCKETS				
Width	Weight	Heaped capacity	SAE capacity	Number of teeth
600 mm (23.6 in)	330 kg (727.5 lb)	0.28 m³ (9.9 ft³)	0.32 m³ (11.3 ft³)	3
750 mm (29.5 in)	370 kg (815.7 lb)	0.36 m³ (12.7 ft³)	0.43 m³ (15.2 ft³)	3
900 mm (35.4 in)	410 kg (903.9 lb)	0.46 m³ (16.2 ft³)	0.54 m³ (19.1 ft³)	3
1000 mm (39.4 in)	440 kg (970.0 lb)	0.52 m³ (18.4 ft³)	0.62 m³ (21.9 ft³)	4
1100 mm (43.3 in)	470 kg (1036.2 lb)	0.58 m³ (20.5 ft³)	0.70 m³ (24.7 ft³)	5
1200 mm (47.2 in)	490 kg (1080.3 lb)	0.65 m³ (23.0 ft³)	0.77 m³ (27.2 ft³)	5

NOTE: For the other available bucket models address to Dealer.

Dimensions and weights WX168

Monoboam Version — Dimensions



N00887N1 1

Rear stabilizers				Rear blade			
Dipper (mm)	2200	2600	3100	Dipper (mm)	2200	2600	3100
A	3109	2984	3027	A	3109	2984	3027
A 1)	3109	2984	3027	A 1)	3109	2984	3027
A 2)	3109	2984	3027	A 2)	3109	2984	3027
A 3)	3034	2962	3006	A 3)	3034	2962	3006
B	8693	8631	8635	B	8633	8571	8575
B 1)	8693	8631	8635	B 1)	8633	8571	8575
B 2)	8693	8631	8635	B 2)	8633	8571	8575
B 3)	8677	8621	8627	B 3)	8617	8561	8567
C	3181			C	3181		
D	6433	6371	6375	D	6433	6371	6375
D 1)	6433	6371	6375	D 1)	6433	6371	6375
D 2)	6433	6371	6375	D 2)	6433	6371	6375
D 3)	6417	6361	6367	D 3)	6417	6361	6367
E	2200			E	2200		
F	2260			F	2094		

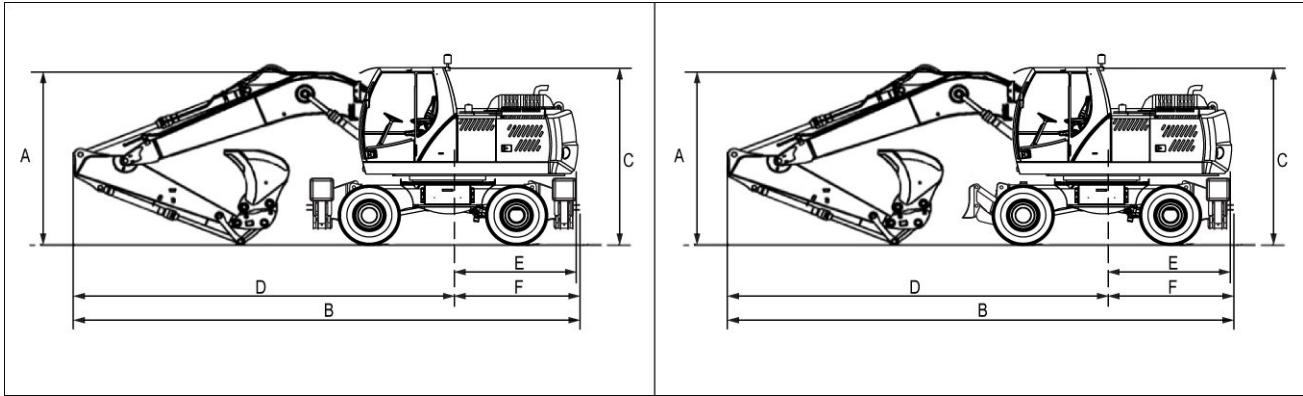
NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2544 mm (100.2 in)**

Dimensions measured with **MITAS 10.00-20** twin tires.

9 - SPECIFICATIONS



N00886N1 2

Front and rear stabilizers				Front blade and rear stabilizers			
Dipper (mm)	2200	2600	3100	Dipper (mm)	2200	2600	3100
A	3109	3075	3726	A	3109	2984	3703
A 1)	3109	3075	3657	A 1)	3109	2984	3584
A 2)	3109	3075	3291	A 2)	3109	2984	3281
A 3)	3036	2962	3006	A 3)	3036	2962	3006
B	8693	8659	8613	B	8693	8631	8617
B 1)	8693	8659	8624	B 1)	8693	8631	8630
B 2)	8693	8659	8668	B 2)	8693	8631	8668
B 3)	8677	8621	8627	B 3)	8677	8621	8627
C	3181			C	3181		
D	6433	6399	6353	D	6433	6371	6357
D 1)	6433	6399	6364	D 1)	6433	6371	6370
D 2)	6433	6399	6408	D 2)	6433	6371	6408
D 3)	6417	6361	6367	D 3)	6417	6361	6367
E	2200			E	2200		
F	2260			F	2260		

NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2544 mm**

Dimensions measured with **MITAS 10.00-20** twin tires.

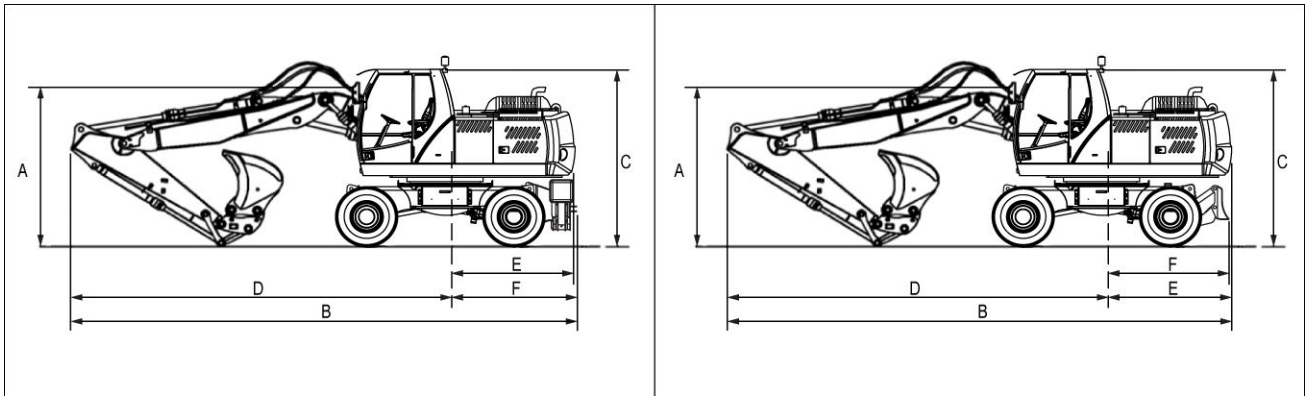
Monoboom Version — Weights

Dipper (mm)	Rear stabilizers (kg)	Rear blade (kg)	Front and rear stabilizers (kg)	Front blade and rear stabilizer (kg)
2200	17250	16950	18250	17850
2600	17300	17000	18300	17900
3100	17370	17070	18370	17970

NOTE: 1 mm (0.039 in) and 1 kg (2.205 lb)

Weight include bucket **480 kg (1058.2 lb)** and quick coupler **250 kg (551.2 lb)**

Triple Articulation Version



N00883N1 3

Dipper (mm)	Rear stabilizers			Dipper (mm)	Rear blade		
	2200	2600	3100		2200	2600	3100
A	2868	2823	2923	A	2868	2823	2923
A 1)	2868	2823	2923	A 1)	2868	2823	2923
A 2)	2868	2823	2923	A 2)	2868	2823	2923
A 3)	2784	2764	2836	A 3)	2784	2764	2836
B	8728	8656	8643	B	8668	8596	8583
B 1)	8728	8656	8643	B 1)	8668	8596	8583
B 2)	8728	8656	8643	B 2)	8668	8596	8583
B 3)	8707	8648	8650	B 3)	8647	8588	8590
C	3181			C	3181		
D	6468	6396	6383	D	6468	6396	6383
D 1)	6468	6396	6383	D 1)	6468	6396	6383
D 2)	6468	6396	6383	D 2)	6468	6396	6383
D 3)	6447	6388	6390	D 3)	6447	6388	6390
E	2200			E	2200		
F	2260			F	2094		

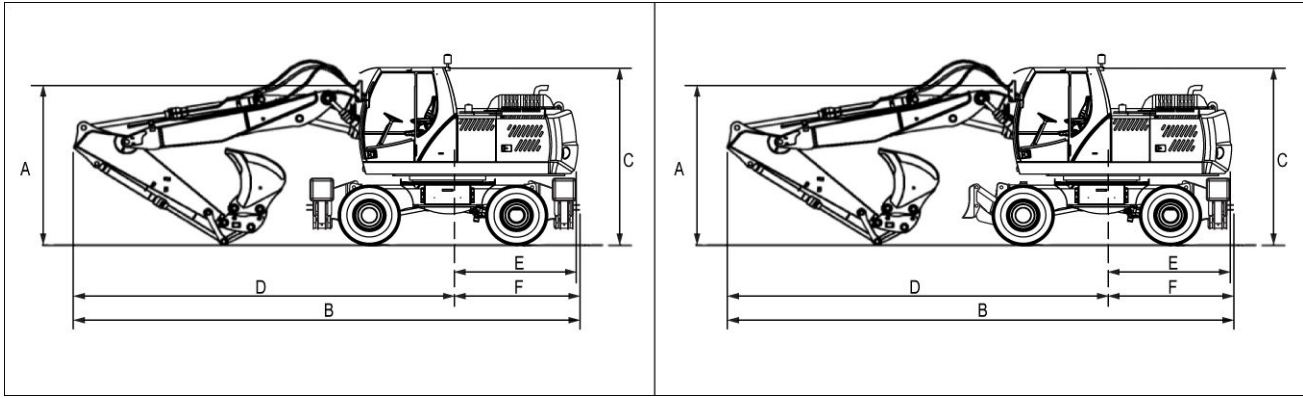
NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2544 mm (100.2 in)**

Dimensions measured with **MITAS 10.00-20** twin tires.

9 - SPECIFICATIONS



N00882N1 4

Front and rear stabilizers				Front blade and rear stabilizers			
Dipper (mm)	2200	2600	3100	Dipper (mm)	2200	2600	3100
A	2868	2823	3313	A	2868	2823	3313
A 1)	2868	2823	3313	A 1)	2868	2823	3198
A 2)	2868	2823	3112	A 2)	2868	2823	3017
A 3)	2784	2764	2836	A 3)	2784	2764	2836
B	8728	8656	8609	B	8728	8656	8609
B 1)	8728	8656	8609	B 1)	8728	8656	8622
B 2)	8728	8656	8610	B 2)	8728	8656	8622
B 3)	8707	8648	8650	B 3)	8707	8648	8650
C	3181			C	3181		
D	6468	6396	6349	D	6468	6396	6349
D 1)	6468	6396	6349	D 1)	6468	6396	6362
D 2)	6468	6396	6350	D 2)	6468	6396	6362
D 3)	6447	6388	6390	D 3)	6447	6388	6390
E	2200			E	2200		
F	2260			F	2260		

NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2544 mm (100.2 in)**

Dimensions measured with **MITAS 10.00-20** twin tires.

Triple Articulation Version — Weights

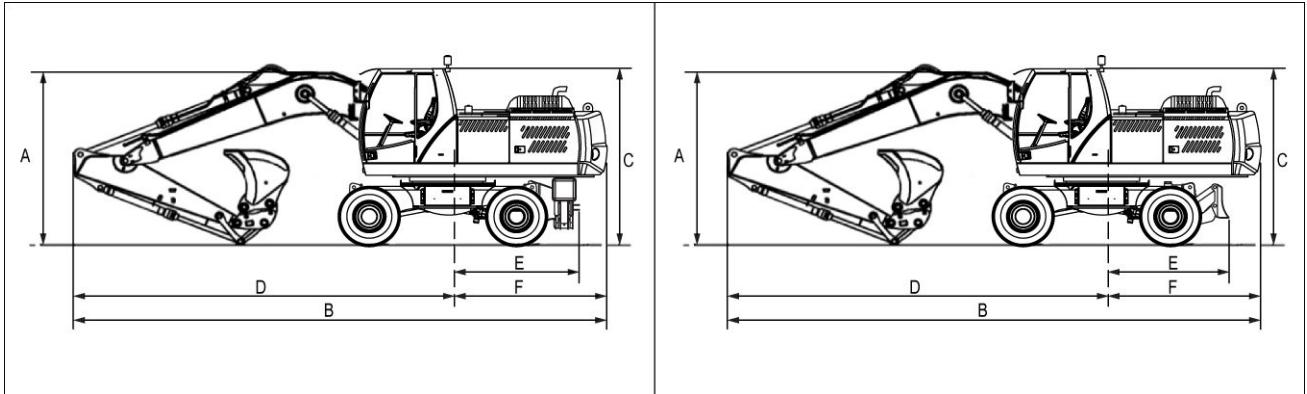
Dipper (mm)	Rear stabilizers (kg)	Rear blade (kg)	Front and rear stabilizers (kg)	Front blade and rear stabilizer (kg)
2200	17400	17100	18400	18000
2600	17450	17150	18450	18050
3100	17520	17220	18520	18120

NOTE: 1 mm (0.039 in) and 1 kg (2.205 lb)

Weight include bucket **480 kg (1058.2 lb)** and quick coupler **250 kg (551.2 lb)**

Dimensions and weights WX188

Monoboarm Version — Dimensions



N00915N1 1

Rear stabilizers				Rear blade			
Dipper (mm)	2200	2600	3100	Dipper (mm)	2200	2600	3100
A	3119	2985	3033	A	3119	2985	3033
A 1)	3119	2985	3033	A 1)	3119	2985	3033
A 2)	3119	2985	3033	A 2)	3119	2985	3033
A 3)	3048	2968	3014	A 3)	3048	2968	3014
B	8882	8809	8818	B	8882	8809	8818
B 1)	8882	8809	8818	B 1)	8882	8809	8818
B 2)	8882	8809	8818	B 2)	8882	8809	8818
B 3)	8864	8801	8811	B 3)	8864	8801	8811
C	3200			C	3200		
D	6432	6359	6368	D	6432	6359	6368
D 1)	6432	6359	6368	D 1)	6432	6359	6368
D 2)	6432	6359	6368	D 2)	6432	6359	6368
D 3)	6414	6351	6361	D 3)	6414	6351	6361
E	2450			E	2450		
F	2280			F	2182		

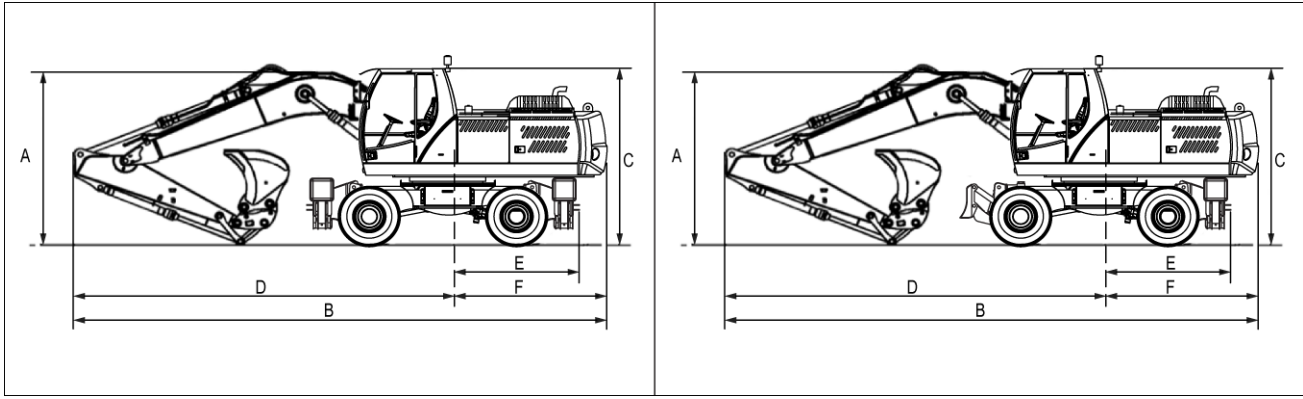
NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2550 mm (100.4 in)** (Germany/Italy) - **2750 mm (108.3 in)** (Germany)

Dimensions measured with **MITAS 11.00-20** twin tires.

9 - SPECIFICATIONS



N00914N1 2

Front and rear stabilizers				Front blade and rear stabilizers			
Dipper (mm)	2200	2600	3100	Dipper (mm)	2200	2600	3100
A	3119	3204	3801	A	3119	3132	3801
A 1)	3119	3204	3771	A 1)	3119	3132	3688
A 2)	3119	3204	3283	A 2)	3119	3132	3283
A 3)	3048	2968	3078	A 3)	3048	2968	3078
B	8882	8850	8790	B	8882	8850	8790
B 1)	8882	8850	8799	B 1)	8882	8850	8815
B 2)	8882	8850	8859	B 2)	8882	8850	8859
B 3)	8864	8801	8834	B 3)	8864	8801	8834
C	3200			C	3200		
D	6432	6400	6340	D	6432	6400	6340
D 1)	6432	6400	6349	D 1)	6432	6400	6365
D 2)	6432	6400	6409	D 2)	6432	6400	6409
D 3)	6414	6351	6384	D 3)	6414	6351	6384
E	2450			E	2450		
F	2280			F	2280		

NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2550 mm (100.4 in)** (Germany/Italy) - **2750 mm (108.3 in)** (Germany)

Dimensions measured with **MITAS 11.00-20** twin tires.

Monoboam Version (2550 mm (100.4 in) axle width) — Weights

Dipper (mm)	Rear stabilizers (kg)	Rear blade (kg)	Front and rear stabilizers (kg)	Front blade and rear stabilizers (kg)
2200	18550	18150	19650	19150
2600	18600	18200	19700	19200
3100	18700	18300	19800	19300

NOTE: 1 mm (0.039 in) and 1 kg (2.205 lb)

Weight include bucket **610 kg (1344.8 lb)** and quick coupler **250 kg (551.2 lb)**

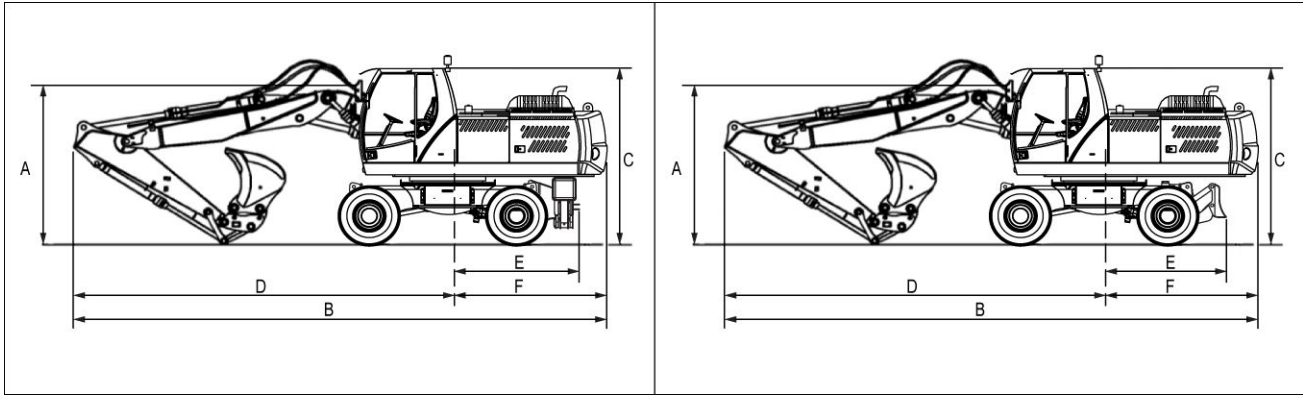
Monoboam Version (2750 mm (108.3 in) axle width) — Weights

Dipper (mm)	Rear stabilizers (kg)	Rear blade (kg)	Front and rear stabilizers (kg)	Front blade and rear stabilizers (kg)
2200	18650	18250	19750	19250
2600	18700	18300	19800	19300
3100	18800	18400	19900	19400

NOTE: 1 mm (0.039 in) and 1 kg (2.205 lb)

Weight include bucket **610 kg (1344.8 lb)** and quick coupler **250 kg (551.2 lb)**

Triple Articulation Version



N00913N1 3

Dipper (mm)	Rear stabilizers			Dipper (mm)	Rear blade		
	2200	2600	3100		2200	2600	3100
A	2881	2831	2927	A	2881	2831	2927
A 1)	2881	2831	2927	A 1)	2881	2831	2927
A 2)	2881	2831	2927	A 2)	2881	2831	2927
A 3)	2799	2774	2850	A 3)	2799	2774	2850
B	8918	8844	8836	B	8918	8844	8836
B 1)	8918	8844	8836	B 1)	8918	8844	8836
B 2)	8918	8844	8836	B 2)	8918	8844	8836
B 3)	8894	8834	8840	B 3)	8894	8834	8840
C	3200			C	3200		
D	6468	6394	6386	D	6468	6394	6386
D 1)	6468	6394	6386	D 1)	6468	6394	6386
D 2)	6468	6394	6386	D 2)	6468	6394	6386
D 3)	6444	6384	6390	D 3)	6444	6384	6390
E	2450			E	2450		
F	2280			F	2182		

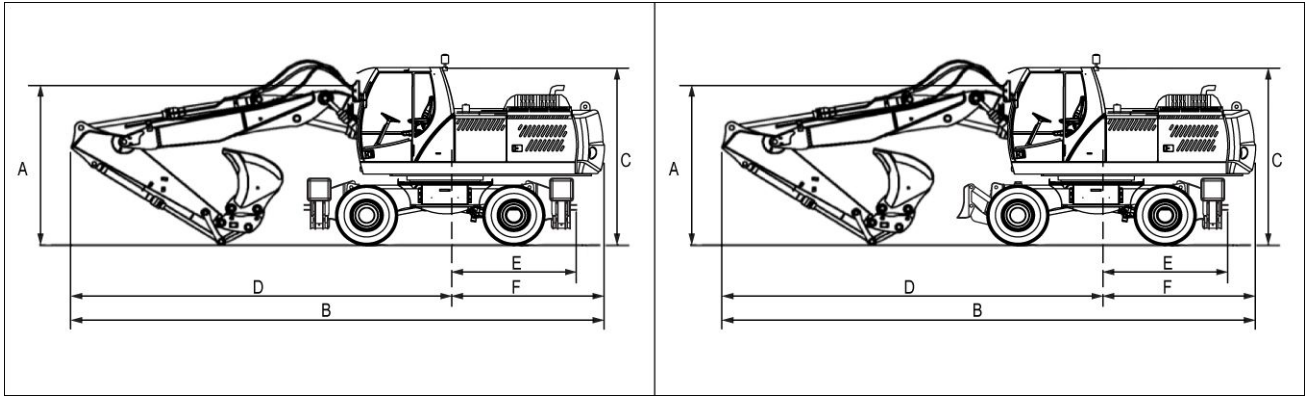
NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2550 mm (100.4 in)** (Germany/Italy) - **2750 mm (108.3 in)** (Germany)

Dimensions measured with **MITAS 11.00-20** twin tires.

9 - SPECIFICATIONS



N00912N1 4

Front and rear stabilizers				Front blade and rear stabilizers			
Dipper (mm)	2200	2600	3100	Dipper (mm)	2200	2600	3100
A	2881	2831	3491	A	2881	2831	3437
A 1)	2881	2831	3368	A 1)	2881	2831	3280
A 2)	2881	2831	3108	A 2)	2881	2831	3108
A 3)	2799	2774	2850	A 3)	2799	2774	2850
B	8918	8844	8777	B	8918	8844	8784
B 1)	8918	8844	8793	B 1)	8918	8844	8809
B 2)	8918	8844	8809	B 2)	8918	8844	8806
B 3)	8894	8834	8840	B 3)	8894	8834	8840
C	3200			C	3200		
D	6468	6394	6327	D	6468	6394	6334
D 1)	6468	6394	6343	D 1)	6468	6394	6359
D 2)	6468	6394	6359	D 2)	6468	6394	6356
D 3)	6444	6384	6390	D 3)	6444	6384	6390
E	2450			E	2450		
F	2280			F	2280		

NOTE: 1 mm (0.039 in)

- 1) With bucket only
- 2) With quick coupler only
- 3) Without quick coupler and bucket

Maximum machine width: **2550 mm (100.4 in)** (Germany/Italy) - **2750 mm (108.3 in)** (Germany)

Dimensions measured with **MITAS 11.00-20** twin tires.

Triple Articulation Version (2550 mm (100.4 in) axle width) — Weights

Dipper (mm)	Rear stabilizers (kg)	Rear blade (kg)	Front and rear stabilizers (kg)	Front blade and rear stabilizer (kg)
2200	18950	18550	20000	19500
2600	19000	18600	20050	19550
3100	19100	18700	20150	19650

NOTE: 1 mm (0.039 in) and 1 kg (2.205 lb)

Weight include bucket **610 kg (1344.8 lb)** and quick coupler **250 kg (551.2 lb)**

Triple Articulation Version (2750 mm (108.3 in) axle width) — Weights

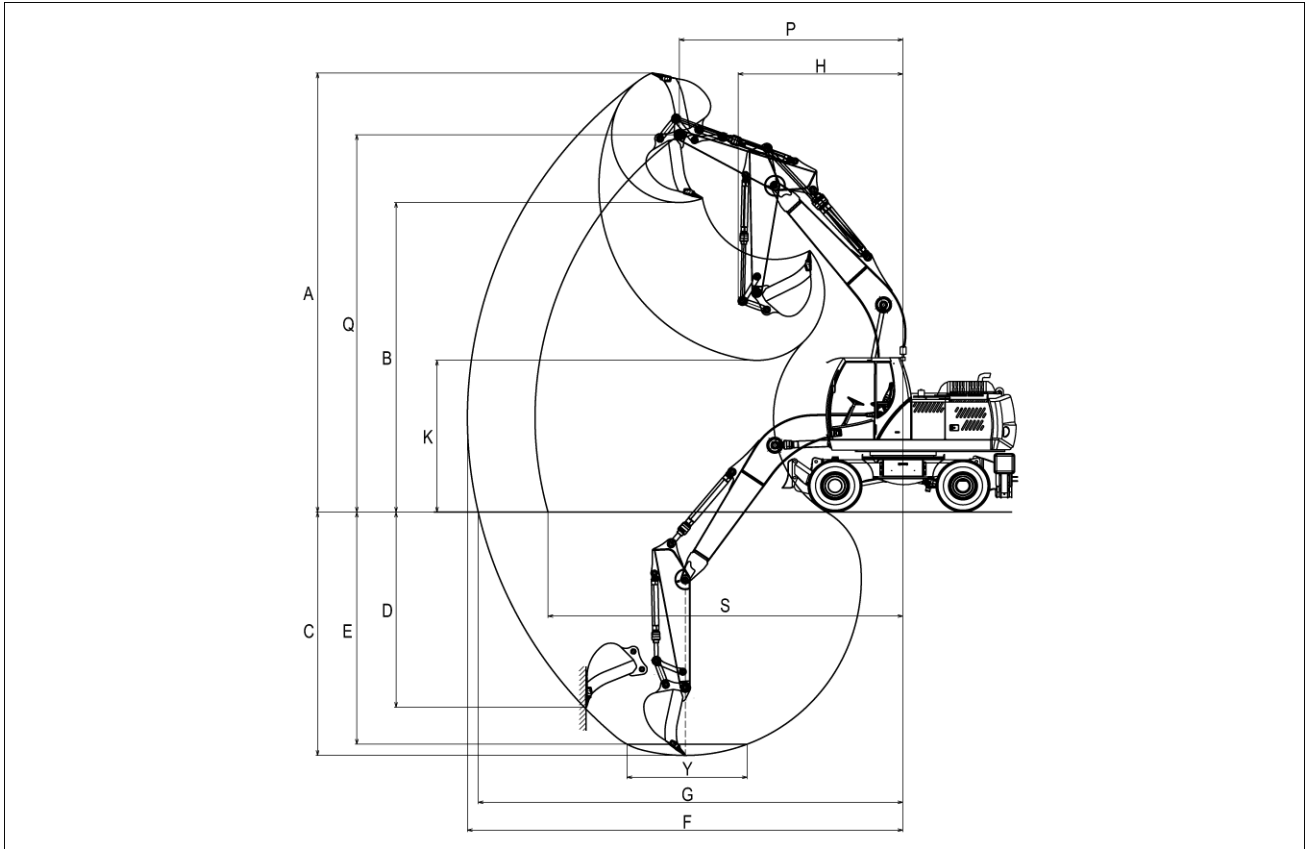
Dipper (mm)	Rear stabilizers (kg)	Rear blade (kg)	Front and rear stabilizers (kg)	Front blade and rear stabilizer (kg)
2200	19050	18650	20100	19650
2600	19100	18700	20150	19700
3100	19200	18800	20250	19800

NOTE: 1 mm (0.039 in) and 1 kg (2.205 lb)

Weight include bucket **610 kg (1344.8 lb)** and quick coupler **250 kg (551.2 lb)**

Digging data WX168

Monoboam Version

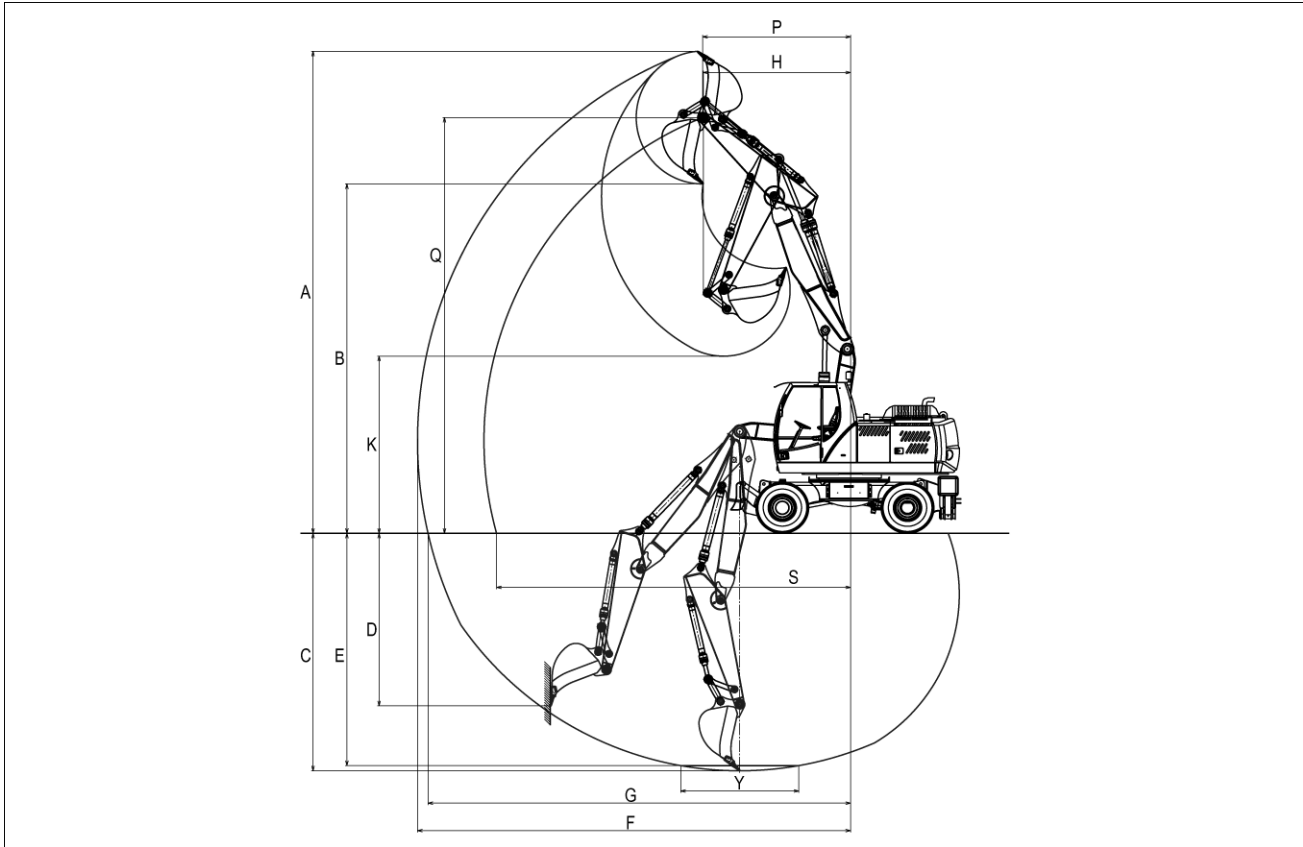


N00370N1 1

Dipper		2200	2600	3100
		mm	mm	mm
Bucket radius		1373 mm		
A	Maximum digging height	8910	8980	9270
B	Maximum loading height	6280	6370	6650
C	Maximum digging depth	4940	5330	5840
D	Maximum vertical wall digging depth	3960	3970	4470
E	Maximum digging depth of cut for level bottom	4710	5120	5660
F	Maximum digging reach	8840	9150	9360
G	Maximum digging reach at ground level	8620	8940	9430
H	Minimum swing radius	3340	2950	2860
K	Maximum loading height (dipper retracted)	3070	2640	2140
Y	Maximum digging depth bucketing movement	2440		
P	Maximum swing radius of bucketing connection	4540	4930	4540
Q	Maximum height of bucketing connection	7660	7750	8020
S	Maximum reach at ground level of bucketing connection	7200	7350	8020

NOTE: 1 mm (0.039 in)

Triple Articulation Version



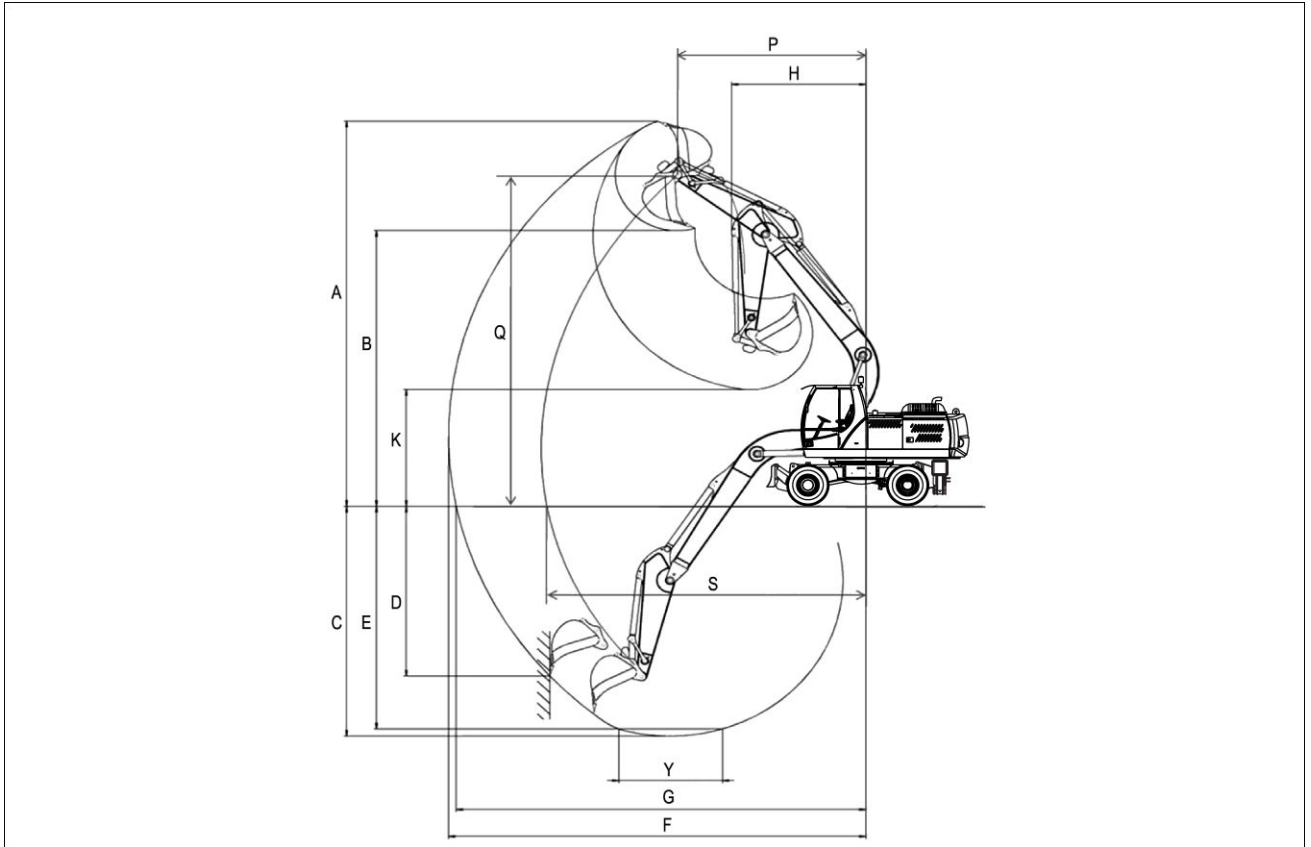
N00371N1 2

Dipper		2200	2600	3100
		mm	mm	mm
Bucket radius		1373 mm		
A	Maximum digging height	9970	10190	10580
B	Maximum loading height	7220	7450	7840
C	Maximum digging depth	4910	5290	5790
D	Maximum vertical wall digging depth	3570	3900	4390
E	Maximum digging depth of cut for level bottom	4800	5180	5690
F	Maximum digging reach	8950	9290	9780
G	Maximum digging reach at ground level	8730	9080	9580
H	Minimum swing radius	3040	2810	2870
K	Maximum loading height (dipper retracted)	3660	3130	2630
Y	Maximum digging depth bucking movement	2440		
P	Maximum swing radius of bucking connection	3060	3400	3710
Q	Maximum height of bucking connection	8600	8820	9210
S	Maximum reach at ground level of bucking connection	7320	7670	8170

NOTE: 1 mm (0.039 in)

Digging data WX188

Monoboam Version

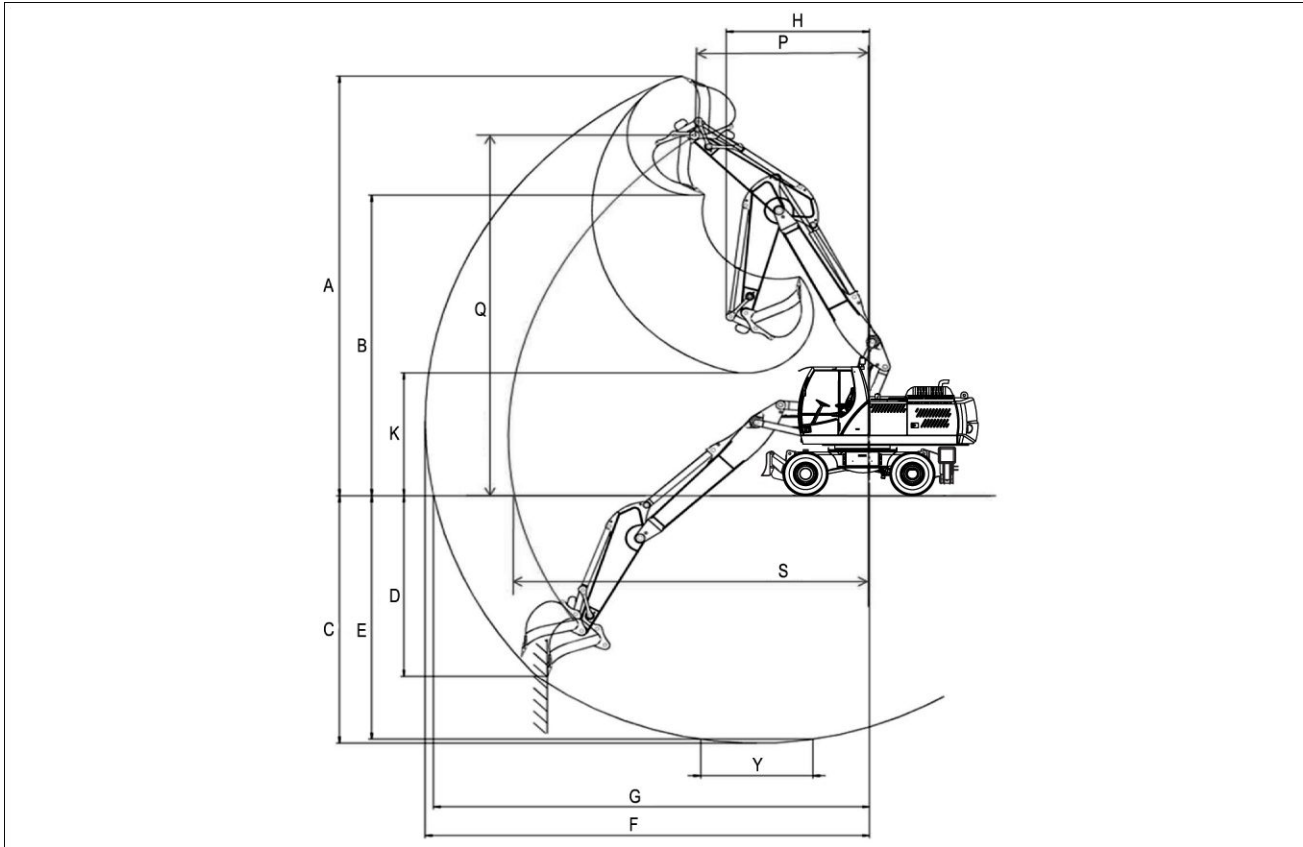


N00917N1 1

Dipper		2200	2600	3100
		mm	mm	mm
Bucket radius		1369 mm		
A	Maximum digging height	9100	9300	9600
B	Maximum loading height	6500	6600	7000
C	Maximum digging depth	4900	5300	5800
D	Maximum vertical wall digging depth	3900	4200	4800
E	Maximum digging depth of cut for level bottom	4700	5100	5700
F	Maximum digging reach	8900	9300	9800
G	Maximum digging reach at ground level	8700	9100	9600
H	Minimum swing radius	3400	3300	3300
K	Maximum loading height (dipper retracted)	3100	2700	2200
Y	Maximum digging depth bucketing movement	2438		
P	Maximum swing radius of bucketing connection	4400	4800	5200
Q	Maximum height of bucketing connection	7800	8000	8300
S	Maximum reach at ground level of bucketing connection	7300	7600	8200

NOTE: 1 mm (0.039 in)

Triple Articulation Version



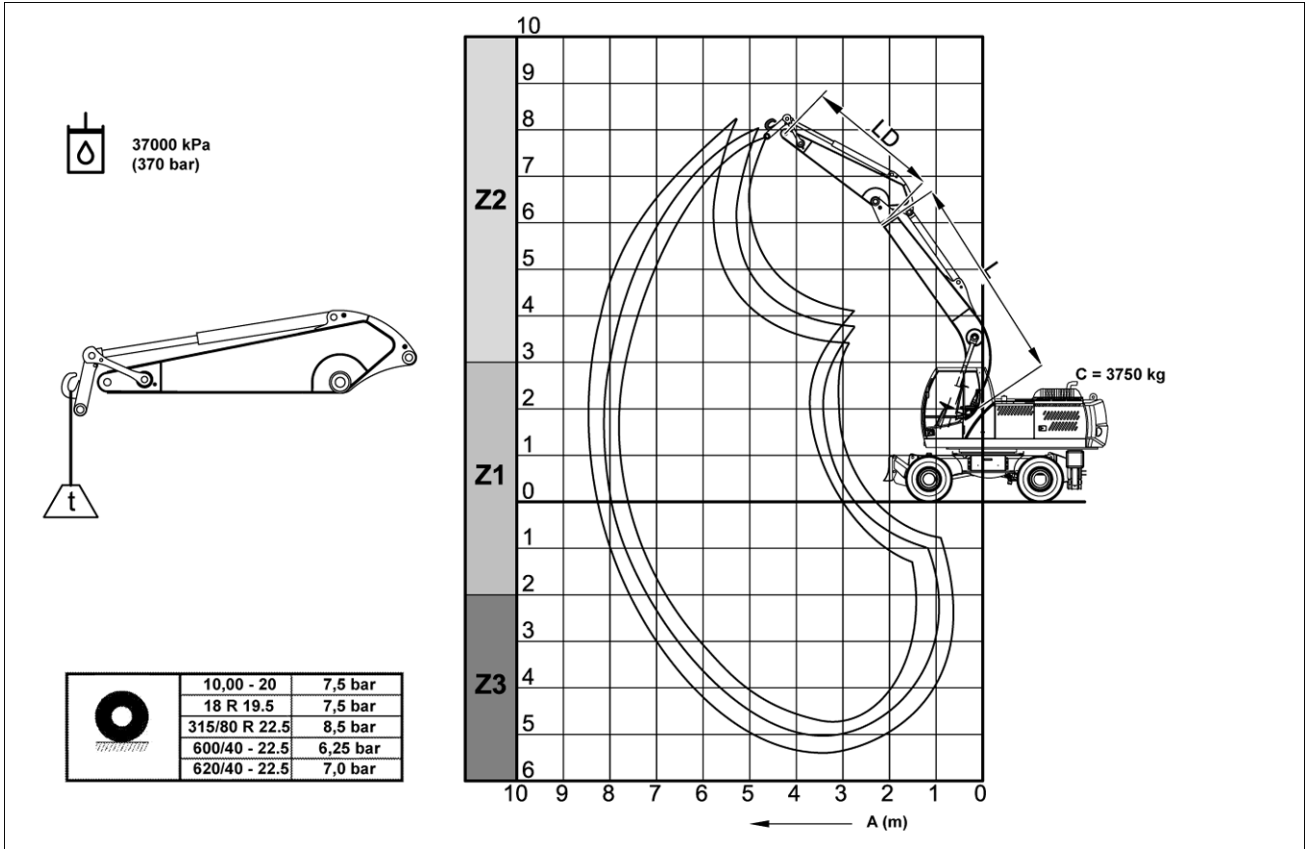
N00916N1 2

Dipper		2200	2600	3100
		mm	mm	mm
Bucket radius		1369 mm		
A	Maximum digging height	10100	10300	10800
B	Maximum loading height	7400	7600	8000
C	Maximum digging depth	4900	5300	5800
D	Maximum vertical wall digging depth	3500	3900	4400
E	Maximum digging depth of cut for level bottom	4800	5200	5700
F	Maximum digging reach	9000	9290	9780
G	Maximum digging reach at ground level	8730	9400	9900
H	Minimum swing radius	3100	2800	2900
K	Maximum loading height (dipper retracted)	3700	3100	2600
Y	Maximum digging depth bucking movement	2438		
P	Maximum swing radius of bucking connection	2900	3200	3500
Q	Maximum height of bucking connection	8700	9000	9400
S	Maximum reach at ground level of bucking connection	7400	7800	8300

NOTE: 1 mm (0.039 in)

Loads handling WX168

Outfit with Monoboam



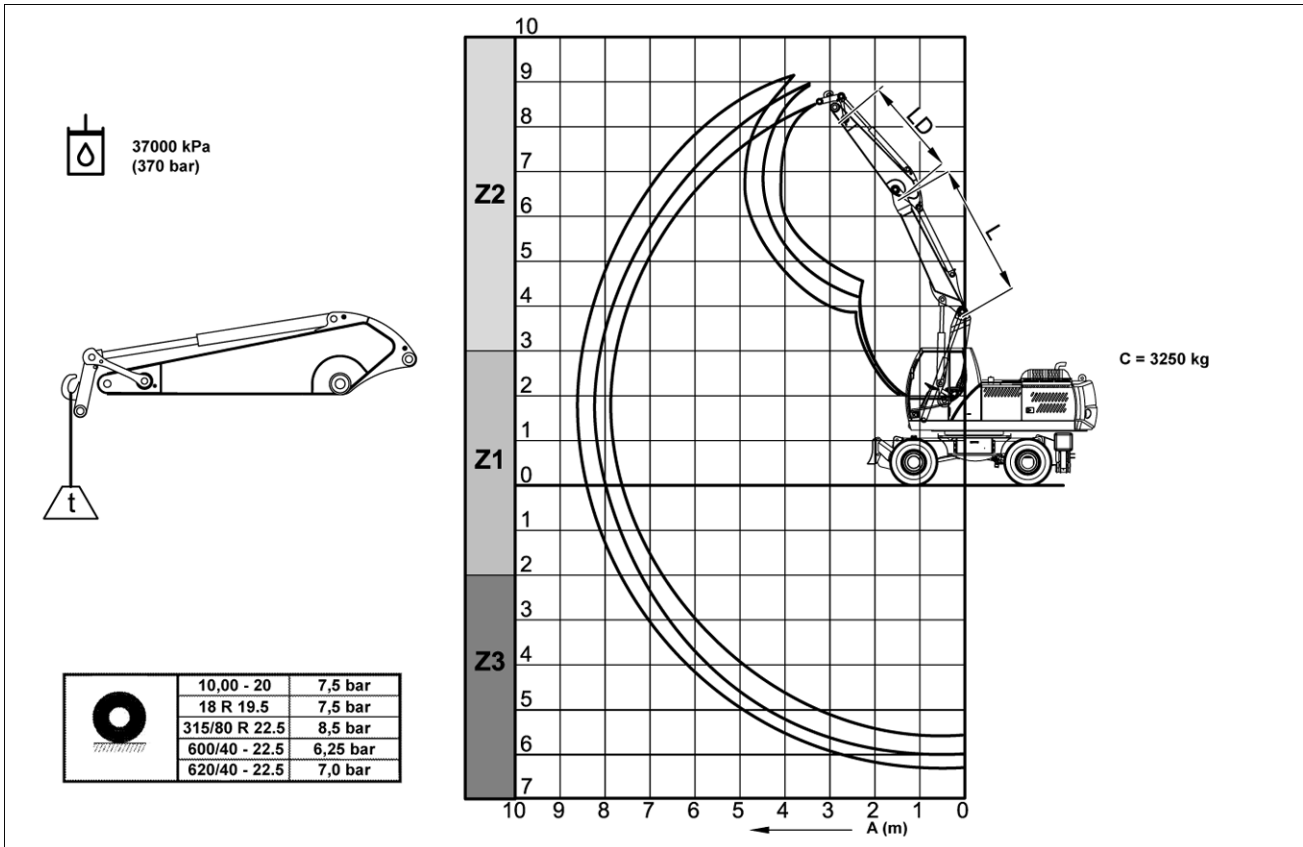
N00889_1 1

A(m)		4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5
LD = 2.2 m	Z2	3.8	2.5	1.8	4.4	2.9	2.1	5.3	3.5	2.5	6.6	4.5	3.2	6.6	4.6	3.4
	Z1	3.3	2.2	1.7	3.8	2.6	1.9	4.7	3.1	2.3	6.4	4.2	3.1	7.5	5.2	3.8
	Z3	3.3	2.2		3.8	2.6		4.7	3.1		6.4	4.2		7.5	5.2	
LD = 2.6 m	Z2	3.9	2.6	1.8	4.5	2.9	2.1	5.4	3.0	2.5	6.1	3.0	3.2	6.1	3.0	3.4
	Z1	3.3	2.2	1.7	3.8	2.6	1.9	4.6	3.1	2.3	6.4	4.2	3.1	7.2	5.2	3.8
	Z3	3.3	2.2		3.8	2.6		4.6	3.1		6.4	4.2		6.4	5.2	
LD = 3.1 m	Z2	4.0	2.6	1.8	4.6	2.9	2.0	5.5	3.5	2.0	6.5	3.6	2.0	6.5	3.6	2.0
	Z1	3.2	2.1	1.6	3.7	2.5	1.8	4.6	3.0	2.2	6.3	4.1	3.0	6.5	5.1	3.7
	Z3	3.2	2.1	1.6	3.7	2.5	1.8	4.6	3.0	2.2	6.3	4.1	3.0	7.2	5.0	3.7

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Triple Articulation Version



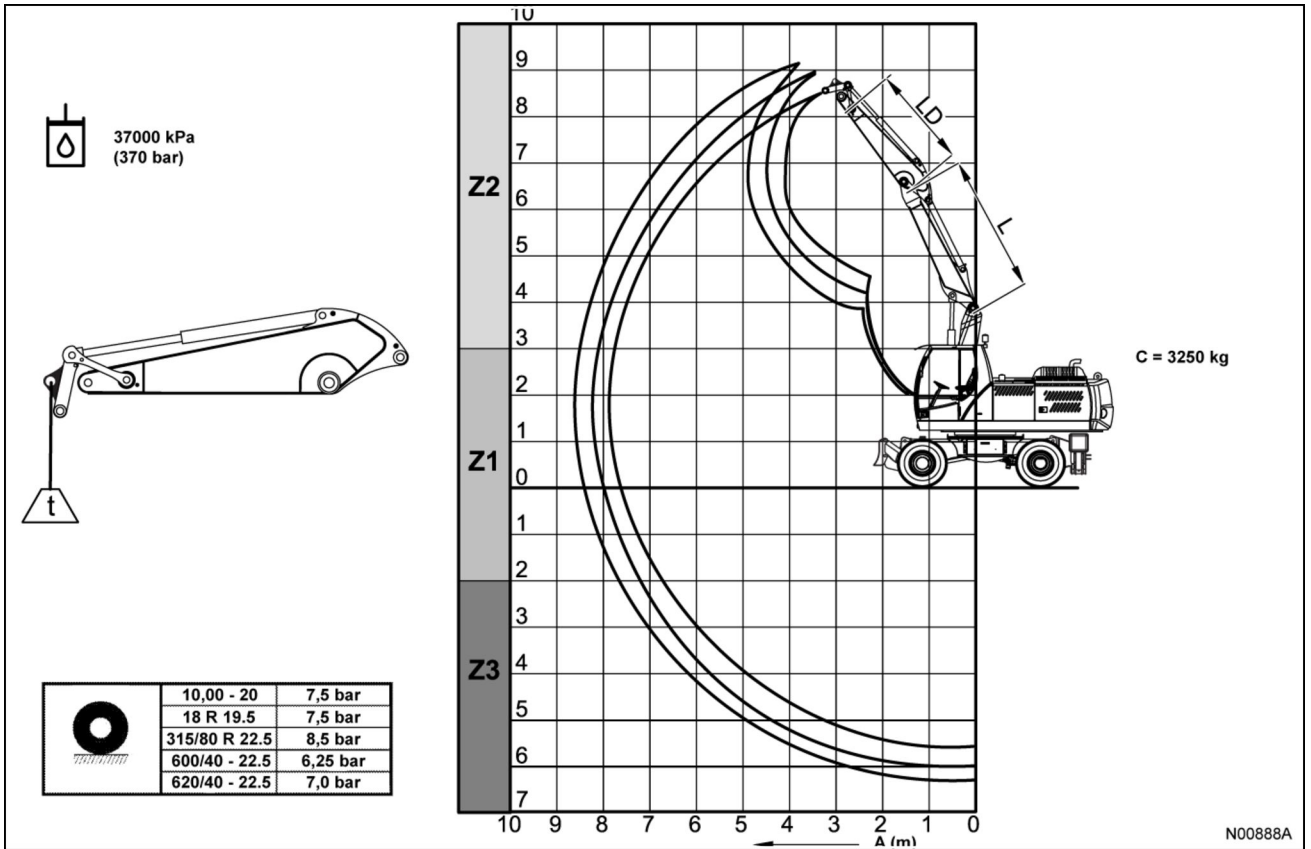
N00888_1 2

Am		4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5
LD = 2.2 m	Z2	4.0	2.6	1.6	4.5	3.0	1.9	4.9	3.5	2.3	4.9	4.5	3.1	4.9	4.9	3.8
	Z1	3.4	2.1	1.5	3.9	2.4	1.8	4.8	3.0	2.2	6.6	4.0	2.9	7.4	5.0	3.6
	Z3	3.2	2.1		3.8	2.4		4.6	3.0		6.4	4.0		7.5	5.0	
LD = 2.6 m	Z2	4.0	2.6	1.7	4.0	3.0	2.0	4.0	3.5	2.4	4.0	3.6	3.0	4.0	3.6	3.0
	Z1	3.5	2.1	1.5	4.1	2.5	1.7	5.0	3.0	2.1	6.6	4.1	2.9	7.0	5.1	3.6
	Z3	3.3	2.0		3.8	2.4		4.7	2.9		6.4	4.0		7.5	5.0	
LD = 3.1 m	Z2	3.2	2.6	1.7	3.2	2.6	2.0	3.2	2.6	2.4	3.2	2.6	2.5	3.2	2.6	2.5
	Z1	3.5	2.2	1.4	4.1	2.5	1.7	5.0	3.1	2.1	6.3	4.1	2.8	6.3	4.9	3.5
	Z3	3.1	2.0	1.4	3.7	2.4	1.7	4.5	2.9	2.1	6.3	4.0	2.8	7.5	5.0	3.5

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Triple Articulation Version



N00888A 3

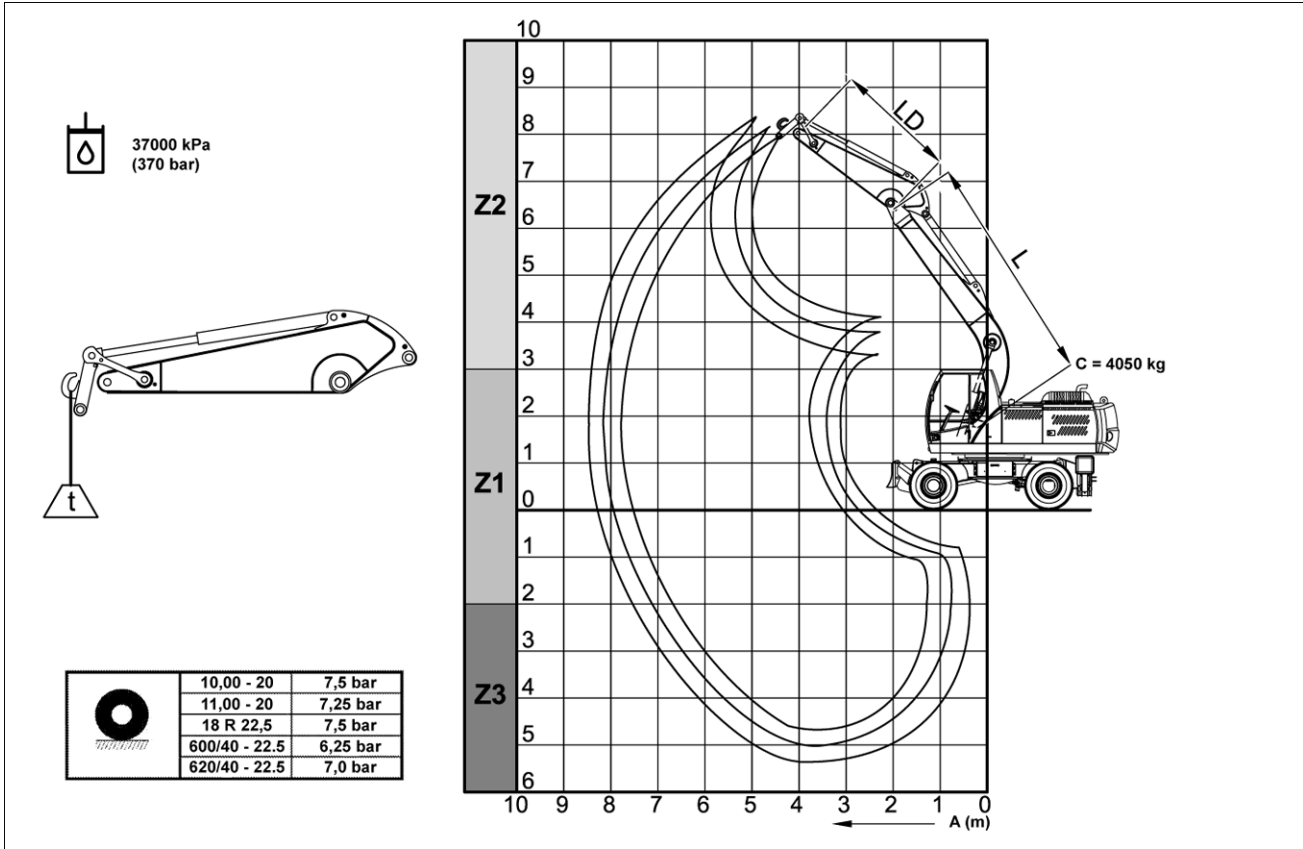
Am																		
	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5			
LD = 2.2 m	Z2	3.9	2.7	1.6	4.5	3.0	1.9	4.9	3.5	2.3	4.9	4.5	3.1	4.9	4.8	3.8		
	Z1	3.4	2.1	1.5	4.0	2.4	1.8	4.8	3.0	2.2	6.6	4.0	2.9	7.4	5.0	3.6		
	Z3	3.2	2.1		3.8	2.4		4.6	3.0		6.4	4.0		8.1	5.0			
LD = 2.6 m	Z2	4.0	2.7	1.7	4.0	3.0	2.0	4.0	3.5	2.4	4.0	3.5	3.0	4.0	3.5	3.0		
	Z1	3.5	2.1	1.5	4.0	2.5	1.7	4.9	3.0	2.1	6.6	4.1	2.9	7.0	5.1	3.6		
	Z3	3.3	2.0		3.8	2.4		4.7	2.9		6.4	4.0		8.1	5.0			
LD = 3.1 m	Z2	3.2	2.6	1.8	3.2	2.6	2.0	3.2	2.6	2.4	3.2	2.6	2.5	3.2	2.6	2.5		
	Z1	3.5	2.2	1.4	4.1	2.5	1.7	5.0	3.1	2.1	6.2	4.1	2.8	6.2	4.9	3.5		
	Z3	3.1	2.0	1.4	3.7	2.4	1.7	4.5	2.9	2.1	6.3	4.0	2.8	8.0	5.0	3.5		

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Loads handling WX188

Outfit with Monoboam



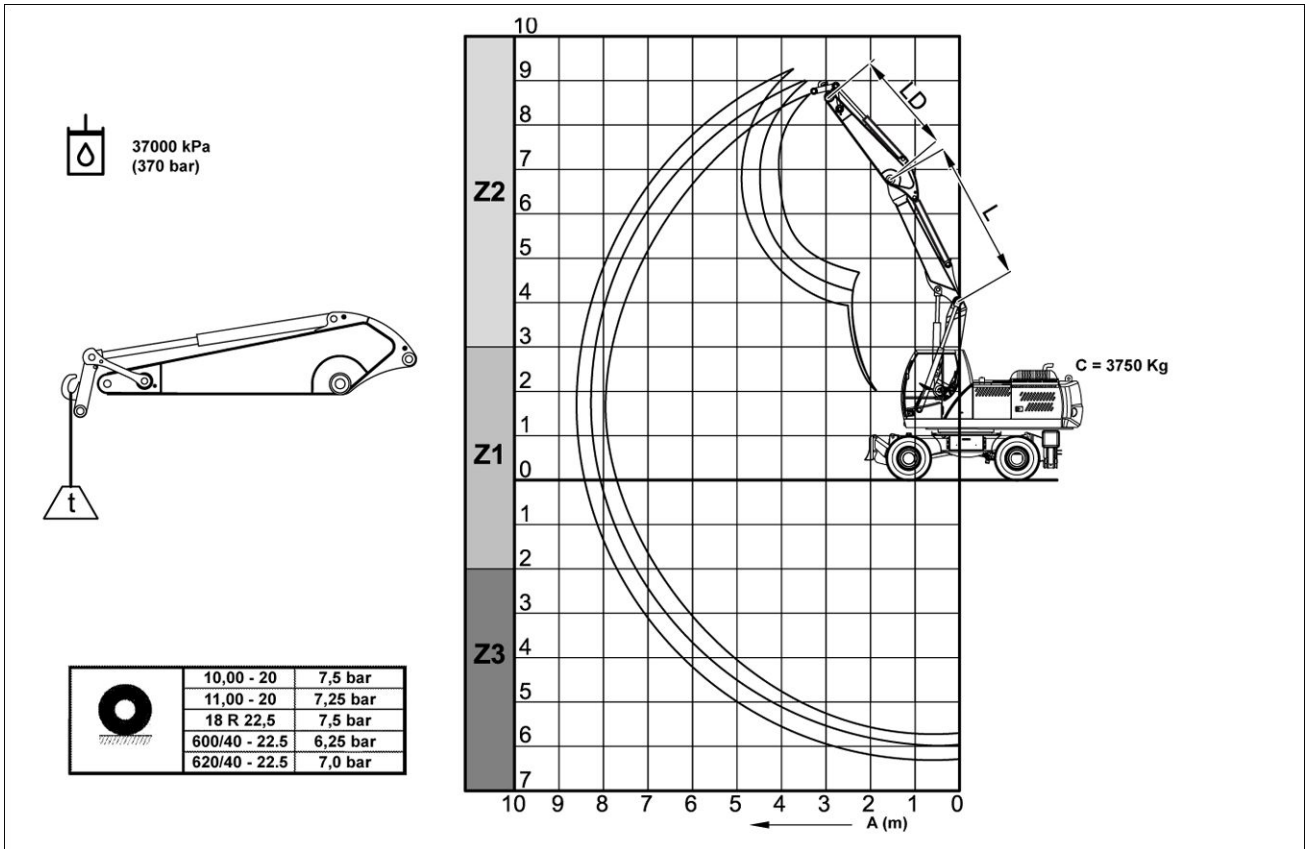
N00891_1 1

Am		4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5
LD = 2.2 m	Z2	4.3	2.9	2.0	5.1	3.4	2.4	6.1	4.0	2.9	7.3	5.1	3.7	7.3	5.1	3.9
	Z1	3.7	2.5	1.9	4.4	3.0	2.3	5.5	3.7	2.7	7.3	4.8	3.5	7.5	5.9	4.3
	Z3	3.7	2.5		4.5	3.0		5.5	3.7		7.3	4.8		7.5	5.6	
LD = 2.6 m	Z2	4.4	2.9	2.1	5.2	3.4	2.4	6.2	3.4	2.7	6.8	3.4	2.7	6.8	3.4	2.7
	Z1	3.7	2.5	1.9	4.4	3.0	2.2	5.4	3.6	2.7	7.3	4.7	3.5	7.5	5.8	4.3
	Z3	3.7	2.5		4.4	3.0		5.4	3.6		6.9	4.7		6.9	5.8	
LD = 3.1 m	Z2	4.5	2.2	2.0	5.3	2.2	2.2	6.3	2.2	2.2	7.2	2.2	2.2	7.2	2.2	2.2
	Z1	3.6	2.4	1.8	4.3	2.9	2.2	5.3	3.5	2.6	7.1	4.7	3.4	7.2	5.7	4.2
	Z3	3.6	2.4	1.8	4.3	2.9	2.2	5.3	3.5	2.6	7.1	4.7	3.4	7.5	5.4	4.2

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Triple Articulation Version



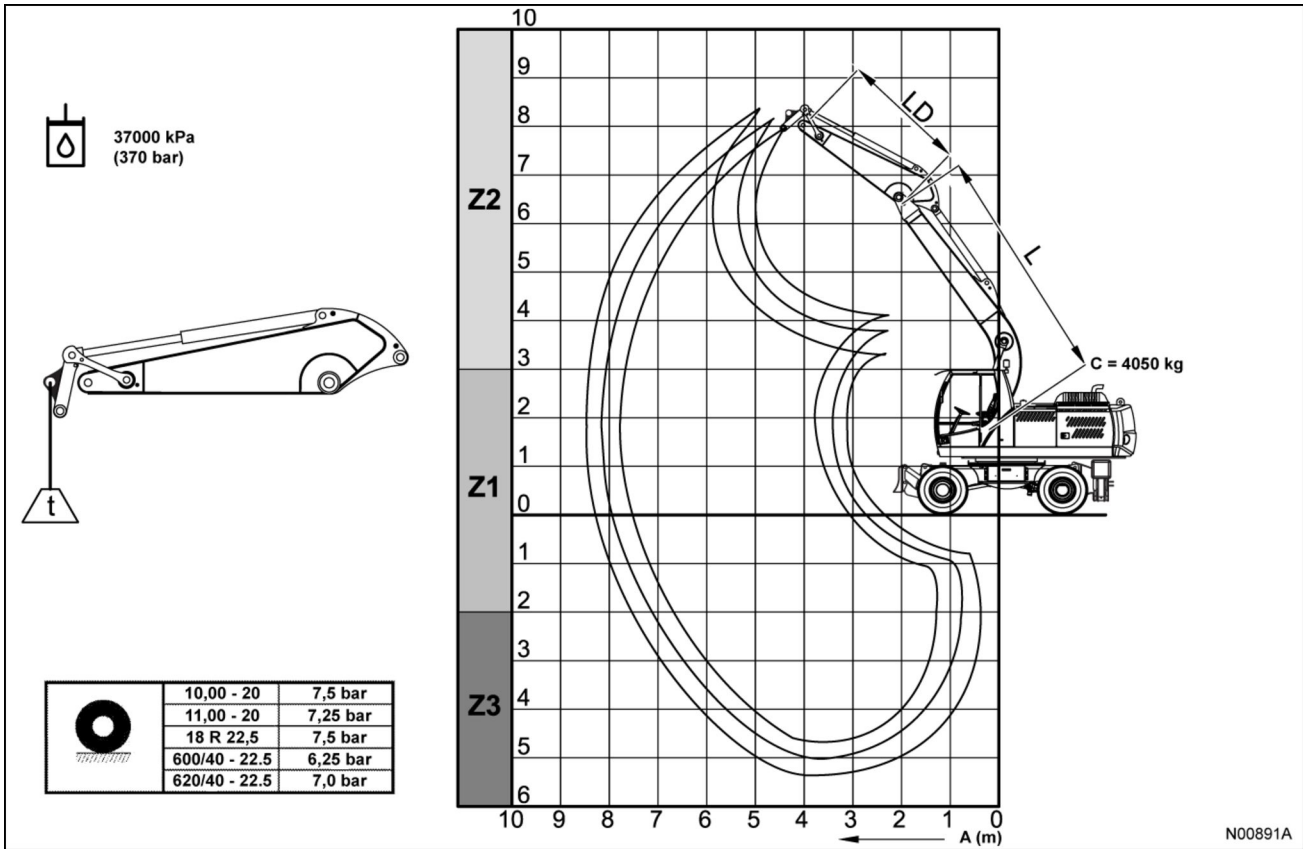
N00890_1 2

Am		4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5
LD = 2.2 m	Z2	4.5	2.9	2.0	5.2	3.4	2.3	5.4	4.1	2.8	5.4	4.2	3.6	5.4	4.2	4.4
	Z1	4.0	2.5	1.8	4.8	3.0	2.2	5.9	3.7	2.6	7.5	4.8	3.4	7.5	5.9	4.2
	Z3	3.8	2.5		4.6	3.0		5.7	3.7		7.5	4.8		7.5	5.9	
LD = 2.6 m	Z2	4.4	3.1	2.0	4.4	3.6	2.4	4.4	4.0	2.9	4.4	4.0	3.4	4.4	4.0	3.4
	Z1	4.1	2.5	1.8	4.9	3.0	2.1	6.0	3.7	2.6	7.5	4.8	3.4	7.5	5.9	4.2
	Z3	3.9	2.5		4.7	2.9		5.7	3.6		7.5	4.7		7.5	5.8	
LD = 3.1 m	Z2	3.6	2.9	2.1	3.6	2.9	2.4	3.6	2.9	2.8	3.6	2.9	2.8	3.6	2.9	2.8
	Z1	4.1	2.6	1.7	4.9	3.1	2.1	5.9	3.7	2.6	7.0	4.8	3.3	7.0	5.5	4.1
	Z3	3.7	2.4	1.7	4.5	2.9	2.1	5.5	3.6	2.6	7.4	4.7	3.3	7.5	5.8	4.1

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Outfit with Monoboam



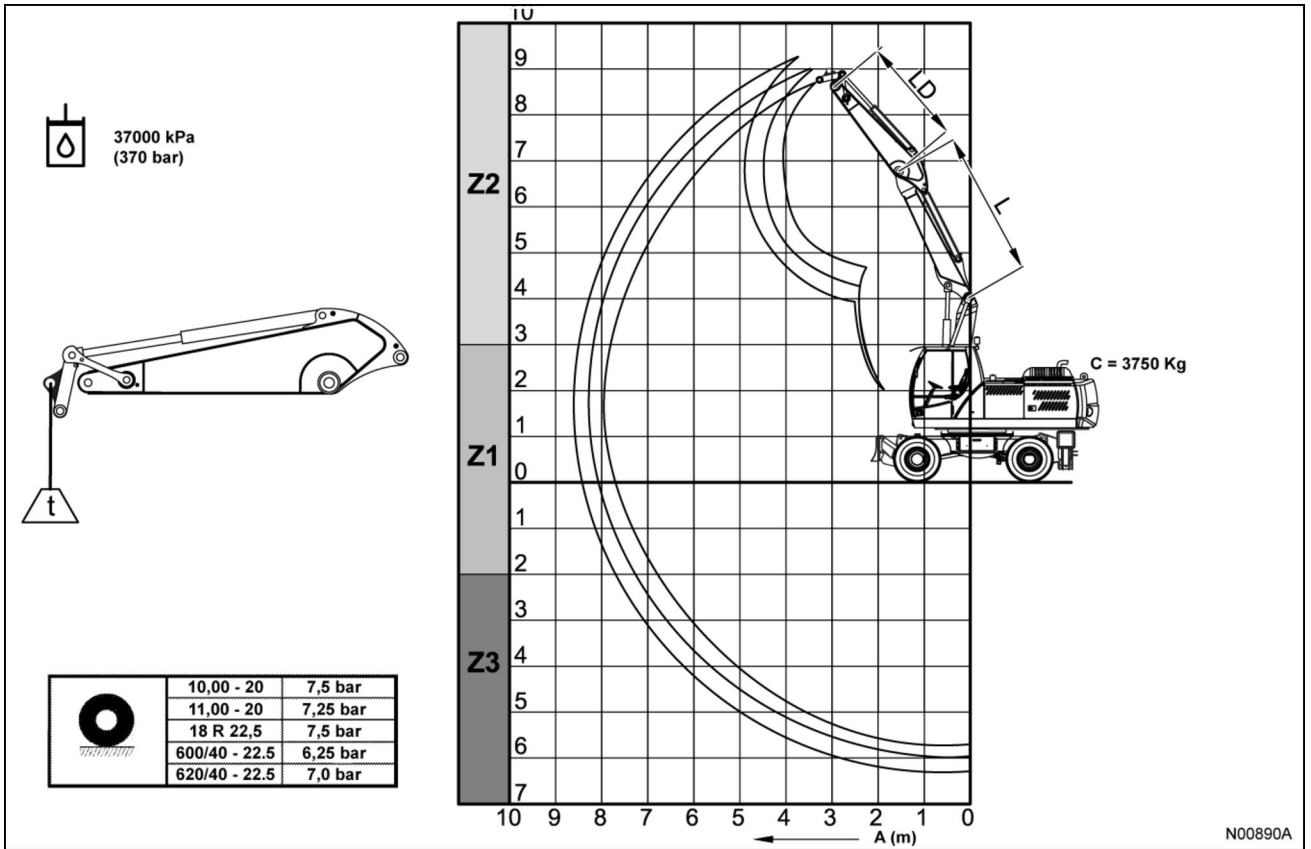
N00891A 3

Am		4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5
LD = 2.2 m	Z2	4.3	2.9	2.1	5.1	3.4	2.4	6.1	4.0	2.9	7.3	5.1	3.7	7.3	5.1	3.8
	Z1	3.7	2.5	1.9	4.4	3.0	2.3	5.5	3.7	2.8	7.3	4.8	3.5	8.4	5.9	4.3
	Z3	3.7	2.6		4.5	3.0		5.5	3.7		7.3	4.8		8.1	5.7	
LD = 2.6 m	Z2	4.4	2.9	2.1	5.2	3.3	2.4	6.2	3.3	2.7	6.7	3.3	2.7	6.7	3.3	2.7
	Z1	3.7	2.5	1.9	4.4	3.0	2.2	5.4	3.6	2.7	7.3	4.7	3.5	7.9	5.8	4.3
	Z3	3.7	2.5		4.4	3.0		5.4	3.6		7.0	4.7		7.0	5.8	
LD = 3.1 m	Z2	4.5	2.2	2.0	5.3	2.2	2.2	6.3	2.2	2.2	7.1	2.2	2.2	7.1	2.2	2.2
	Z1	3.6	2.4	1.8	4.3	2.9	2.2	5.3	3.6	2.6	7.1	4.7	3.4	7.1	5.7	4.2
	Z3	3.6	2.4	1.8	4.3	2.9	2.2	5.3	3.6	2.6	7.1	4.7	3.4	7.8	5.4	4.2

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Triple Articulation Version



N00890A 4

Am																
		4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5	4.5	6.0	7.5
LD = 2.2 m	Z2	4.6	3.0	2.0	5.3	3.5	2.3	5.4	4.1	2.8	5.4	4.1	3.6	5.4	4.1	4.4
	Z1	4.0	2.5	1.8	4.8	3.0	2.2	5.9	3.7	2.7	7.7	4.8	3.5	8.1	5.9	4.2
	Z3	3.8	2.5		4.6	3.0		5.7	3.7		7.5	4.8		9.4	5.9	
LD = 2.6 m	Z2	4.4	3.1	2.0	4.4	3.6	2.4	4.4	3.9	2.9	4.4	3.9	3.4	4.4	3.9	3.4
	Z1	4.1	2.5	1.8	4.9	3.0	2.1	6.0	3.7	2.6	7.8	4.8	3.4	7.7	5.9	4.2
	Z3	3.9	2.5		4.7	2.9		5.7	3.6		7.6	4.7		9.5	5.8	
LD = 3.1 m	Z2	3.6	2.9	2.1	3.6	2.9	2.4	3.6	2.9	2.8	3.6	2.9	2.8	3.6	2.9	2.8
	Z1	4.1	2.6	1.7	4.9	3.1	2.1	5.9	3.7	2.6	7.0	4.8	3.3	7.0	5.5	4.1
	Z3	3.7	2.5	1.7	4.5	2.9	2.1	5.5	3.6	2.5	7.4	4.7	3.3	9.2	5.8	4.1

NOTE: Values in the table are in ton.

NOTE: 1 m (3.281 ft)

Travelling on public roads

⚠ WARNING

Driving hazard!

Know all rules, regulations, laws, and required safety equipment for transporting or operating this machine on a road or highway. See your dealer to obtain a rotating beacon, backup alarm, Slow Moving Vehicle (SMV) emblem, and other safety equipment.

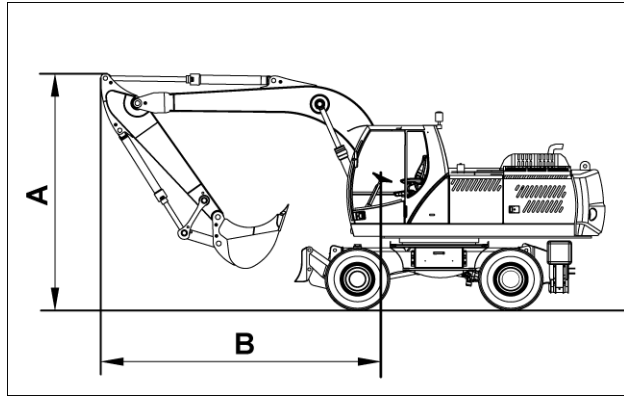
Failure to comply could result in death or serious injury.

W0154A

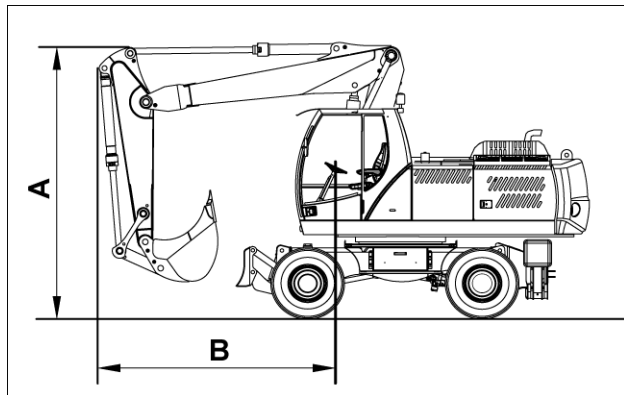
Transfer on public roads (each time you leave a yard) is allowed only with and approved configuration, complying with dimensions (A) , (B) as shown on the tables.

WX168				
MONOBOOM				
Dipper		2200 mm (86.6 in)	2600 mm (102.4 in)	3100 mm (122.0 in)
A	Maximum height	3910 mm (153.9 in)	3865 mm (152.2 in)	3870 mm (152.4 in)
B	Frontal off-set	5050 mm (198.8 in)	5020 mm (197.6 in)	5045 mm (198.6 in)
TRIPLE ARTICULATION VERSION				
A	Maximum height	3945 mm (155.3 in)	3945 mm (155.3 in)	—
B	Frontal off-set	3500 mm (137.8 in)	3035 mm (119.5 in)	—

WX188				
MONOBOOM				
Dipper		2200 mm (86.6 in)	2600 mm (102.4 in)	3100 mm (122.0 in)
A	Maximum height	3935 mm (154.9 in)	3890 mm (153.1 in)	3890 mm (153.1 in)
B	Frontal off-set	5130 mm (202.0 in)	5100 mm (200.8 in)	5125 mm (201.8 in)
TRIPLE ARTICULATION VERSION				
A	Maximum height	3970 mm (156.3 in)	3970 mm (156.3 in)	—
B	Frontal off-set	3495 mm (137.6 in)	3115 mm (122.6 in)	—



N00006N 1



N00005N 2

NOTICE: During road transfer with monoboom version the help of a flagman to signal the motion is compulsory. Car with blinking lights and flags should precede and follow the machine.

NOTICE: ITALY ROAD TRAVEL APPROVAL: travel with traffic beams and warning beacon alight (also during the day).

GERMANY ROAD TRAVEL APPROVAL: travel with traffic beams alight (also during the day).

10 - ACCESSORIES

Hydraulic Hammer

NOTE: Select a appropriate hammer model that meets the requirements of stability, flow rate and pressure of the excavator hydraulic system. Contact your authorized Dealer to select a type for hammer suitable for this machine.

SAFETY PRECAUTIONS AND OPERATING PROCEDURES

Before starting working, check that the hammer is securely fastened to the working equipment and that the hydraulic lines are correctly connected.

The hazard zone of the hydraulic hammer must be kept clear of all persons.

Dangers caused by rock fragments which could be propelled in the working area.

Close the front window of the machine before starting up the hammer.

Install the protective grating.

Wear ear protectors.

Avoid striking objects violently with the hydraulic hammer with the hazard of being damaged or to damage the attachment and the upper structure.

Before activating the hammer always lower it slowly until the tip of the chisel touches the object to strike.

Do not use the hydraulic hammer and/or the slewing action, to move objects because this could damage the working attachment.

Avoid working with excavator cylinders completely extended (fully extended or fully retracted) so as not to damage the attachment structure or the cylinders.

Stop working if hydraulic hoses are bent abnormally.

Do not operate the hydraulic hammer in water. This use may originate rust or damage seals and components of the hydraulic system.

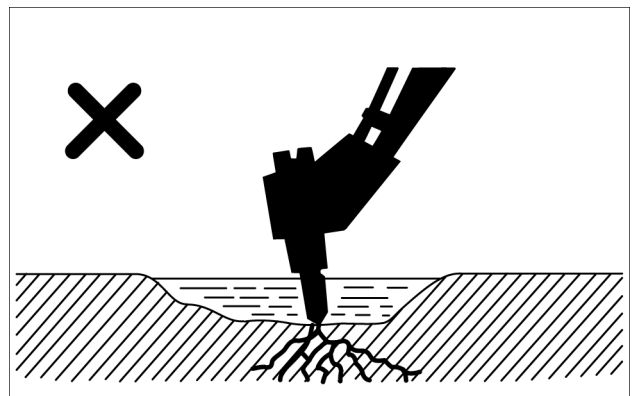
Do not use the hydraulic hammer for lifting of moving objects; the excavator may overturn and/or the hydraulic hammer could get damaged.

While working with the excavator pay attention not to strike the boom with the hydraulic hammer.

Do not use the hydraulic hammer when the dipper is positioned vertically; excessive vibrations to dipper cylinder may generate oil leaks.

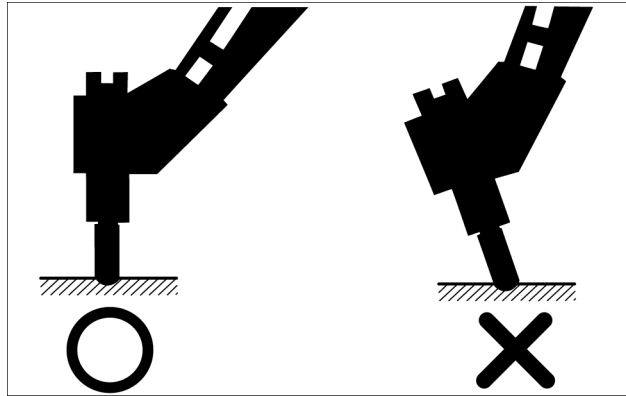


F34131N1 1



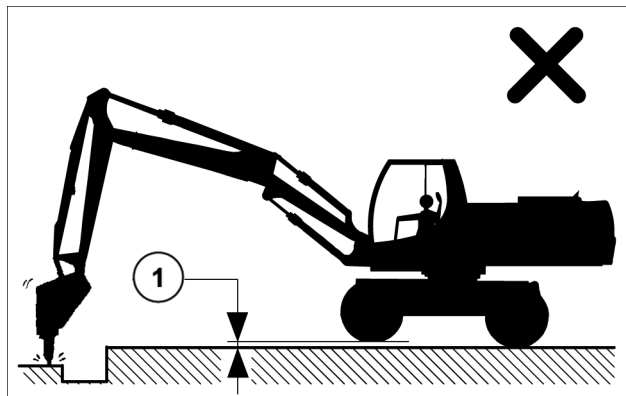
F34165N1 2

Position the hydraulic hammer with the chisel placed vertically on the material to be struck.
 The hammer should not be operated longer than one minute, because the chisel could wear down.
 If the material is not broken after one minute, position the chisel on different spots of the material.



F34166N1 3

Do not lift the front side of the undercarriage by pushing with the hydraulic hammer downward: the front attachment could get damaged. Although a lifting of **150 mm (5.9 in) (1)** of the front edge can be tolerated, perform this operation only if strictly necessary. Never exceed the **150 mm (5.9 in)** of tolerance.



F34642N2 4

USE OF HYDRAULIC HAMMER

Switching on the hydraulic hammer

Select the "Hydraulic hammer" function by depressing the rocker switch (1).

When the rocker switch is activated, the selection menu (A) is displayed for 10 s.

The display shows the hammer symbol (B), the working mode selected and the number of the selected hammer.

ATTENTION: when several hydraulic attachments are activated at the same time, the first switch setting has priority.

Hammer operation with fixed impact frequency

Place tip of chisel then switch on hammer with push button (3). The hammer works with the maximum preset hydraulic power and is on as long as the button is pressed.

NOTE: The push button for hammer operation can ONLY be operated while the following conditions are met:

- Safety lever is in down (active) position and Hammer mode is activated by rocker switch

Hammer operation with variable impact frequency

Place tip of chisel then depress pedal (2) for mono boom attachment or pedal (4) for triple articulation version backwards.

The impact frequency increases with the press on the pedal.

NOTE: The foot pedal for hammer operation can ONLY be operated while the following conditions are met:

Scenario 1: Safety Lever Up

- Hammer mode is activated by rocker switch and auxiliary pedal in Neutral position

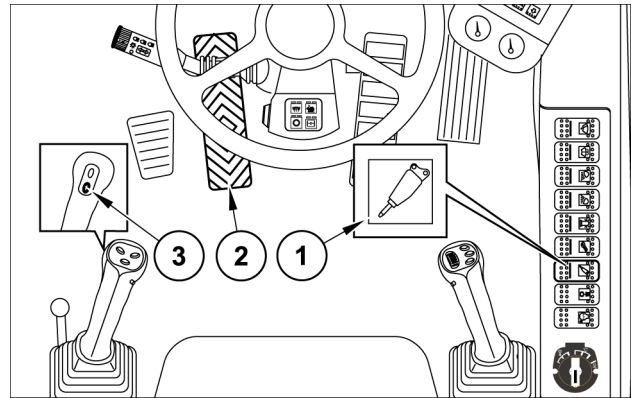
In case the pedal is not in Neutral the function is not enable. A warning message will shown on screen after the operator moves down the safety lever.

Scenario 2: Safety Lever Down

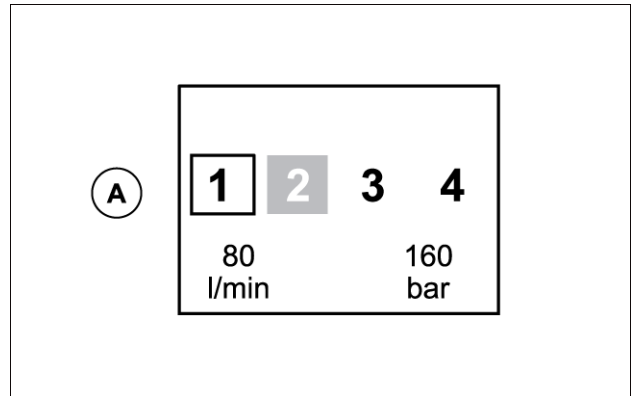
- Hammer mode is activated by rocker switch

Switching off the hydraulic hammer

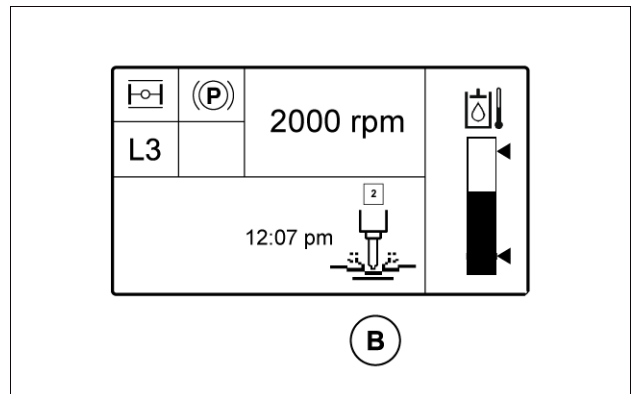
Release push-button (3) or pedal (2) for mono boom attachment or pedal (4) for triple articulation version attachment. Depress symbol face of switch (1). The illumination behind the hammer switch is off.



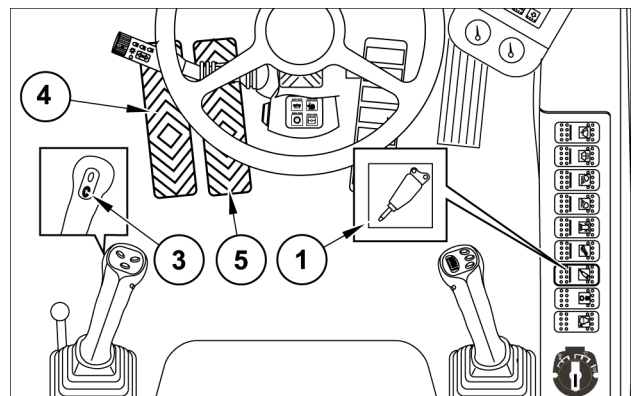
F42762N1 5



F34169N 6

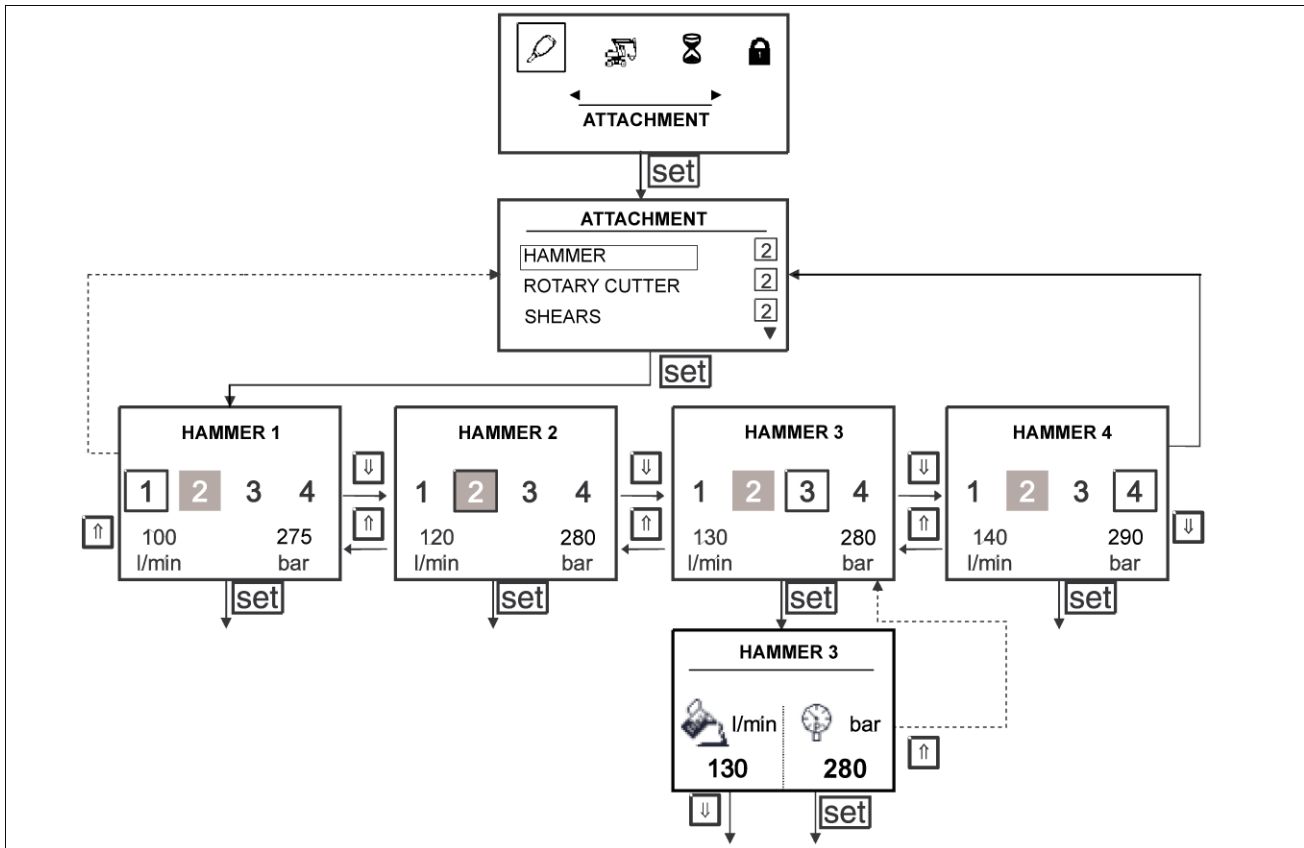


F34170N 7

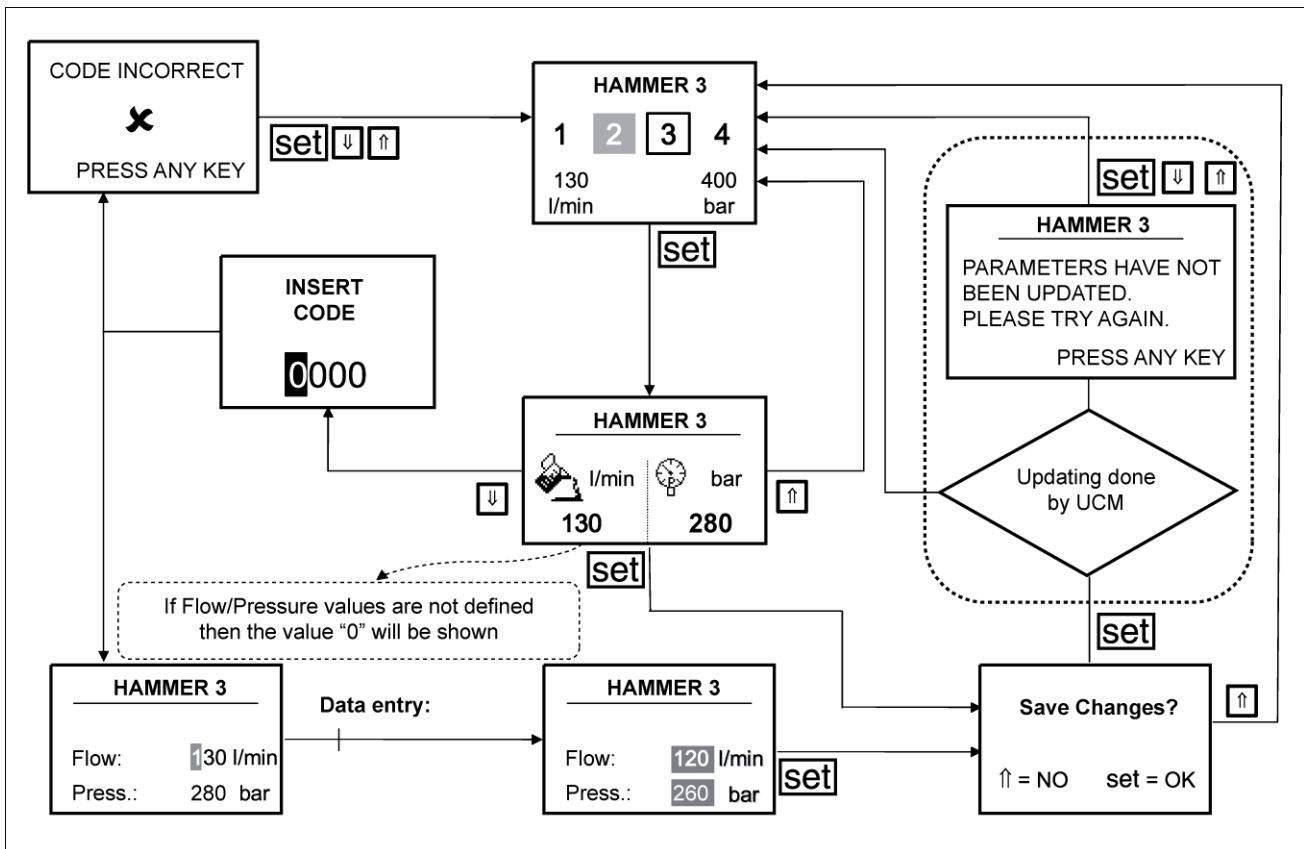


F44210N1 8

HYDRAULIC HAMMER, SETTING THE PARAMETER



F44077N 9



F34172N 10



Depending on the working conditions, up to four hydraulic oil pressure and volume flow configurations can be set for hydraulic hammer.

The machine is delivered ex factory with the following parameter settings:

- For hammer 1, the volume flow **80 l/min (21.1 US gpm)**; pressure **160 bar (2320.0 psi)**.
- For hammers 2 through 4, the preset values for pressure and flow are 0.

NOTE: *to use the hammer functions, the values specified by the hammer manufacturer must be adjusted as described below.*

In the working mode, depress an arrow key until "ATTACHMENT" appears in the display and the attachment symbol is marked by a frame. Confirm with "**set**" button. Depress the arrow key until the bar is on "HAMMER". Confirm with "**set**" button.

To get back to the "ATTACHMENT" menu, depress the button with the upward arrow  or downward arrow button , until the beginning or the end of the display selection is reached.

The return to the next higher menu is automatic if the buttons are not pressed for a prolonged period.




Confirm with "**set**" button, the sub-menu "HAMMER" is recalled.

The grey number field indicates actually active hammer 2 with the selected parameters for volume flow and pressure.


By means of the arrow buttons, you can set 4 different hammer settings. The selection is marked by a frame around the number.

In the example shown hammer 3 is preselected. Depress "**set**" to confirm the selection of hammer 3.

To activate the settings for hammer 3 without any changes, depress button "**set**".

If the settings for hammer 3 are to be changed, depress the downward arrow button . Enter the four digit code and change the settings with the arrow buttons. Depressing the upward arrow button , the number increases by one unit. By depressing the button with the downward arrow , the number decreases by one unit. By depressing button "**set**", the setting is confirmed and the cursor slides to the right. When the cursor is on the last digit of a set value, a press on the "**set**" button moves it on to the first digit of the next set value.

After changing the set values, depress the "**set**" button. The following options are available:

- to reject selected hammer 3 and to retain the settings for hammer 2. Depress the button with the upward arrow  ;
- to activate hammer 3 with the changed settings. Depress the "**set**" button. The setting is saved.

The arrow buttons always scroll to higher menu. The return to the next higher menu is automatic if the buttons are not pressed for a prolonged period.

For queries concerning the hydraulic oil volume flow and oil pressure settings or the specified setting range please contact our Service Department.

Hydraulic Shears

SELECTING THE HYDRAULIC SHEARS

If a hydraulic shears has to be fitted on the machine, it is important to choose a model satisfying the stability of the machine, pressure and oil quantity requirements of the hydraulic system.

ATTENTION: For the selection of the hydraulic shears type most suitable to the machine features, address to Dealer as well as for the adjustment of power supply and service pressure required by the selected tool.

Before starting working, check that the shears are securely fastened to the working equipment and that the hydraulic lines are correctly connected.

The hazard zone of the hydraulic shears must be kept clear of all persons.

Risk of flying or falling rock fragments.

Close the front window of the machine before starting up the shears.

Install the protective grating.

Never support the machine weight by prying on the hydraulic shears and the cylinders completely extended or retracted because this could damage the front attachment. In particular, with shear cylinder completely extended, the front attachment can get damaged more easily.

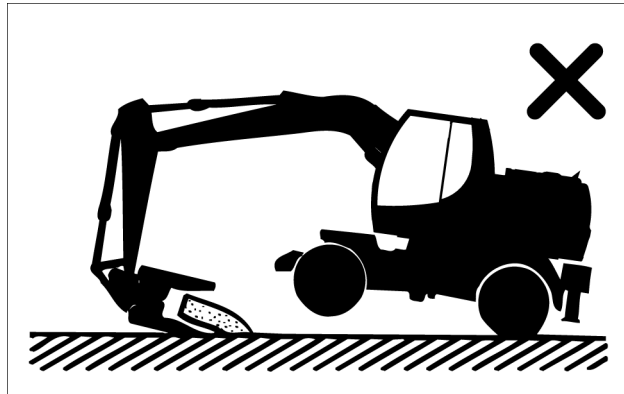
The hydraulic shears must be used with front attachment oriented towards the longitudinal position of the excavator. The use of other orientations could impair machine stability and originate risks of overturning.

When you work with the hydraulic shears oriented upwards and the boom extended pay attention to the fall of debris.

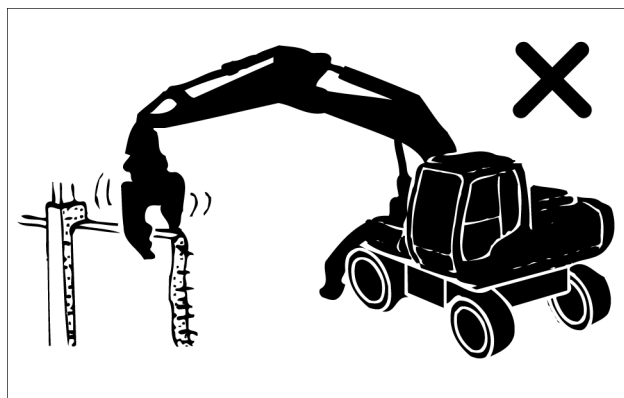
When you work with the hydraulic shears on a building floor, always check that the floor is strong enough to support the shear weight summed to the machine weight.

The excavator must always work on levelled and stable soil. Never work on material debris or inclined surfaces.

Always disassemble the shears from the excavator before beginning the transport.



F34173N1 1



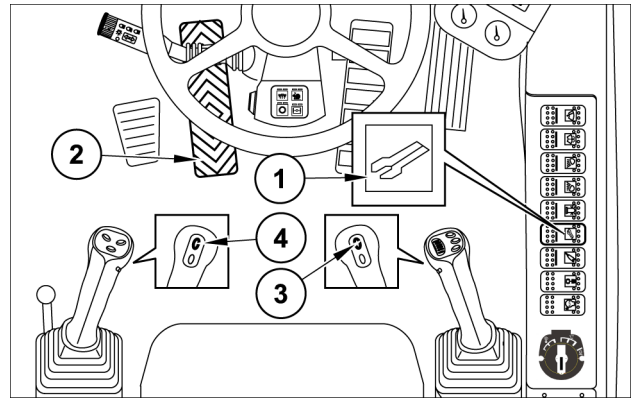
F34174N1 2

USE OF HYDRAULIC SHEARS

Switching on the hydraulic shears

Preselect "Hydraulic shears" with rocker switch (1) on the right side of the cab. Depress the blank face of switch, switch backlighting is on.

Once the function is set, the display shows for 10 seconds menu (A) for the selection of 4 different shear types. The shear can now be selected.



F44211N1 3

Monoboom attachment

To close the shears: press pedal forward (2).

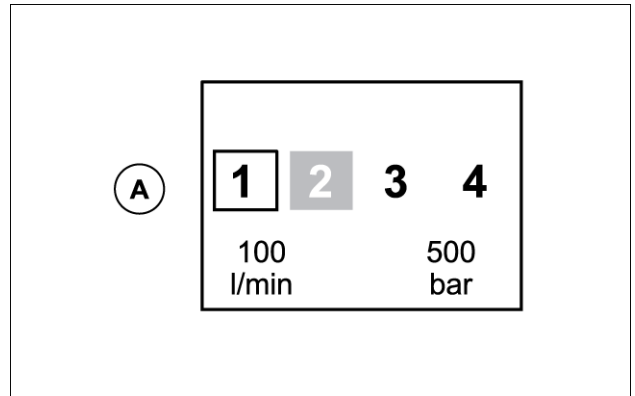
To open the shears: press pedal backward (2).

Triple articulation version

To close the shears: press pedal forward (5).

To open the shears: press pedal backward (5).

Pedal (6) controls the adjusting cylinder function.

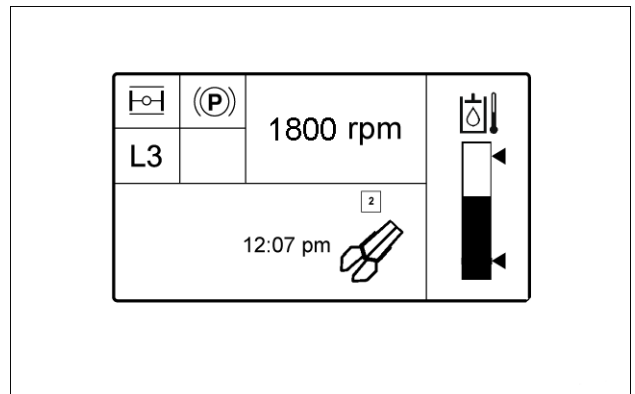


F34176N 4

Hydraulic shears slewing

To slew the shears to the right: depress button (3) of right hydraulic control lever.

To slew the shears to the left: depress button (4) of left hydraulic control lever.



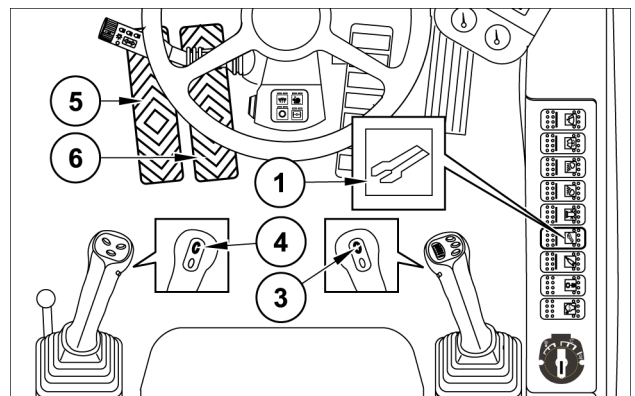
F34177N1 5

Switching off the hydraulic shears

Release pedal (2) in monoboom attachment.

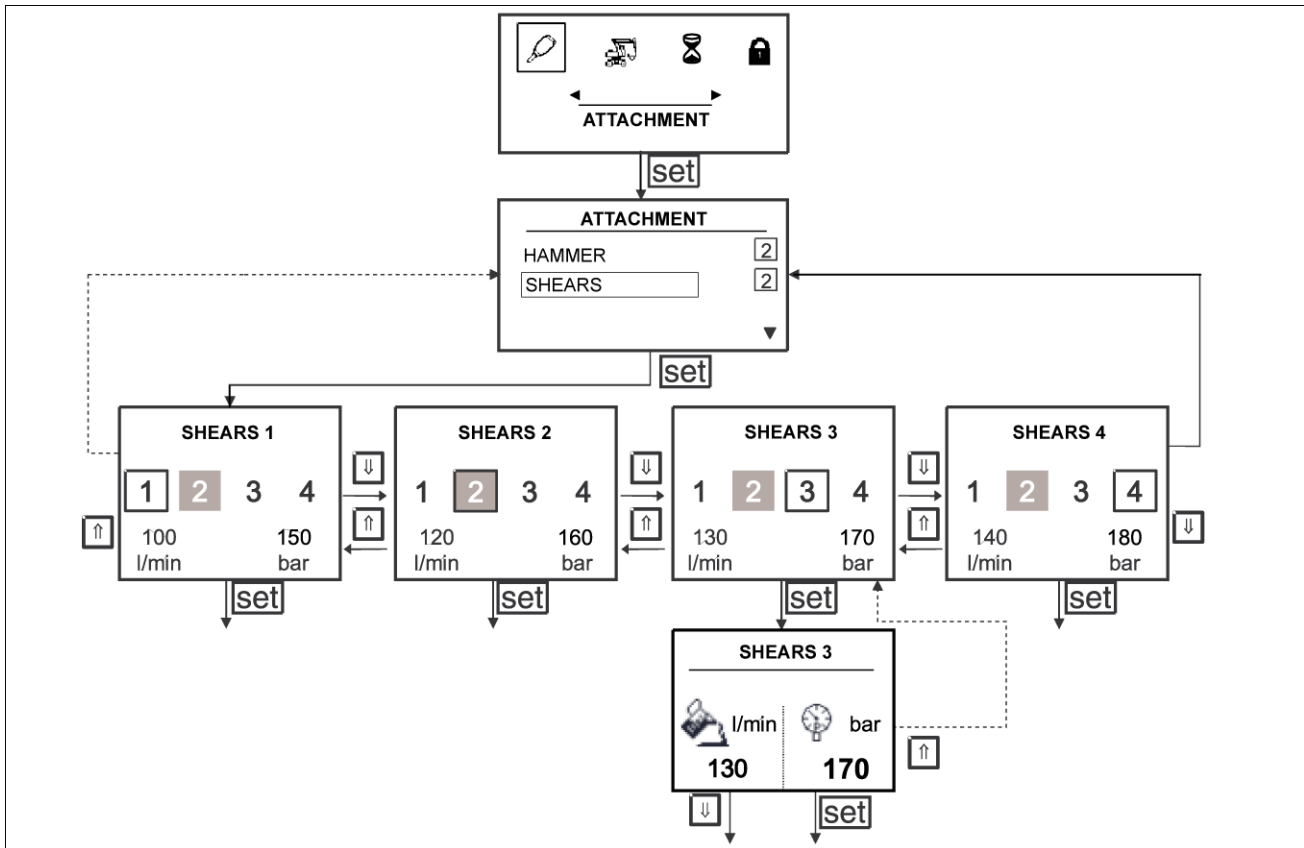
Release pedal (5) in 2 piece boom attachment.

Disconnect switch (1). (Depress the symbol face of switch, switch backlighting is off).

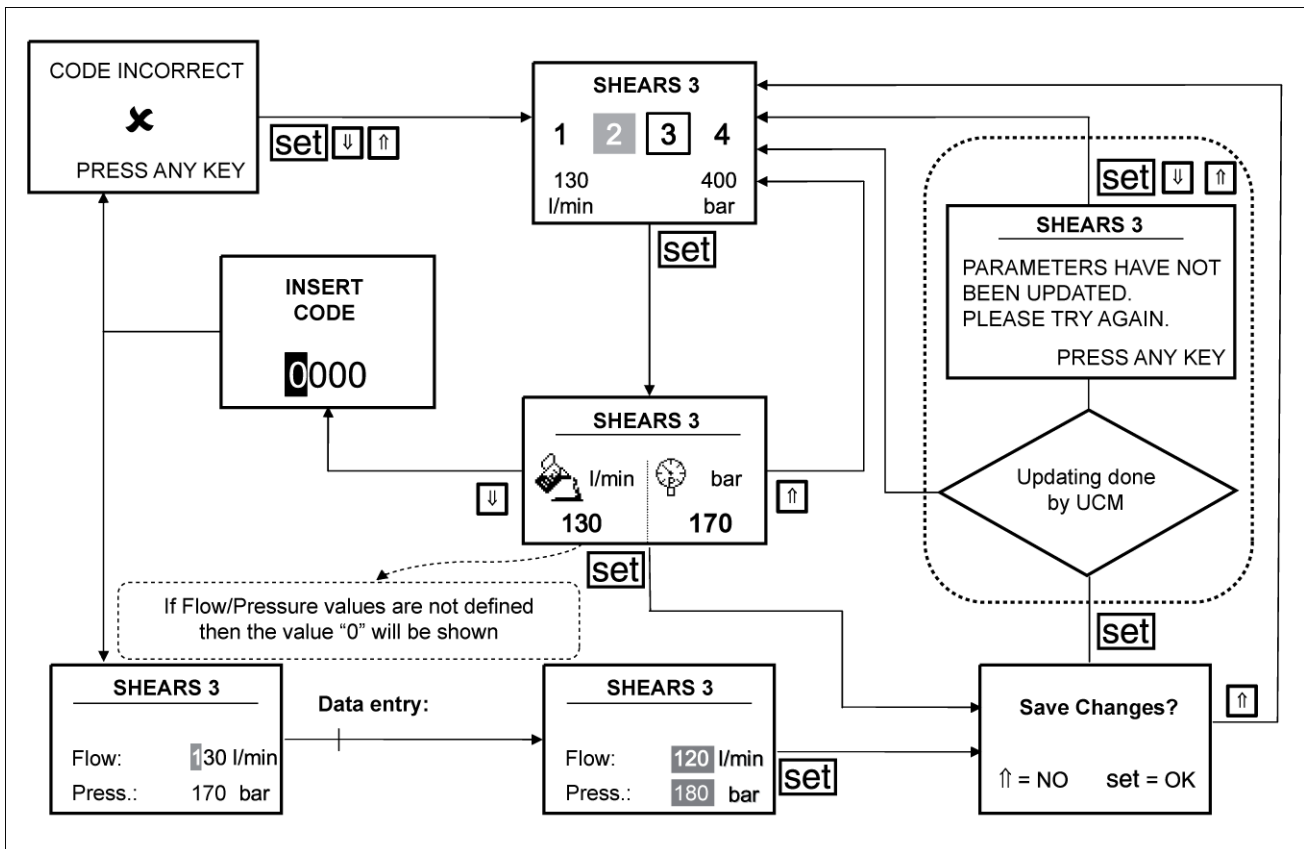


F44212N1 6

HYDRAULIC SHEARS, SETTING THE PARAMETERS



F44078N 7



F34179N 8

Depending on the working needs and conditions of use, up to four hydraulic oil pressure and volume flow configurations can be set for hydraulic shears.

For the first configuration - shear 1 - the machine is delivered ex factory with the following parameter settings:

- volume flow unlimited (9999);
- pressure unlimited (9999)



For shear 2 through 4, the preset values are:

- volume flow unlimited (9999);
- unlimited pressure 0 bar

NOTE: to use the shears functions, the values specified by the shears manufacturer must be adjusted as described below.

In the working mode, depress an arrow key until "ATTACHMENT" appears in the lower part of the display and the attachment symbol is marked by a frame. Confirm with "set" button.

Depress the arrow keys until the bar is on "SHEARS". Confirm with "set" button.

To get back to the "ATTACHMENT" menu, depress the upward arrow button  or downward arrow button , until the beginning or the end of the display selection is reached.


When scrolling is continued on reaching the beginning or the end of the list, the program returns to the next higher menu. The return to the next higher menu is automatic if the buttons are not pressed for a prolonged period.




Confirm with "set" button, the sub-menu "SHEARS" is recalled. The grey number field indicates actually active shears 2 with the selected parameters for volume flow and pressure.

By means of the arrow buttons, you can set 4 different shears settings. The selection is marked by a frame around the number. In the example shown shears 3 is preselected.

Depress "set" to confirm the selection of shears 3.


To activate the settings for shears 3 without any changes, depress the "set" button. The following options are available:

- to reject selected shears 3 and to retain the settings for shears 2.
Depress the button with the upward arrow  ;
- to activate selected shears 3 with unchanged settings.
Depress the "set" button. The setting is saved.

If the settings for shears 3 are to be changed, depress the downward arrow button . Enter the four digit code and change the settings with the arrow buttons. Depressing the upward arrow button , the number increases by one unit. By depressing the button with the downward arrow , the number decreases by one unit. By depressing button "set", the setting is confirmed and the cursor slides to the right. When the cursor is on the last digit of a set value, a press on the "set" button moves it on to the first digit of the next set value.

Both for pressure and volume flow limit values are preset. If during the setting phase they are exceeded, the indication sets to value 9999 (pressure or volume flow unlimited). With reset (button with downward arrow), the previous value, lower than the limit value, is restored.

After changing the set values, depress the "set" button. The following options are available:

- to reject selected shears 3 with the newly selected values and to retain the setting of shears 2.
Depress the button with the upward arrow  ;
- to activate shears 3 with the changed settings: depress the "set" button. The setting is saved.

The arrow buttons always scroll to higher menu. The return to the next higher menu is automatic if the buttons are not pressed for a prolonged period.

For queries concerning the hydraulic oil volume flow and oil pressure settings or the specified setting range please contact our Service Department.

Low flow operation

The operator can control the “Low flow” optional function to proportionally change the delivery to the auxiliary attachment in use (e.g.: cutter, shears, etc.).

The “Low flow” system is controlled by means of the slider **(1)**:

by moving the slider to the right, delivery is increased on the right side of the “Low flow” valve, from value 0 to a defined value, through the position of the slider;

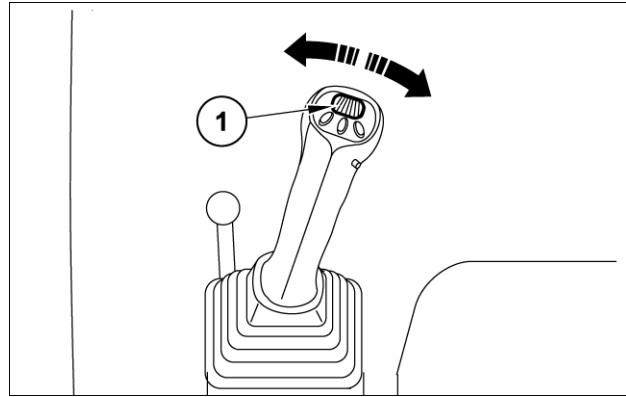
by moving the slider to the left, delivery is increased on the left side of the “Low flow” valve, from value 0 to a defined value, through the position of the slider. By releasing the slider to neutral position, the operation of the auxiliary equipment is stopped.

The “Low flow” system operates **ONLY** with the safety lever in active position.

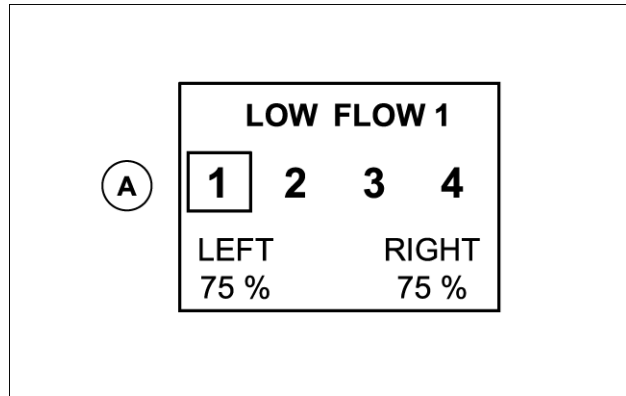
At the beginning of a job, the first time the safety lever is lowered, the display shows for 10 seconds the menu **(A)** for the selection of 4 possible values:

- Low Flow 1: 75%
- Low Flow 2: 100%
- Low Flow 3: 50%
- Low Flow 4: 25%

NOTE: these values represent the percentage of maximum values of flow. They are changeable with the same procedure as described in previous pages.



F44213N 1



F44214N 2

Quick coupler

SAFETY INSTRUCTIONS

Do not use the quick coupler before to have read carefully and well understood the instructions and safety prescriptions, indicated in this Manual.

During the machine operation, the switch for quick coupler locking and unlocking must always be set to "locked" position.

Check daily that the quick coupler does not show hydraulic oil leak. Possibly tighten the connectors or replace the concerned parts.

Never use your hands to search for hydraulic fluid leaks, use piece of paper or cardboard. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury.

A defective coupler could injure you or others. Do not operate a defective coupler.

Check that the safety rod operates correctly and that it is not jammed because of debris. Clean the locking system.

Each time the bucket is fitted on the quick coupler, close the bucket and lift the attachment, to check visually and make sure that the bucket pin is correctly fitted into the hooks.

The quick coupler modifies the machine operating range. In particular positions the attachment can hit the machine, therefore it has to be operated always at a certain safety distance.

The loads handling must always be performed in strict conformity with the instructions given in this Manual and in conformity with the rules in force.

During the handling of loads, never use the front and rear anchoring points, as they are necessary to fit the tool on the quick coupler.

The use of the quick coupler for works other than those for which it has been designed are prohibited. Never use the quick coupler as a hammer. Never use the quick coupler to sweep or level the ground or to move objects.

Never put your hands inside of the quick coupler and never try to adjust or repair it while the engine is running.

Unauthorized modifications of the quick coupler can cause serious injuries. Never perform any modification without prior approval of the Dealer. Any modification carried out, must be in conformity with the machine's technical specifications and must conform to current safety regulations.

To ensure the safe operation of the quick coupler you must place the coupler decal in the machine cab where it can be seen clearly.

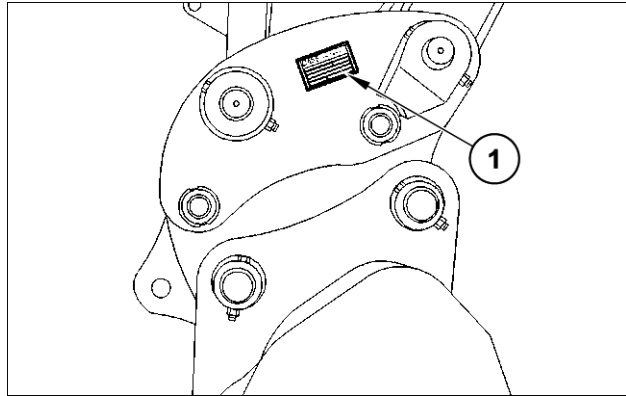
Do not smoke whilst working on the hydraulic system.

ATTENTION: *quick couplers extend the length of the dipper arm and with certain attachments could hit the cab in some positions. Check this before operating the machine.*

IDENTIFICATION PLATES

When ordering spare parts or when needing information or assistance, it is always necessary to give the local Dealer all references as regards the type and the serial number of the relevant quick coupler.

The serial number, weight and safety working load (**SWL**) of the coupler are reported on the plate **(1)** located on the quick coupler side.



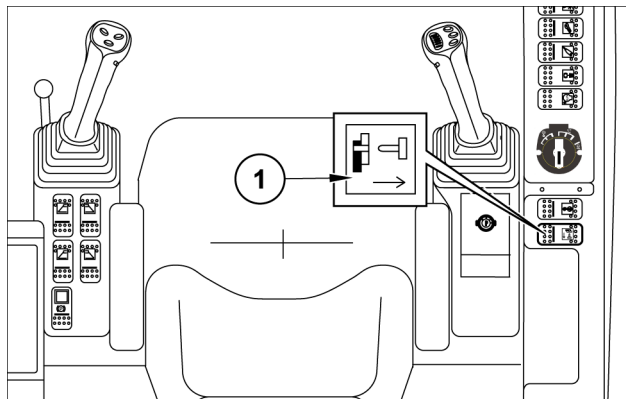
F34479 1

CONTROL SWITCH

On the control panel to the right of the cab seat, is installed switch **(1)** for quick coupler control.

Quick coupler activation (locking) by depressing blank face of switch **(1)**.

Quick coupler deactivation (unlocking) by depressing symbol face of switch **(1)**.



F42770N1 2

QUICK ASSEMBLY AND DISASSEMBLY

ASSEMBLY

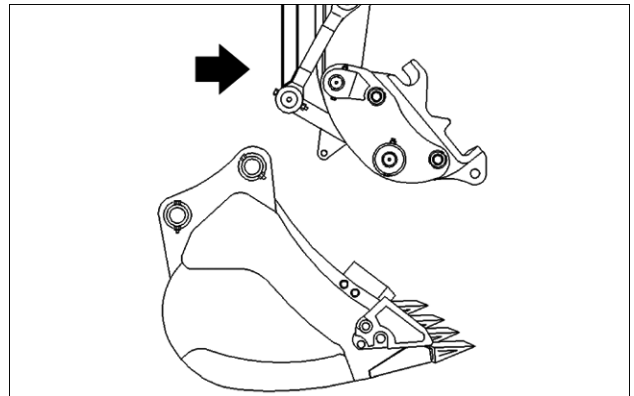
Make sure that the attachment to be fitted is standing firmly on a flat surface and that it is equipped with pins delivered with the quick coupler.

Set the switch to unlocking position. The acoustic alarm sounds.

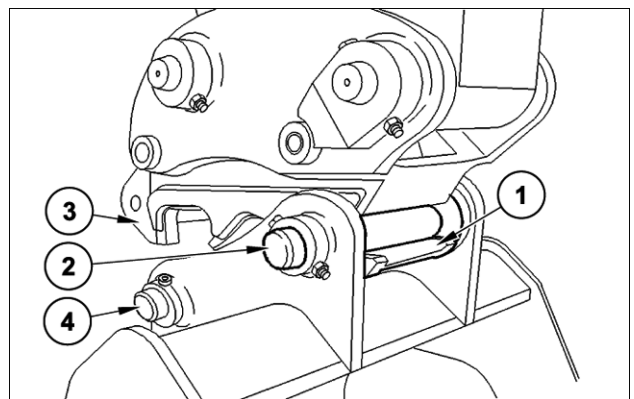
By handling on the hydraulic control levers, place the dipper to vertical position, slightly tilted toward the cab, so as to release the safety device.

Pull out the bucket cylinder rod completely and hold it under pressure, to allow the locking hook to retract.

Use the hydraulic control lever of dipper to guide the quick coupler hook (1) onto the bucket pin (2).

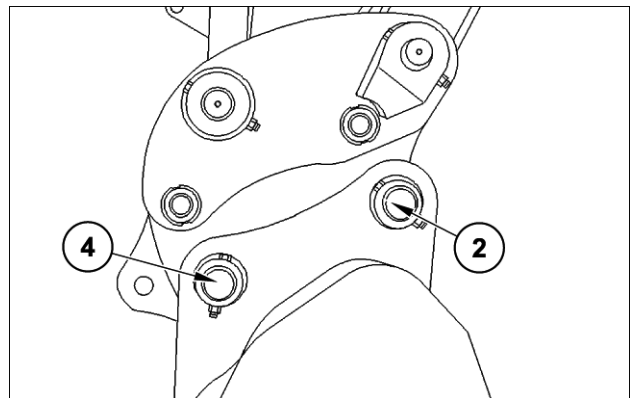


F34397 3



F34398 4

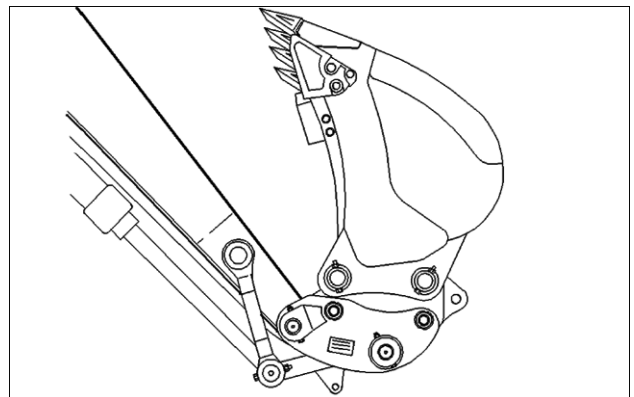
Move the bucket hydraulic control lever in such a way that the pin (2) fits completely into the locking hook and pin (4) sits in the hook (3).



F34481 5

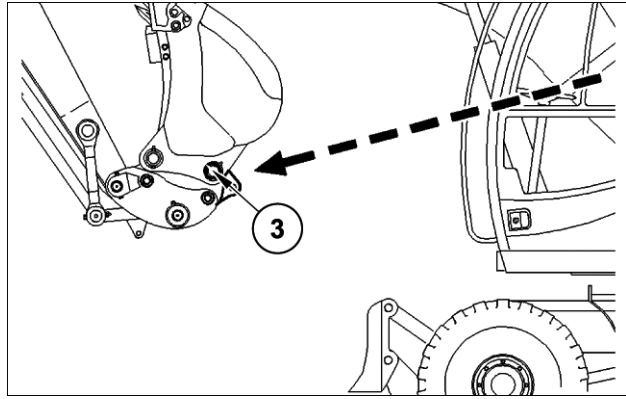
Lift the dipper and retract completely the bucket cylinder rod.

Set the switch to locking position. The acoustic alarm stops sounding.



F34400 6

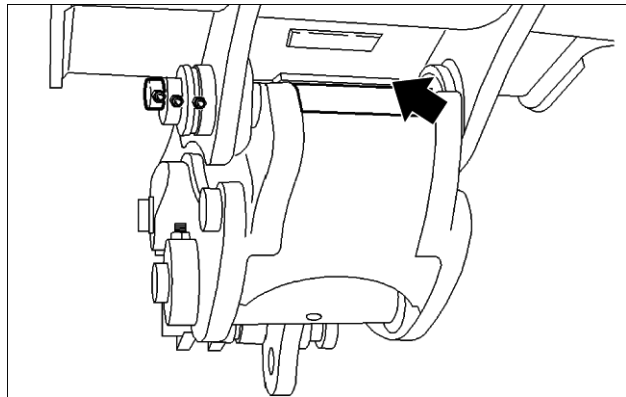
Keep the bucket cylinder under pressure so as to allow the closure of the locking hook. Lift the working attachment so that the bucket pin (3) becomes visible.



F34401 7

By means of a visual check, verify that the bucket pin is correctly fitted into the locking hook.

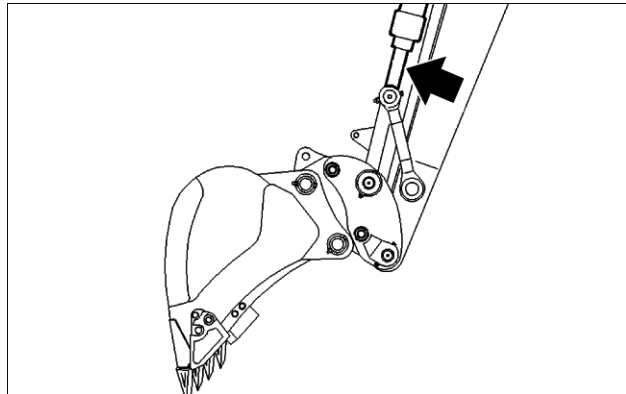
NOTICE: if a visual check is not possible when sitting, dismount from the machine and check if the working attachment is properly secured with the safety device hooked.



F34402 8

To allow the engagement of the safety device, retract completely the bucket cylinder rod, by moving the bucket hydraulic control lever.

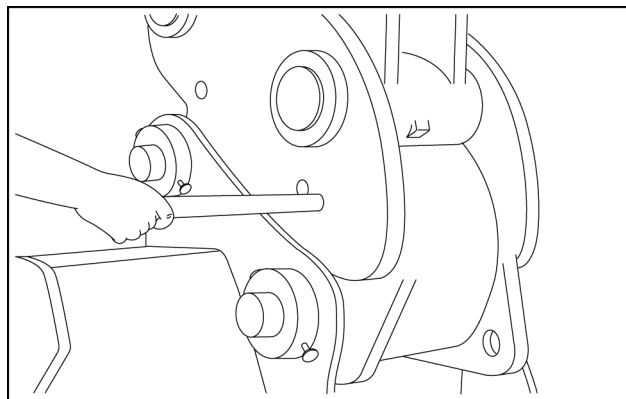
ATTENTION: If the bucket pin have not been correctly engaged the locking hook **MUST NOT** be retracted. This could results in machine damage and personal injury.



F34403 9

If the locking hook is correctly engaged the manual back up safety pin must be inserted.

NOTICE: The safety pin must be fitted by hand pressure only not hammered or forced into position. Once the safety pin is in place, insert the cotter pin into the end of the safety pin to secure it.



SMIL12WEX0078AB 10

DISASSEMBLY

By moving the dipper hydraulic control lever, place this one to vertical position, slightly tilted toward the cab, so as to release the safety device.

By moving the bucket hydraulic control lever, lean the bucket on the ground on a flat and firm surface.

Set the switch to unlocking position. The acoustic alarm sounds.

Remove the cotter pin and the safety pin.

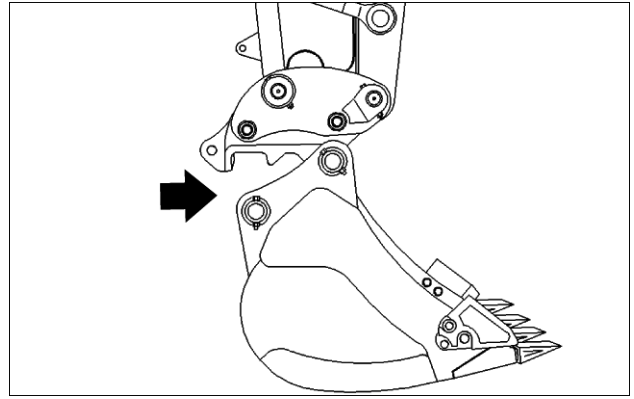
Pull out the bucket cylinder rod completely and hold it under pressure, to allow the locking hook to retract.

Lift the dipper and leave the bucket on the ground.

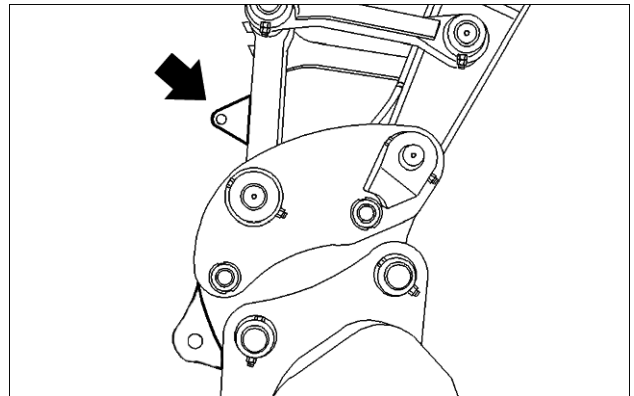
HANDLING OF LOADS

When lifting loads, the ropes and chains have to be secured to the proper lifting eyes of the bucket link or quick coupler.

NOTICE: the maximum load carrying capacity is showed in the table load decal applied in the cab.



F34404 11



F34405N1 12

Clamshell bucket system

SAFETY INSTRUCTIONS

The hazard zone of the clamshell must be kept clear of all persons.

Never try to change the clamshell position or its support with your hands.

The bucket link when blocked should not be used to lift weights.

The safety pin could get bent or break.

Use the safety hook or the clamshell lifting eyes or remove the safety pin, until you have to move loads.

CLAMSHELL ASSEMBLY

ATTENTION: Before performing the assembly, check if the clamshell and the machine are filled with the same hydraulic oil or with oil mixed. Otherwise, drain oil from the hydraulic system of the clamshell.

Retract the bucket cylinder and assemble the lock pin for the bucket link (1).

NOTE: after installation of the lock pin, the bucket cylinder should not be extended, because this operation could damage the pin and also the bucket link.

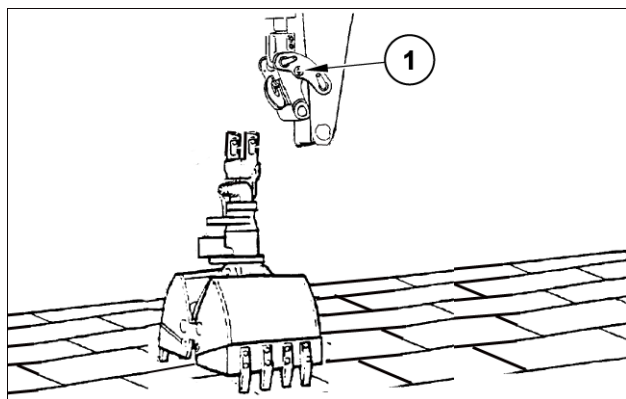
Stop the engine and bring the starter switch key to position "I".

Relieve the pressure from the hydraulic hoses for the clamshell.

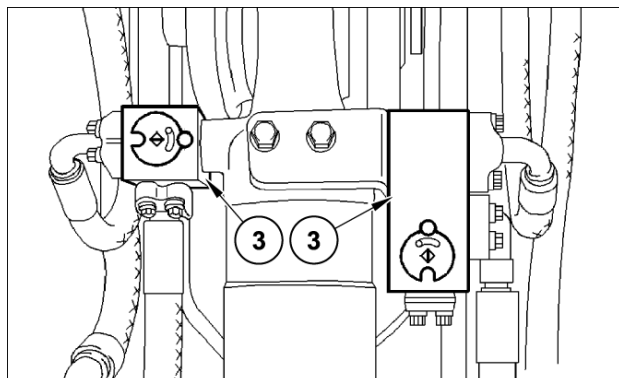
Deactivate the controls by means of the safety lever.

Set the marker grooves on the valves squares (3) as shown in the picture.

NOTE: the symbols of clamshell are shown into the grooves.



F00336N 1

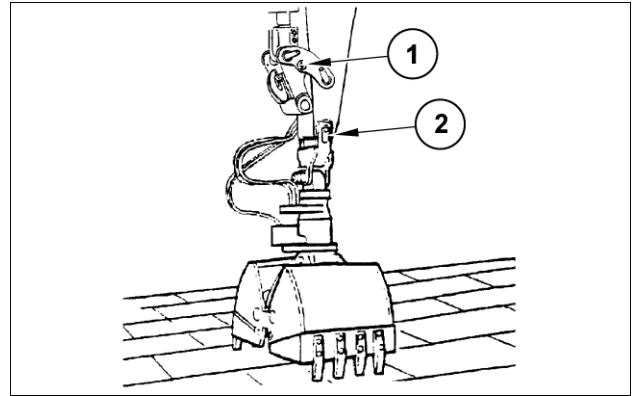


F44092N 2

Clean and grease pin and bushes.

Drive the machine towards the clamshell.

Insert dipper into grab bearing, push bearing pin (2) home and secure it.



F00019N 3

Shut off engine and relieve hydraulic pressure from clamshell hoses.

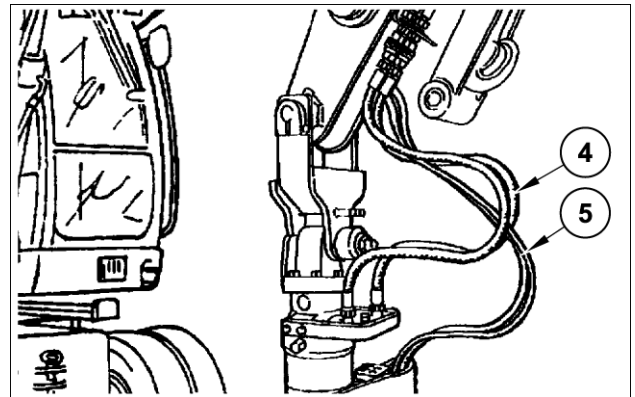
Clean quick couplers on clamshell and dipper.

Connect the hydraulic hoses of the clamshell cylinder (4) and of the clamshell rotation function (5).

Check that quick couplers are perfectly engaged.

Grease all nipples on clamshell and gearing of clamshell rotating mechanism.

Start the engine and lift the clamshell from the ground.



F42765N 4

Bleed clamshell hydraulic system by opening and closing the clamshell repeatedly and by turning it clockwise and counterclockwise.

CLAMSHELL DISASSEMBLY

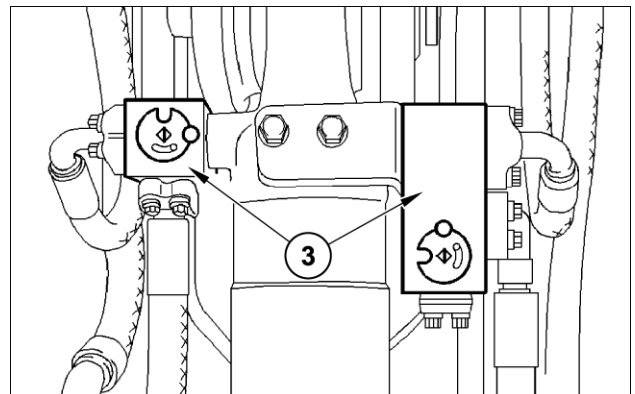
Completely open clamshell valves and rest the clamshell on the ground.

Shut off the engine, turn the starter switch key to position "I".

Relieve the pressure from the hydraulic system.

Turn the starter switch key to position "0".

Disconnect hydraulic hoses (4) and (5) and quick couplers.



F44132N 5

Protect quick couplers of clamshell and dipper from dirt by applying the dust cups.

Unscrew the pin's mechanical lock (2) and extract the pin.

Start the engine.

Disassemble the lock pin for the bucket link (1).

To switch over the working attachment from clamshell to bucket: set the marker grooves on the valves squares (3) as shown in the picture.

NOTE: the symbols of cylinder are shown into the grooves.

Bucket hook

SAFETY INSTRUCTIONS

The machine can be used to carry loads only if equipped and approved for this task.

The machine must be equipped with overload warning system and pipe break protection valves and with an approved load hook or load eye.

Before starting the work, activate the overload warning system.

During the lifting or transfer of a load, the personnel must stay or walk near the machine but out of the danger area. The operator must keep visual contact with other persons in the working area.

Use only tested and efficient lifting device with an adequate load capacity.

During transfer do not hang a load over a person but transfer the same by keeping it as close as possible to the ground to avoid its swinging.

The machine must never be driven with a slung load unless the road surface is even and the roadway is clearly visible. The visibility in the passage area can be improved, by shifting the boom and by turning the upper structure to the right. Once the upper structure is turned, block the floating axle.

If the hook is installed on the bucket link pay particular attention to following: the bucket link components must be connected with a lock pin, if an attachment other than the bucket is installed (e.g. the clamshell).

In this case the hook cannot be used to lift loads.

The pin is not designed for such situations, therefore it could bend or break abruptly. In this case the bucket link and the hanging load start suddenly to swing.

USE OF THE HOOK

In order to use the bucket with craning function, buckets and bucket links with hook welded are available (optional).

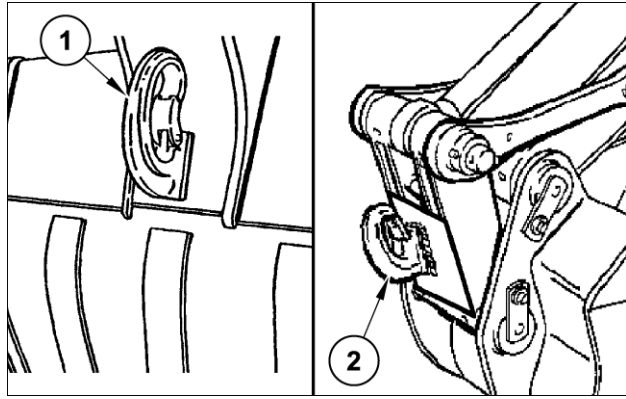
▲ WARNING

Falling object hazard!

Never weld hooks or lugs on the bottom plate of the bucket for handling operations. The connecting rod eye is the only authorized attachment point. Always have a bucket installed when using the connecting rod eye.

Failure to comply could result in death or serious injury.

W0246A



F34195N 1

LOAD CARRYING CAPACITY OF HOOK

The maximum load carrying capacity of the hook is indicated on the same hooks (1) and (2).

ATTENTION: the maximum load carrying capacity of the machine is showed in the table load decal applied in the cab. Do not exceed these values.

Overload warning system

Hydraulic excavators used for lifting operations or for transporting loads must be equipped with an overload warning system and pipe break protections in the lifting cylinders of the working equipment.

During these operations the overload warning system must be activated.

When the admissible load moment is exceeded, the red warning lamp (1) lights up. The buzzer sounds at the same time. The display shows the OVERLOAD! text (2).

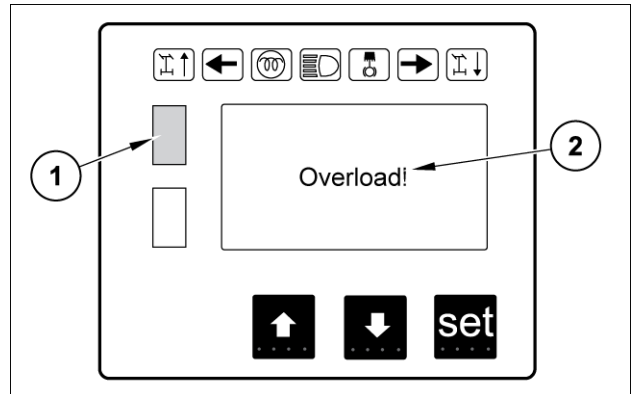
ATTENTION: The overload warning system sends exclusively acoustic and visual indication on the display to avoid the machine overturning.

When the warning system sounds:

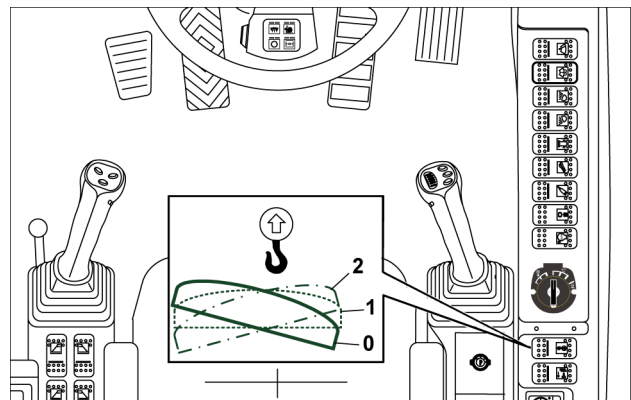
- lower the load immediately;
- reduce the working radius or the load.

SETTING THE OVERLOAD WARNING SYSTEM INTO OPERATION

The rocker switch is latched in three positions:

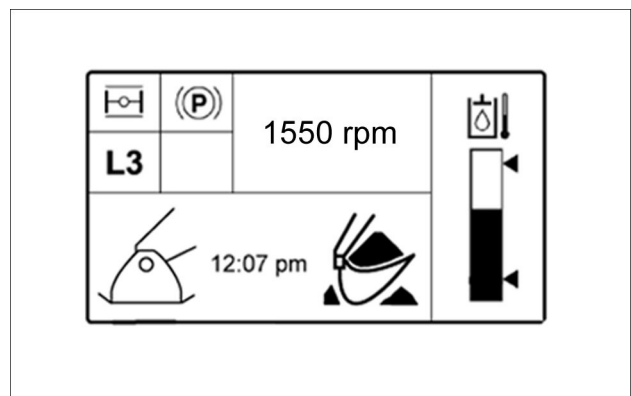


F34197N1 1




F00312N1 2

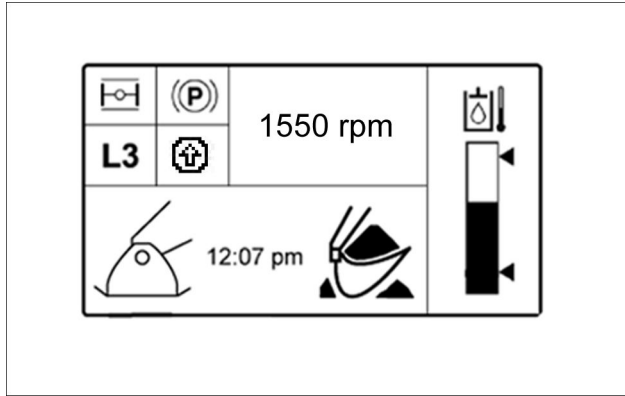
0 = neutral position: the overload warning is OFF and no overload symbol is displayed. The lamp of rocker switch is turned off.



F00405N 3


1 = overload warning with stabilized machine: the overload warning with settings for stabilized machine is active.

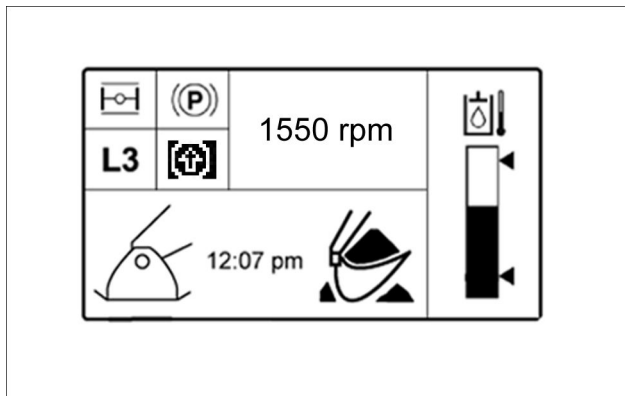
The symbol for overload stabilized  displayed. The lamp of rocker switch is turned on.



F00403N 4

2 = overload warning with unstabilized machine: the overload warning with settings for unstabilized machine is active.

The symbol for overload unstabilized  is displayed. The lamp of rocker switch is turned on.

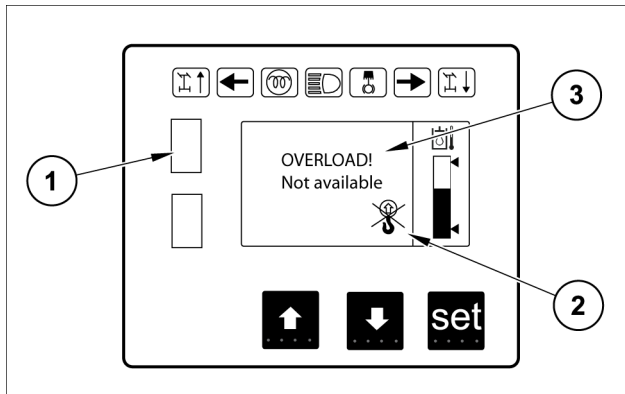


F00404N 5

Failure mode:

If one failure is detected an error message is displayed:

- The red lamp (1) lights on
- The warning "Overload not available" (3) with the overload symbol crossed out (2) shows up on display for 3 seconds.
- The yellow light is permanently ON & beeps with a frequency of yellow error.



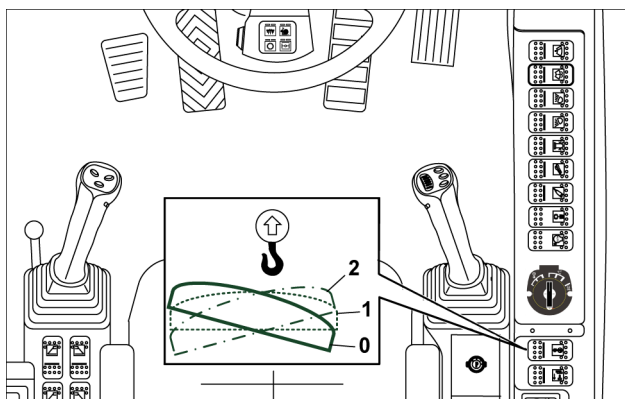
F00406N1 6

OVERLOAD WARNING SYSTEM CHECK

The overload warning system has to be checked:

- every day before beginning the work;
- every time before using the machine for lifting.

Push the rocker switch into 2 position.

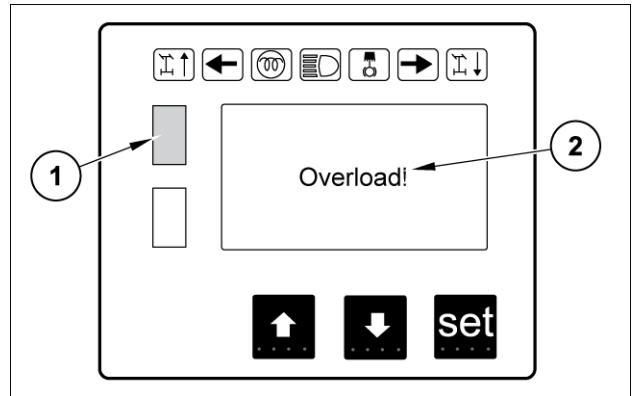


F00312N1 7

Raise the boom to the highest position and move against block.

Warning lamp **(1)** lights up and an acoustic warning is sounded. The display shows the "overload!" text **(2)**.

If a fault occurs, have the overload warning system checked and repaired immediately by our Service Department.



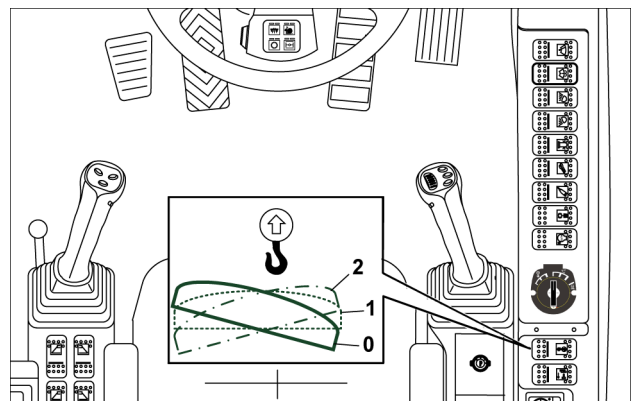
F34197N1 8

OVERLOAD WARNING SYSTEM DEACTIVATION

If the machine has to be used exclusively for digging and not for craning, the overload warning system can be deactivated.

Push the rocker switch in neutral position **(0)**.

Now the overload warning system is deactivated.



F00312N1 9

Control valve operation

HOSE BURST CONTROL VALVE

The break protection valves (1), (2) and (3) prevent the working attachment from lowering in case of a hydraulic hose breaking on the head side of the boom cylinders.

The hydraulic connection of boom cylinder head is cut out, so that hydraulic oil can flow back from this point only if the "boom lowering" control is activated.

Also the upper and dipper cylinders can be equipped with pipe break protection valves.

If hydraulic pipe breaks, carry out the following operations:

Set hydraulic control lever for "Boom lowering", or the pedal for "Boom lowering" to idle position.

Alert people nearby with the horn.

The working attachment area with lifted load has to be ensured so as nobody can stay under the working attachment or under the load or in proximity of the hydraulic hose broken.

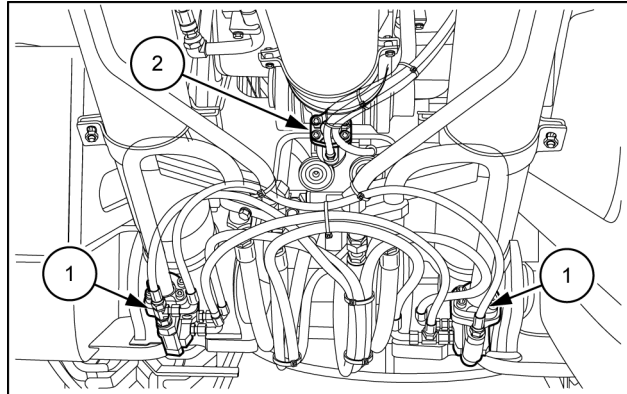
When the working attachment and the load are lowered to the ground, oil comes out from the broken spot of the pipe.

Place the working equipment and the load carefully on the ground.

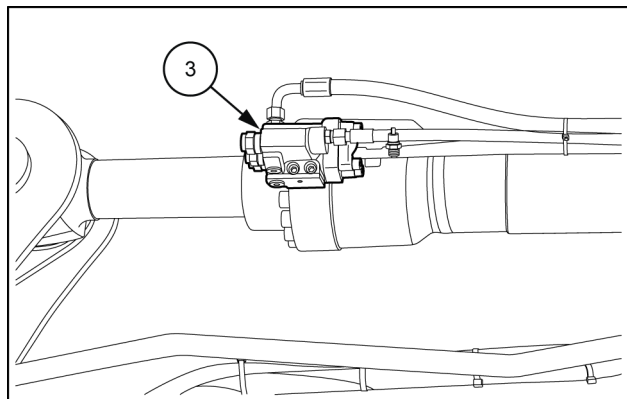
Replace the broken hydraulic hose.

Only after replacement, resume the work.

Escaping hydraulic oil and possible rags have to be discarded without polluting the environment.



SMIL12WEX0068AB 1



SMIL12WEX0069AB 2

Filling the fuel tank

If the machine is refuelled often or regularly with fuel from cans or barrels, there is an increased risk of foreign matter and water getting into the fuel system.

In this case:

- always refuel through a fine mesh filter;
- user only intake hoses with a fine mesh filter;
- drain off water from the fuel filter more often than specified in the maintenance schedule.

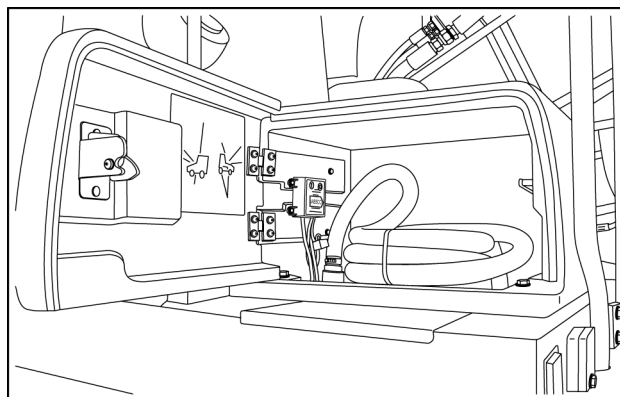
ATTENTION: *refuel only with decanted fuel. We suggest to refuel at the end of each working day, condensation will so be avoided during overnight down-time. Do not let the tank run out of fuel because air could penetrate inside of the supply circuit and would require the air bleeding.*

By means of the refuelling system, fuel can be pumped from a large spare container into the machine tank.

ATTENTION: *Before refuelling, the tank cap must be opened to avoid overpressure in the tank and risks of dangerous fuel leaks.*

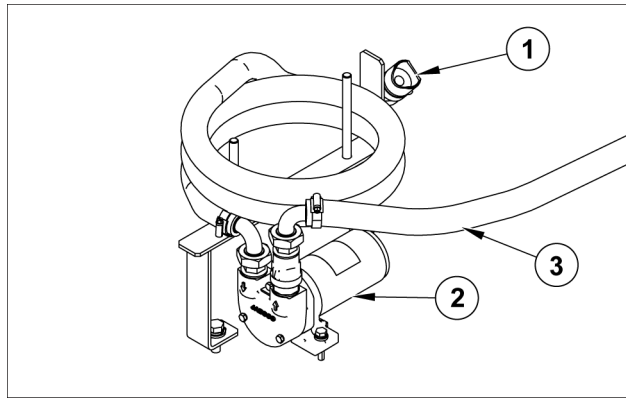
ATTENTION: *Read and observe: refuelling with the refuelling system, safety instructions.*

The refuelling system is installed on the right side of the machine.



SMIL12WEX0076AB 1

The fuelling system consists of an inlet hose (1), an electrically driven fuel pump (2), the filling hose (3) for the fuel tank and the switch box (4).



F00428N 2

One end of the intake hose is firmly attached to the pump, whereas the other end is located in a holder.

The filling hose is firmly attached to the pump and the fuel tank.

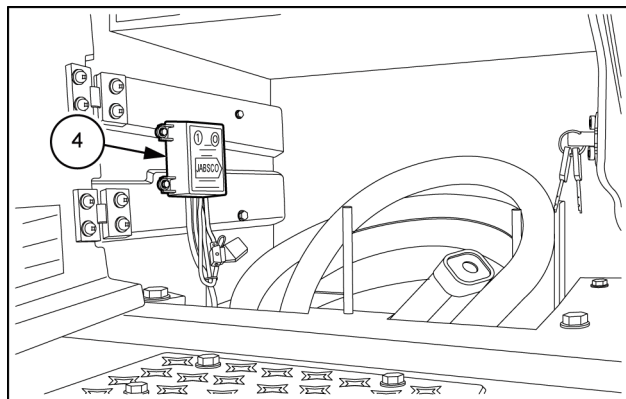
Open the tank cap (5).

Plunge the inlet hose into the collection tank.

Press the start button 1 on the switch box (4) to start filling the tank.

Switch on the pump moving the switch from OFF to ON position.

NOTE: Press button 0 on the switch box (4) to stop the pump automatically, before the tank is full

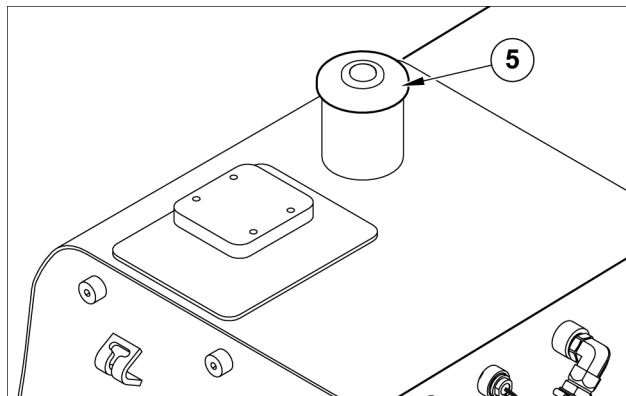


SMIL12WEX0077AB 3

Remove the end of the inlet hose from the fuel container/ collection tank, thoroughly clean it from any fuel residues, roll up again the hose and put it back into place in the pump compartment.

Reinstall the cap (5) on the fuel tank.

ATTENTION: The pump can be deteriorated or irreparably damaged by prolonged dry running. Therefore, switch on the pump only when it is to be used for refuelling.

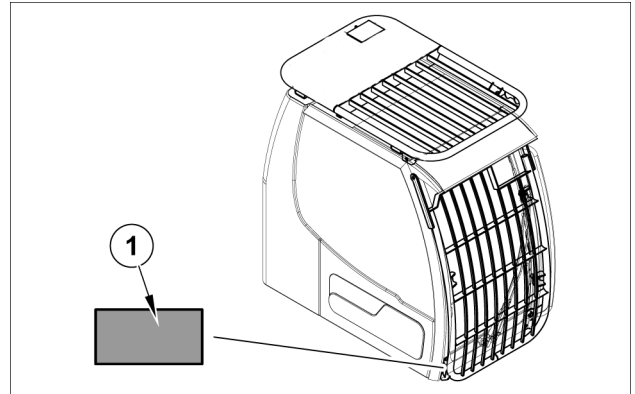


F00428N 4

Cab protection

When you work in areas where there is the danger of rocks or debris falling the use of following cab protection is unavoidable.

- FGPS (Front Guard Protective System), tubular structure to install on the front side of the cab.
- The label **(1)** of homologation is localized on the right side of the protective structure.

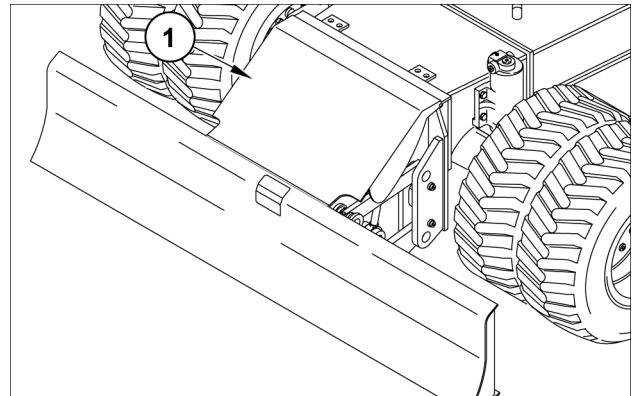


F00358N 1

Dozer blade

Dozer blade protection

A protection **(1)** can be provided and installed on the front between the blade and the undercarriage, with the purpose of protecting the blade cylinders and the relevant hydraulic lines.

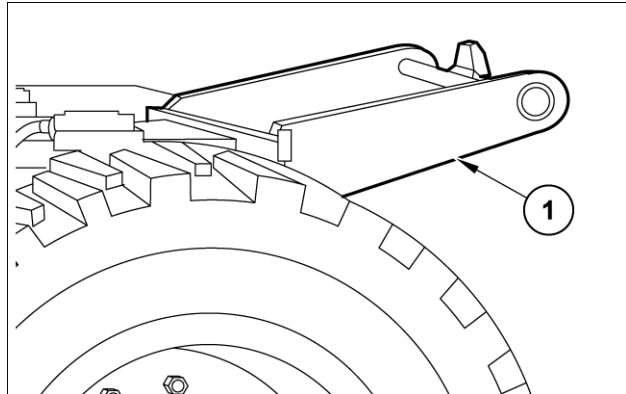


F00331N 1

Transport operations

Transport bracket for clamshell

A transport bracket (1) can be supplied for the clamshell transport, to fasten on the front side of the undercarriage. Secures the clamshell during travel or excavator transport.



F34208N 1

11 - FORMS AND DECLARATIONS

Declaration of conformity

The page that follows contains a copy of the declaration of conformity. The Manufacturer declares that the machine has been designed and constructed in conformity with European Directives and amendments and the decrees and regulations governed by national laws.

The original declaration of conformity is supplied with each machine. Keep the original copy in a safe place. The local authorities may ask for this document to be presented in order to check the conformity of your machine.

There is a translation of the declaration on the back of the original copy in the language of the country in which the machine is used.

There are some additional notes for greater clarity:

1. The main safety components installed and supplied with the machine are listed in point **1.2**. Some of these are supplied as standard, such as the **FOPS/ROPS**. Others, such as the variant for moving suspended loads or the cab front guard, are available on request by the customer.
2. Point **2** contains all the information required by the Acoustic emission directive **2000/14/EC**. Refer to the original copy for specific information on the equipment. Other information relating to the sound power level guaranteed by the equipment (**LWA**) can be found on page **Noise level** . This page also contains information relating to the acoustic pressure level in the driver's seat (**LpA**) which is not the subject of the above mentioned directive and therefore not contained in it.
3. General registration number for this type of equipment. The sequence of letters and numbers may vary depending on the configuration of the equipment.
4. Registration number of the declaration of conformity. Refer to this number when information or assistance is requested from the manufacturer about the declaration of conformity.
5. Signature of a person authorized to sign the document on behalf of the company.



CNH ITALIA S.p.A.
Via Plava, 80 - 10135 Torino - Italia

DICHIARAZIONE "CE" DI CONFORMITÀ "EC" DECLARATION OF CONFORMITY

Il sottoscritto dichiara che la sottoindicata macchina è stata progettata e costruita in conformità alle seguenti Direttive Europee, come emendate, e ai decreti e regolamenti che le traspongono nelle leggi nazionali:

The undersigned declare that the machine described below has been designed and manufactured in compliance with the following European Directives, as amended, and the regulations transposing them into national laws:

1. 2006/42/CE "Sicurezza delle macchine"

- 1.1 Norme europee armonizzate nel cui rispetto la conformità è dichiarata: **EN 474-1:2006+A1:2009; EN 474-5:2006+A2:2012**
European Harmonised standards under which conformity is declared:
- 1.2 Principali componenti di sicurezza montati e forniti con la macchina
Main safety components installed and supplied with the machine
- | | | Sì
Yes | No
No |
|--|-------------------------------------|-------------------------------------|-------------------------------------|
| 1.2.1 Struttura di protezione contro la caduta di oggetti (F.O.P.S.)
<i>Falling Object Protective Structure (F.O.P.S.)</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1.2.2 Variante per la movimentazione dei carichi sospesi (EN 474-5 §5.6.4; EN 474-1 Annex E)
<i>Object handling application kit (EN 474-5 §5.6.4; EN 474-1 Annex E)</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 1.2.3 Struttura di protezione in caso di ribaltamento (R.O.P.S.)
<i>Roll Over Protective Structure (R.O.P.S.)</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1.2.4 Protezione frontale cabina
<i>Cab front guard</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 1.2.7 ### | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
- 1.4 Nome e indirizzo della persona autorizzata a costituire il fascicolo tecnico:
Name and address of the person authorised to compile the technical file:
CNH Italia S.p.A. Strada Settimo, 323 - 10099 S. Mauro, Italy

2. 2000/14/CE "Emissione acustica"

- 2.1 Procedura di valutazione di conformità eseguita: **Allegato XXXXXXXXXXXX**
Conformity assessment procedure followed:
- 2.2 Nome e indirizzo dell'Organismo Notificato coinvolto: **XXXXXXXXXX**
Name and address of the Notified Body involved:
- 2.3 Livello di potenza sonora misurato LWA (rif. 1 pW): **0** dB(A)
Measured sound power level LWA (ref. 1 pW):
- 2.4 Livello di potenza sonora garantito LWA (rif. 1 pW): **2** 0 dB(A)
Guaranteed sound power level LWA (ref. 1 pW):
- 2.5 Potenza motore (come definita dalla ISO 14396): **0** kW
Engine power (as defined by ISO 14396):
- 2.6 Detentore della documentazione tecnica: **XXXXXXXXXX**
Holder of the technical documentation:

3. 2004/108/CE "Compatibilità Elettromagnetica"

- 3.1 Norme europee armonizzate nel cui rispetto la conformità è dichiarata: **EN 13309:2010**
European Harmonised standards under which conformity is declared:

4. Altre Direttive applicabili:

Other applicable Directive/s:

5. **Costruttore:** CNH ITALIA S.p.A.
Manufacturer:

6. **Categoria:** Escavatore idraulico
Category: Hydraulic excavator

7. **Tipo:** WX168
Type:

8. **Matricola:** NSUWX168NCLB00000
Serial n°:

4

NCLB00000

San Mauro Torinese, Italia 01/08/2012

Signature
(Name and Function)

5



CNH ITALIA S.p.A.
Via Plava, 80 - 10135 Torino - Italia

DICHIARAZIONE "CE" DI CONFORMITÀ
"EC" DECLARATION OF CONFORMITY

Il sottoscritto dichiara che la sottoindicata macchina è stata progettata e costruita in conformità alle seguenti Direttive Europee, come emendate, e ai decreti e regolamenti che le traspongono nelle leggi nazionali:

The undersigned declare that the machine described below has been designed and manufactured in compliance with the following European Directives, as amended, and the regulations transposing them into national laws:

1. 2006/42/CE "Sicurezza delle macchine"

- 1.1 Norme europee armonizzate nel cui rispetto la conformità è dichiarata: **EN 474-1:2006+A1:2009; EN 474-5:2006+A2:2012**
European Harmonised standards under which conformity is declared:
- 1.2 Principali componenti di sicurezza montati e forniti con la macchina Si Yes No No
Main safety components installed and supplied with the machine
- 1.2.1 Struttura di protezione contro la caduta di oggetti (F.O.P.S.)
Falling Object Protective Structure (F.O.P.S.)
- 1.2.2 Variante per la movimentazione dei carichi sospesi (EN 474-5 §5.6.4; EN 474-1 Annex E)
Object handling application kit (EN 474-5 §5.6.4; EN 474-1 Annex E)
- 1.2.3 Struttura di protezione in caso di ribaltamento (R.O.P.S.)
Roll Over Protective Structure (R.O.P.S.)
- 1.2.4 Protezione frontale cabina
Cab front guard
- 1.2.7 # # #
- 1.4 Nome e indirizzo della persona autorizzata a costituire il fascicolo tecnico: (1)
Name and address of the person authorised to compile the technical file:
CNH Italia S.p.A. Strada Settimo, 323 - 10099 S. Mauro, Italy

2. 2000/14/CE "Emissione acustica"

- 2.1 Procedura di valutazione di conformità eseguita: Allegato XXXXXXXXXXXX
Conformity assessment procedure followed:
- 2.2 Nome e indirizzo dell'Organismo Notificato coinvolto: XXXXXXXXXXXX
Name and address of the Notified Body involved:
- 2.3 Livello di potenza sonora misurato LWA (rif. 1 pW): 0 dB(A)
Measured sound power level LWA (ref. 1 pW):
- 2.4 Livello di potenza sonora garantito LWA (rif. 1 pW): (2) 0 dB(A)
Guaranteed sound power level LWA (ref. 1 pW):
- 2.5 Potenza motore (come definita dalla ISO 14396): 0 kW
Engine power (as defined by ISO 14396):
- 2.6 Detentore della documentazione tecnica: XXXXXXXXXXXX
Holder of the technical documentation:

3. 2004/108/CE "Compatibilità Elettromagnetica"

- 3.1 Norme europee armonizzate nel cui rispetto la conformità è dichiarata: **EN 13309:2010**
European Harmonised standards under which conformity is declared:

4. Altre Direttive applicabili: # # #

Other applicable Directive/s:

5. Costruttore: CNH ITALIA S.p.A.
Manufacturer:

6. Categoria: Escavatore idraulico
Category: Hydraulic excavator

(3)

7. Tipo: WX188
Type:

8. Matricola: NSUWX188NCLB00000
Serial n°:

(4) **NCLB00000**

San Mauro Torinese, Italia 01/08/2012

Signature
(Name and Function)

(5)

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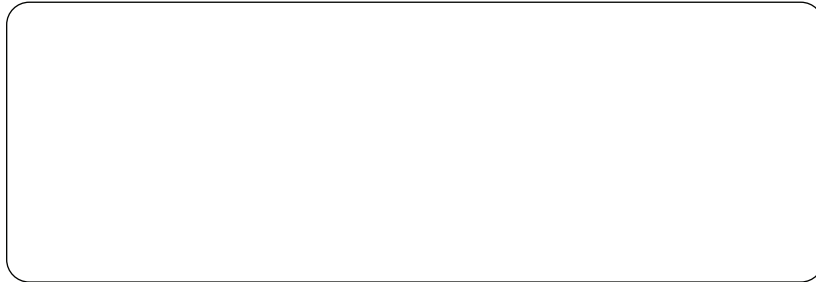
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Dealer's stamp



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Availability of some models and equipment builds varies according to the country in which the equipment is being used. For exact information about any particular product, please consult your Case dealer.