en

Operating Manual

Hydraulic excavator
R 9150 E

from serial number 38120

Document identification

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1.1.2 Uppercarriage

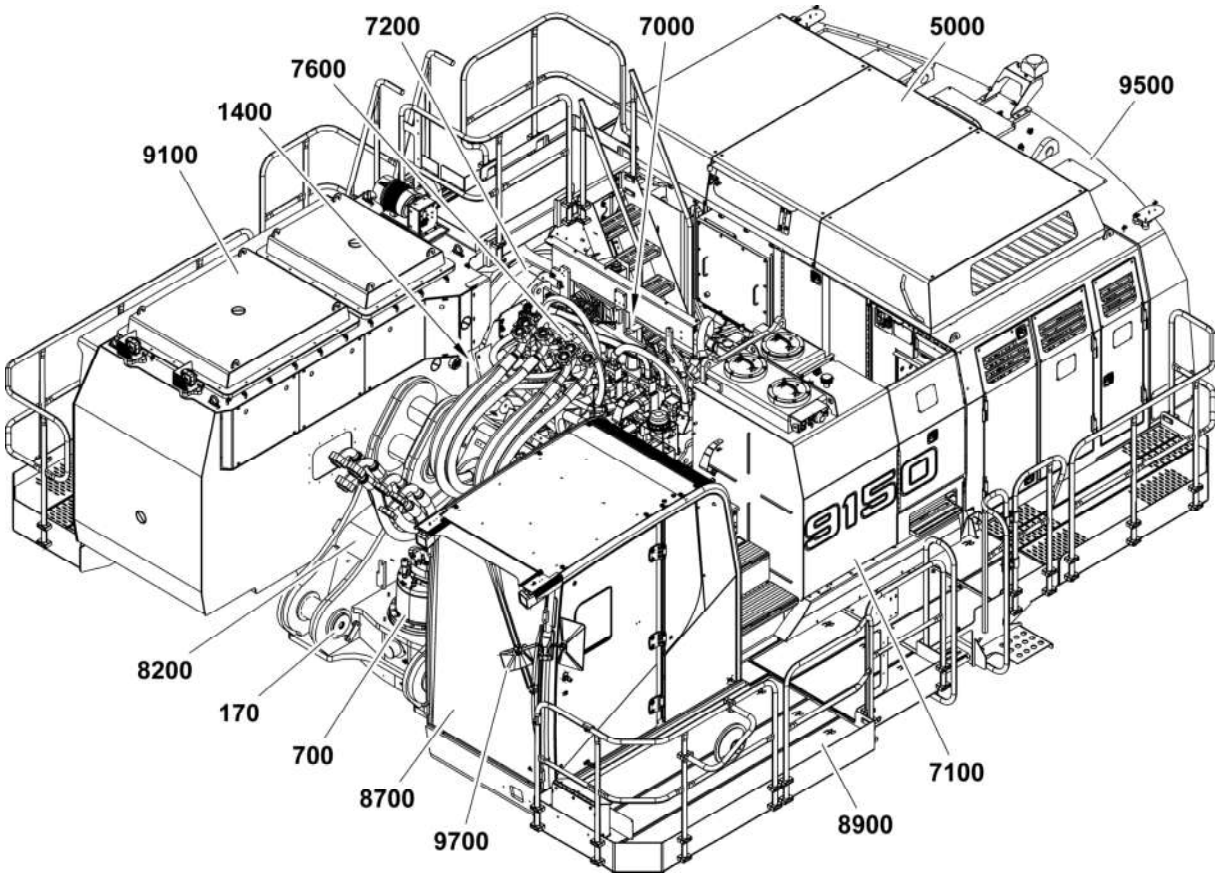

Fig. 1-3 *Uppercarriage*

170	Attachment mounting parts	**7600**	Control valve installation
700	Swing gear installation	**8200**	Rotating deck
1400	Centralized lubrication	**8700**	Cab
5000	Electric motor installation	**8900**	Catwalk and handrail
7000	Hydraulic installation	**9100**	Electric box installation
7100	Hydraulic tank installation	**9500**	Counterweight installation
7200	Oil cooler installation	**9700**	Outside mirror arrangement

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Fast and Precise Movement

Liebherr Engine V12
The R 9150 B is equipped with the long-lasting and proven Liebherr V12 diesel engine specifically designed to withstand extreme outside temperatures and high altitudes with low atmospheric pressure. Integrating the latest engine management system, the R 9150 B is built for extreme conditions.

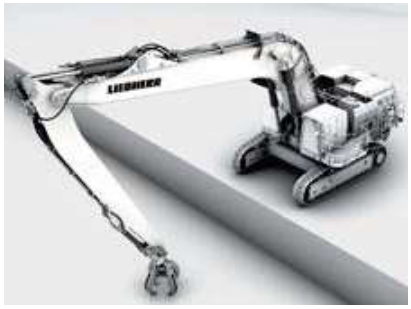
Fast Cycle Time
Like all other Liebherr mining excavators, the R 9150 B uses a closed-loop swing circuit. The main hydraulic circuit comprises a combination of three main valves fed by three working pumps, providing unrivaled flexibility of attachment control and force distribution, while allowing full oil flow integration for fast movement and lowest cycle times.

Precise Machine Motions
The R 9150 B design integrates the Litronic Plus electronic control system allowing for easy control even when simultaneous movements are required. The patented Liebherr electronic bucket cylinder damping system provides controlled endcushioning for smooth attachment motions.

High Digging and Lifting Capabilities

High Digging Forces
Designed for the best mechanical force distribution, the production-tailored attachment delivers increased digging and lifting forces. Integrating Liebherr-made cylinders and a wide range of buckets with mining-optimized GET, the R 9150 B's attachment ensures the highest forces, easy bucket penetration and high fill factor to perform even in the most demanding conditions.

Power-Oriented Energy Management
The R 9150 B's attachment is equipped with pressureless boom-down function to enable fast cylinder retraction without the need for pump energy. Intelligent energy management diverts the pump flow during boom lowering, allowing other cylinder motions to operate unimpeded.



An Array of Applications
The integration of the electronic control system – Litronic Plus – in combination with the R 9150 B's design enables:
- Maximum machine versatility
- To use various long reach attachments and specific tools
- To answer the most specific customers requirements

Liebherr Site-Specific Bucket
- 4 passes to load a 50 t off-highway truck
- Optimized solution for loading 90-100 t off-highway truck
- 3 types of wear package
- Maximal bucket fill factor
- Integrated approach on machine capabilities

Exclusive EVO Bucket Solution
- Liebherr patented EVO bucket design to maximize the loading capacity
- Customized Liebherr GET and wear package according to customer application
- Ensure maximal penetration efficiency
- Single GET hammerless locking system for safe and easy maintenance
- Fully patented GET system design for optimal penetration / lifetime
- 4 tooth profiles available for various range of applications

Minimized Impact on Life

Optimized Energy Consumption, Fewer Emissions
Constant power regulation of the hydraulic system and engine output optimize equipment fuel efficiency, depending on the application. In “Eco-Mode” setting, the machine is set up to reduce engine load, significantly improve fuel consumption and reduce emissions.

Controlled Emission Rejection
The R 9150 B is powered by a high horsepower diesel engine which complies with the US EPA Tier 2 or US EPA Tier 4f / EU Stage V compliant emission limits. This power drive makes the R 9150 B cost effective without compromising productivity and reduces the machines impact on the environment.

Sustainable Design and Manufacturing Process

Certified Environment Management Systems
Subject to the stringent European program for the regulation of the use of chemical substances in the manufacturing process REACH*, Liebherr undertakes a global evaluation to minimize the impacts of hazardous material, pollution control, water conservation, energy and environmental campaigns.

Extended Components and Fluids Lifetime
Liebherr is constantly working on ways to extend component life. Through the Exchange Components program, superior lubrication systems and the reinforcement of parts under stress, Liebherr can reduce frequency of part replacement. The result minimizes environmental impact and lowers the overall total cost of ownership.

*REACH is the European Community Regulation on chemicals and their safe use (EC 1907/2006)
It deals with the Registration, Evaluation, Authorization and Restriction of Chemical Substances.

The Liebherr-Mining Remanufacturing Program
- Reduced environmental impact
- Second life for your components
- Reduced costs and investment
- Liebherr certified workshops
- Alternative to purchase brand-new replacement components

Eco-Mode
The Eco-Mode can be manually selected by the operator when maximal power is not required according to job need for:
- An improved fuel efficiency
- Less load on the engine
- Less noise pollution
- Less dioxide carbon emissions

Automatic Idle Control
Electronic idle control of the engine results in:
- Less fuel consumption
- Less load on the engine
- Reduced emissions
- More comfort to the operator (reduced noise pollution)

2 Safety instructions

Working with the machine holds dangers to which you as the owner, machine operator or maintenance expert could be exposed. If you regularly read and note the safety information, however, you can prevent danger and accidents. This is particularly true for those who are only occasionally in contact with the machine, e.g. for maintenance work. The following information comprises safety regulations which, if followed conscientiously, will contribute to your safety and that of other persons, as well as avoiding damage to the machine.

Following these precautions does not release you from the responsibility to take note of safety regulations which apply on site or of guidelines given by legal bodies or professional associations.

For EU countries, guideline 2009 / 104 / EC contains the minimum required safety information applicable to the owner.

2.1 Meaning of the symbols in this manual

Work processes and actions that could cause danger are accompanied by safety informations in these operating instructions. These safety informations describe various dangers which are emphasized by the terms **Danger**, **Caution** and **Note**.

These terms are identified by symbols in the operating instructions and have the following meaning:

Danger!
Warning relating to a danger that carries with it a high risk of death or serious injury if the appropriate preventative measures are not taken.

Caution!
Warning relating to dangers that could result in physical injury and/or damage to the machine if the appropriate preventative measures are not taken.

Note!
This symbol identifies user tips and operating and maintenance procedures whose use will guarantee a high degree of user-friendliness and longevity to the machine or which will considerably simplify working procedures.

– This symbol identifies a listing.
  • This symbol identifies a sub-listing.

❑ This symbol signifies the following: “The precondition must be fulfilled”.
The machine operator or the maintenance personnel must first fulfil the precondition described, i e. the machine must be brought into a particular work position in order to be able to carry out the actions subsequently described.

▶ This symbol identifies an action.
The machine operator or the maintenance personnel should be active at this location and carry out the action described.
↳ This symbol means “Carry out an activity".

task.

- Only use attachment or special tool approved by Liebherr.
- Only operate the attachment or the special tool with closed windshield and with a front protective grid.
- Only operate the attachment or the special tool with closed door.
- Do not clean the ground with the special tool.
- Make sure that the special tool works in its specified limits. For more information, also refer to the Operator's Manual of the tool manufacturer.

Safe use of a hydraulic hammer or a hydraulic ripper

- According to the severity of the application, the use of a hydraulic hammer or a hydraulic ripper can result in vibrations, shocks or stresses which are higher than in normal use. It may reduce the expected lifetime of structures and/or components.
- The hydraulic hammer or the hydraulic ripper must be selected with particular care. When using a hydraulic hammer or a hydraulic ripper not permitted by Liebherr, warranty for steel structures and machine components will be ceased.
- Before beginning breaking tasks, position the machine on firm and level ground.
- Use a hydraulic hammer or a hydraulic ripper designed exclusively for breaking stone, concrete and other breakable materials.
- Only operate the hydraulic hammer or the hydraulic ripper in the longitudinal direction of the machine and with the windshield closed or with a front protective grid.
- Ensure during hammer or ripper operation that no cylinder is entirely extended or retracted and that the stick is not in the vertical position.
- In order to avoid damages to the machine, try not to break stone or concrete while performing retraction and extension motions of the hydraulic hammer.
- Do not apply the hydraulic hammer uninterrupted for more than 15 seconds at a time to the same place. Change the breaking point. Too long uninterrupted operation of the hydraulic hammer leads to an unnecessary overheating of the hydraulic oil.
- Do not use the drop force of the hydraulic hammer or of the hydraulic ripper to break stone or other materials. Do not move obstacles with the hydraulic hammer. Misuse of this nature would damage both the hammer and the machine.
- Do not use the hydraulic hammer or the hydraulic ripper to lift objects.
- Before beginning breaking tasks, the pressure of the dampening accumulator of the hydraulic ripper must be adjusted depending on the nature of the ground and the excavator model.

Safe use of a ripper

- Rippers are generally used in applications where the use of a bucket is not efficient to break out rocks. Thus, these applications are more severe than in normal use.
- According to the severity of the application, the use of a ripper can result in vibrations, shocks or stresses which are higher than in normal use. It may reduce the expected lifetime of structures and/or components.
- Special hydraulic devices can be necessary. Contact the Liebherr customer service.
- The ripper must be selected with particular care. When using a ripper not permitted by Liebherr, warranty for steel structures and machine components will be ceased.

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– The operating data (minimum and maximum pressure) are marked permanently on hydraulic accumulators. Ensure that this marking remains visible.

Hydraulic lines and hoses

– It is forbidden to carry out repair work on hydraulic lines and hoses!
– All lines, hoses and bolt connections must be checked regularly for externally visible damage and any possible damage must be immediately checked for leakage.
– Never check for leaks with your bare hands, use a sheet of paper or something else.
– Any damaged parts must be removed immediately! Spurting oil can lead to injury and burns.
– Even with correct storage and permitted load, lines and hoses are subject to the natural aging process. This restricts their duration of use.
  • Incorrect storage, mechanical damage and unauthorized load are the most common causes of failure.
  • In relation to duration of use, current norms, regulations and guidelines pertaining to lines and hoses at place of use must be adhered to.
  • Use at the limit range of permissible load can shorten duration of use (e.g. high temperatures, frequent movement cycles, extremely high pulse frequencies, multiple shift usage).
– Lines and hoses should be replaced if the following are found during inspection:
  • Damage to the outer sheath as far as the liner (e.g. chafing, cuts and cracks);
  • Brittleness of the outer sheath (fracture formation in hose material);
  • Deformations which do not correspond to the natural form of the line or hose, whether in a unpressurized or pressurized state or on bends e.g. sheath separation, blistering;
  • Unsealed areas;
  • Non-adherence to requirements during installation;
  • Damage or deformations to the hose fittings which reduce the tightness of the fittings or the hose / fitting connection;
  • Hoses working themselves out of the fittings;
  • Corrosion of the fittings which reduces function and tightness;
– When replacing lines and hoses, use only original replacement parts.
– Install and mount lines and hoses correctly. Do not mix up the connections.
– The following is to be noted when replacing lines and hoses:
  • Always ensure that the lines and hoses are installed free of torsion. For high-pressure hoses, the screws from the half-clamps or full flange must always be attached to both hose ends and should only be tightened afterwards.
  • When tightening the flange on high-pressure lines and hoses with bent fittings, the side with the bent fitting must always be tightened first and then the side with the straight fitting tightened afterwards.
  • Any mounting clamps which are located in the centre of the hose may only be attached and tightened subsequently.
  • Check daily to ensure that all clamps, covers and protective devices are properly fastened. Doing this will prevent vibration and damage during operation.
  • Install the lines and hoses in such a way that they cannot chafe on other lines, hoses or parts.
  • A minimum distance from other parts of approx. half the exterior diameter of the hose is recommended. The distance should not, however, be less than 10 to 15 mm.
  • When replacing the lines or hoses on moving parts (e.g. from the boom to the stick), check before initial start-up that there are no chafing areas in the entire area of movement.

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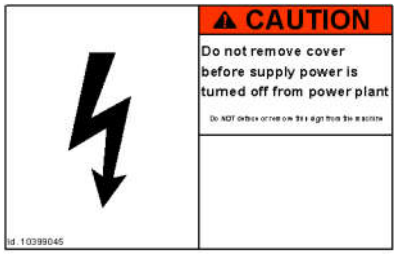


Plate 49: S1 cover removal label

Indicates that the cover on concerned element may only be removed when supply power is turned off from power plant.

Plate 54: Door-closing label

Indicates that the concerned door must stay closed during operation.

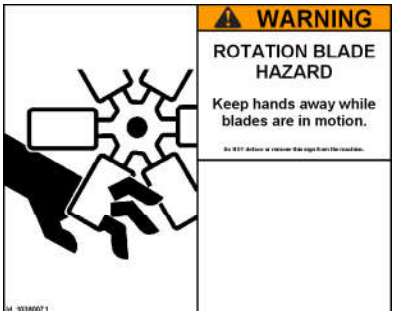


Plate 56: Rotation blade hazard label

Indicates risks due to rotating blades and gives associated safety instructions.

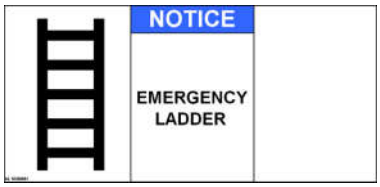


Plate 70: Emergency ladder label

Indicates the emergency ladder.

Plate 10: Restricted area label

Indicates access restriction to the related area.

A169 – Standard functions keypad 1

Windshield wiper

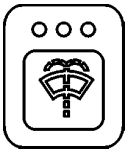
- ▶ Push the button.
  - ↳ Intermittent mode is activated.
  - ↳ First LED in the button comes on.

You can set the interval in the submenu "Wiper" of the monitoring display.

- ▶ Push the button again.
  - ↳ Continuous mode is activated.
  - ↳ First LED in the button goes off.
  - ↳ Second LED in the button comes on.
- ▶ Push the button a third time.
  - ↳ Windshield wiper is switched off.
  - ↳ Second LED in the button goes off.

In option, the machine can also have a roof windshield with its related wiper.

Windshield washer



- ▶ Push and hold button.
  - ↳ Washing water is sprayed onto the windshield through the outlet nozzles.
  - ↳ Windshield wiper runs continuously.
  - ↳ First LED in the button comes on.
- ▶ Release button.
  - ↳ First LED in the button goes off.
  - ↳ Washing water is stopped.
  - ↳ Windshield wiper finish its cycle.

Front working lights / Attachment headlights

- ▶ Push the button.
  - ↳ Front working lights on the uppercarriage are activated.
  - ↳ First LED in the button comes on.
- ▶ Push the button again.
  - ↳ Front working lights and attachment headlights are activated.
  - ↳ First LED and second LED in the button are on.
- ▶ Push the button a third time.
  - ↳ Front working lights are deactivated.
  - ↳ First LED in the button goes off.
  - ↳ Attachment headlights remain activated.
  - ↳ Second LED in the button is still on.
- ▶ Push the button a fourth time.
  - ↳ Attachment headlights are deactivated.
  - ↳ Second LED in the button goes off.

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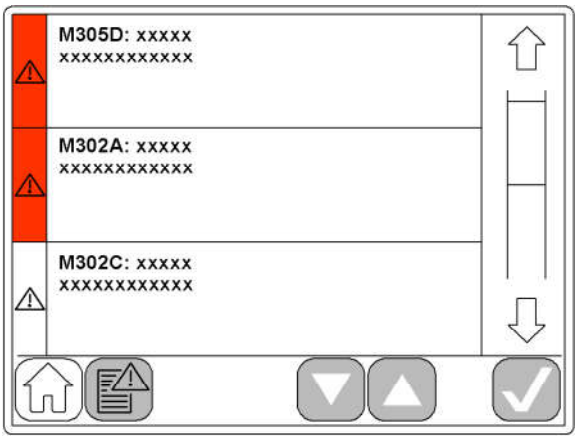


Fig. 3-13 *Menu "Diag"*

▶ Push the safety lever up to see the error messages.

A code number and a short description are shown for each error code.

▶ Push the "**Up**" and "**Down**" buttons to select an error message.

▶ Push the "**Acknowledgement**" button to acknowledge the error.

Danger!
If the error shown on the display is not rectified immediately, this could cause injuries to persons or damages to the machine.

▶ Rectify / have the error rectified immediately.

If you want to change the language of the messages:

▶ Refer to the menu "**Settings**".

Menu "Check"

This menu gives access to the submenus that follow:

– the remaining time before the next scheduled maintenance interval

Hours related to the electric motor

Hours related to the hydraulic system

When the necessary maintenance task is done:

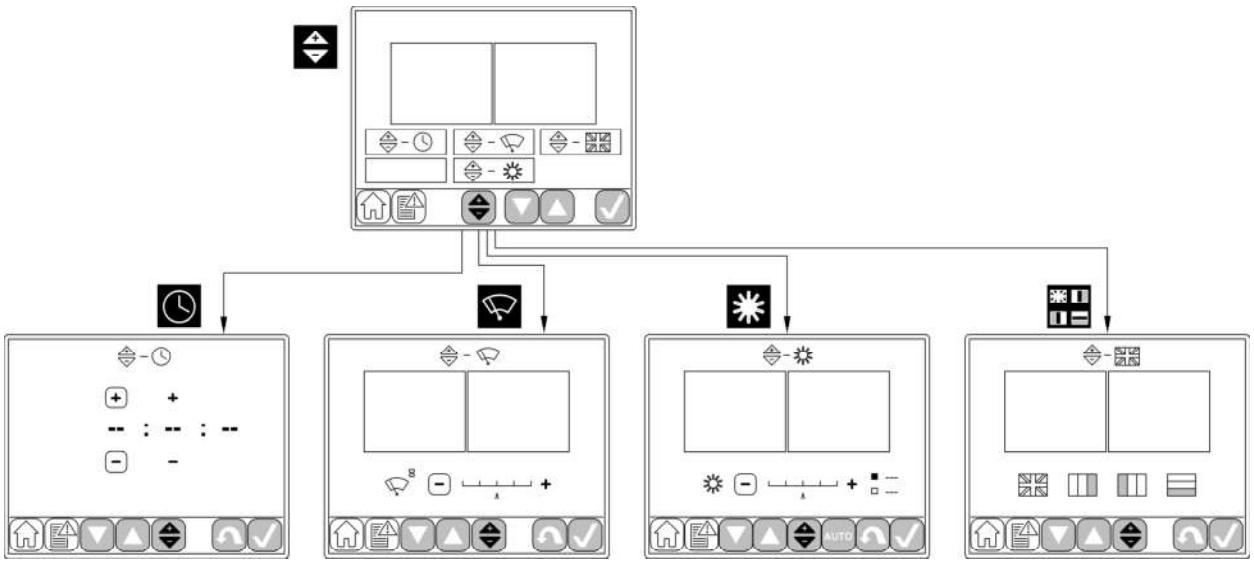
▶ Push the "**Up**" and "**Down**" buttons to select the applicable symbol.

↳ The applicable symbol is shown by a white frame.

▶ Push the "**Accept**" button to confirm that the related maintenance task is done.
↳ The system records the time of this task.
↳ It calculates the next scheduled maintenance interval.

Menu "Settings"

This menu gives access to the submenus that follow:



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▶ Close the door.

▶ Go down with your face towards the ladders, and use the appropriate handholds.

Movable access ladder (optional)

An optional movable access ladder can be installed on the excavator and moved into:

– lower position to permit the access to the uppercarriage
– upper position during the operation

Before operating the excavator, the movable access ladder must be fully lifted to the uppercarriage and locked in upper position.

Sliding access ladder (optional)

The sliding access ladder is manually lowered and lifted.

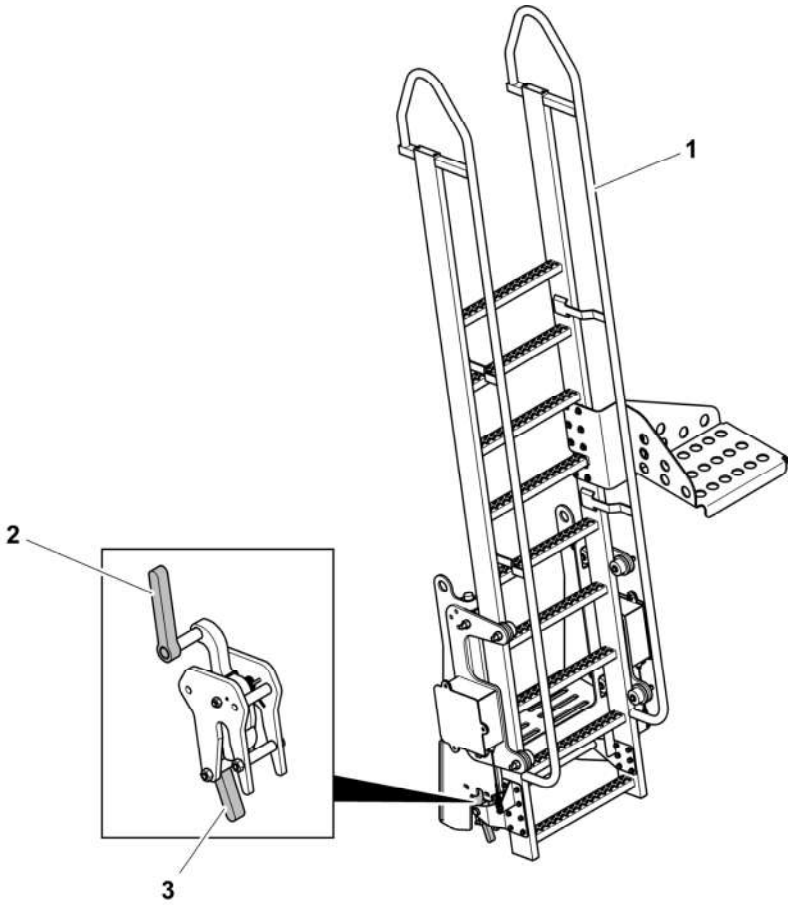

Fig. 3-19 *Sliding access ladder*

1 Sliding access ladder
2 Foot lever
3 Hand lever

Height adjustment

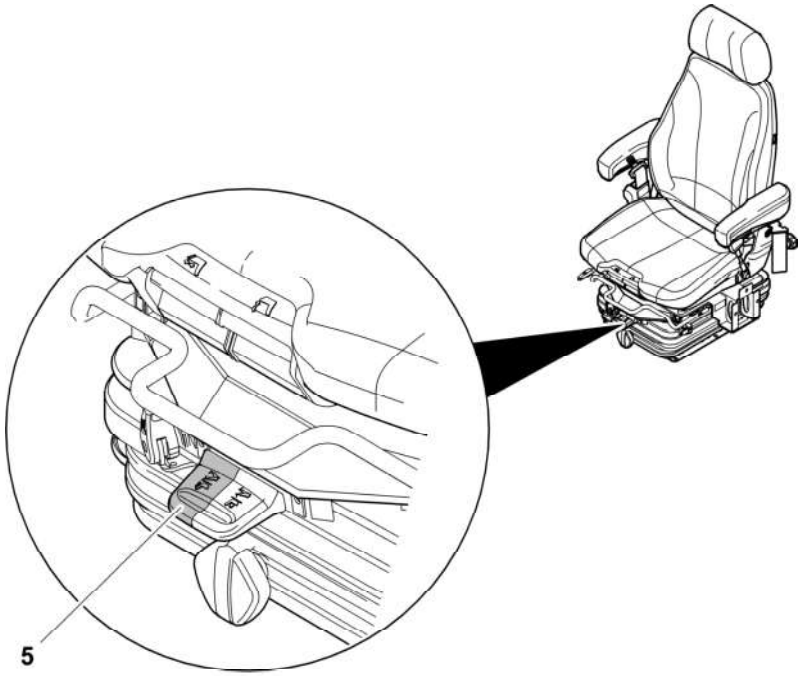

Fig. 3-29 *Setting the height*

The seat height can be set pneumatically and is continuously adjustable.

To adjust the seat height:

▶ Pull the lever **5** up or down.

Caution!
Before adjusting the height, adjust shock absorbers to the position «soft».

Danger!
Before using the excavator, make sure that the cameras and the outside mirrors are correctly adjusted.

- ▶ Regularly check mirrors and cameras for condition. If necessary:
  - – Clean them with a soft, dry cloth.
  - – Use an external safety device to get access to them.
- ▶ Regularly check mirrors and cameras for correct adjustment.
- ▶ For maintenance intervals, refer to the control and maintenance chart.
- ▶ Replace damaged mirrors and cameras immediately.

To cover the correct area:

- ▶ Set the cameras and adjust the outside mirrors so as to be able to see a person standing out of the hatched area defined by the four checkpoints given on the fig. above.

Additional cameras (optional)

Optional forward-oriented cameras can be installed on the counterweight.

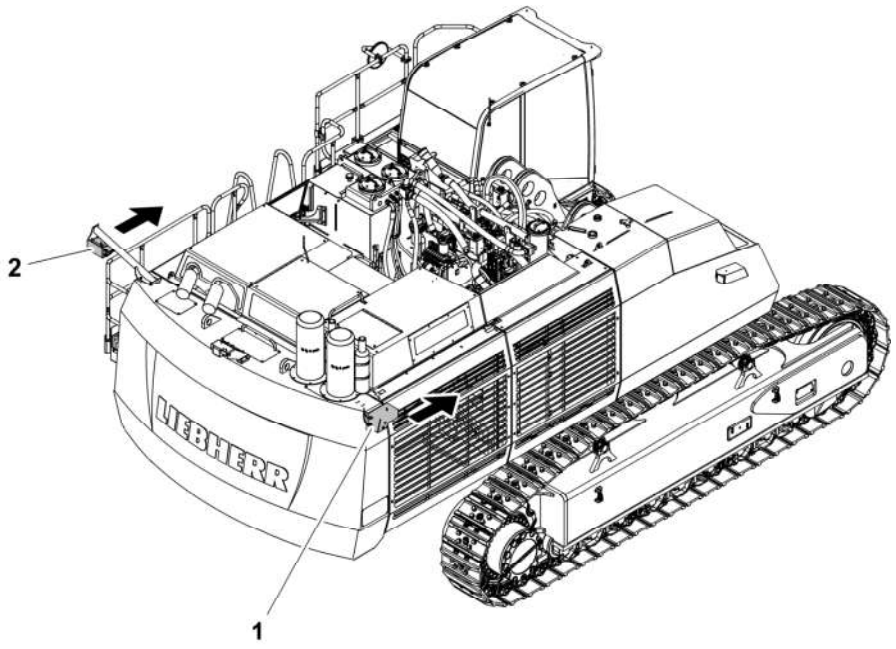

Fig. 3-40 *Additional cameras locations*

1 Right side camera
2 Left side camera

Under this option:

Adjustment of the air flow

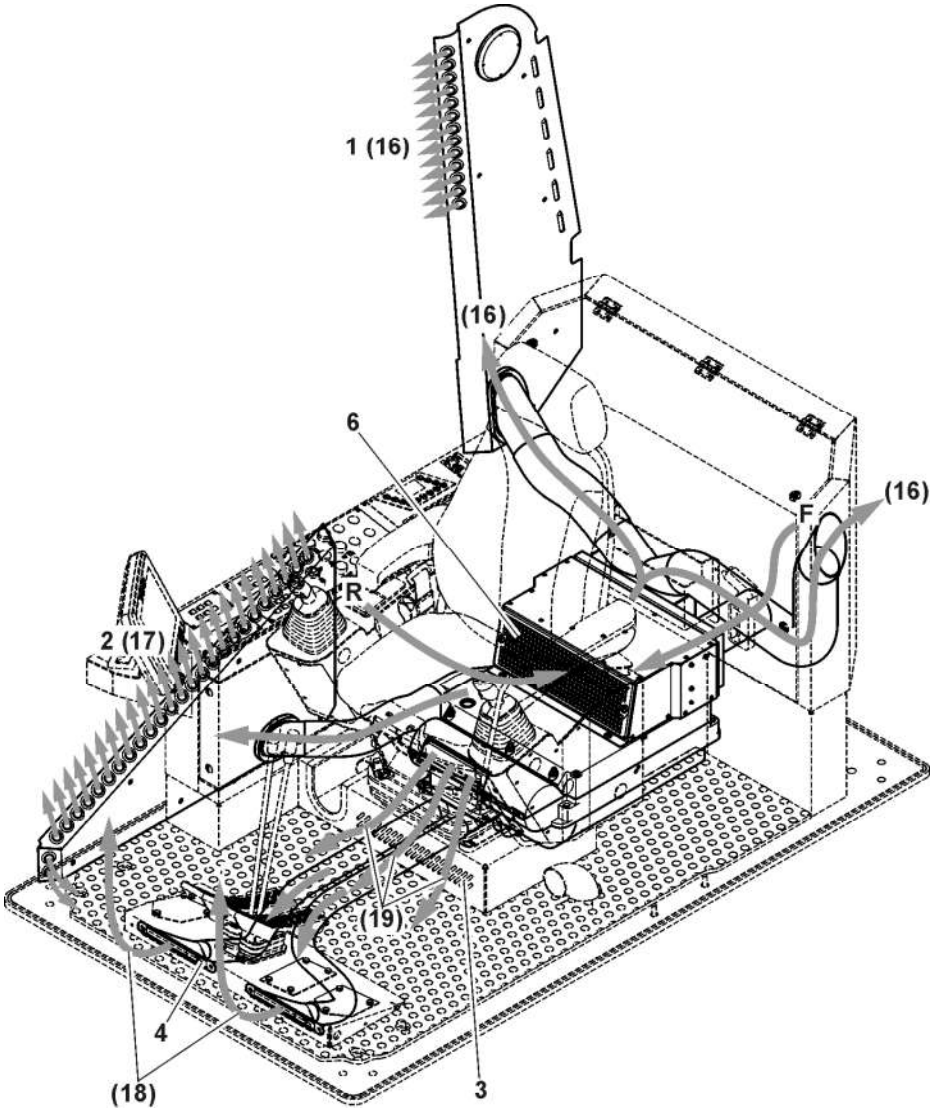

Fig. 3-51 *Position of front air vents and vents on the rear cab wall*

The air vents are located on the seat console **3 (19)**, on the right control panel **2 (17)**, on the front window **4 (18)** and on the cab rear wall **1 (16)**. The area that is open on each ventilation flap is indicated with an arrow in the display.

To obtain optimal comfort:

- ▶ When **heating**, open the air vents in the footwell **3** and possibly in the windscreen **4**.
- ▶ When **air-conditioning**, open the air vents in the cab rear wall **1** and the right control panel **2**.

The best heating or cooling effect is achieved when using the recirculated air function.

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1 Cab elevation
2 Circuit breaker of control box **E1090**

The control box **E1090** is located in the cab elevation **1**.

▶ Make sure that the switch **2** is in position "**CLOSE**".

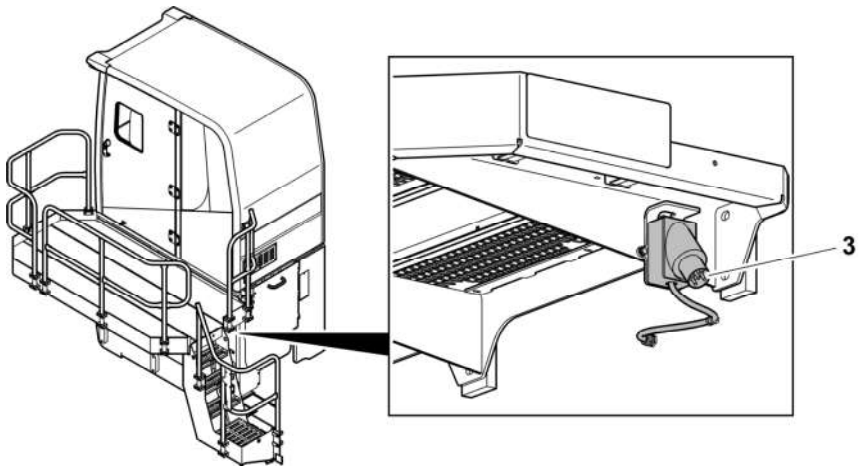

Fig. 3-59 *External socket (if installed)*

3 External socket

The external socket **3** is located under the catwalk.

▶ Connect the Gen-Set to the external socket **3**.

3.3.2 Warm-up procedure for hydraulic circuit

If the excavator is started when the exterior temperature is below 0°C, the operator must do the warm-up procedure:

❑ Make sure that the hydraulic oil temperature is sufficient (refer to lubricating section in chapter 5) to do this procedure. If this temperature is not sufficient when a preheating system is installed on the excavator, keep preheating.

▶ Let the motor run during the first 3 to 5 minutes and make sure that no error symbols are shown on the monitoring display (refer to the functions of the display in chapter 3).

▶ Step 1 - Open louvers and tarpaulins (if installed).

– If the ambient temperature is less than -20°C during the machine operation, do not open the louvers of the hydraulic oil cooler more than one quarter.

▶ Step 2 - Carefully activate the working hydraulic circuits. Do not reach end positions of piston rod. Operate all movements at reduced speed:

– Smoothly lift up attachment.

– Slowly activate each cylinder of the attachment. Activate cylinder in order below and repeat 10 times before moving to next cylinders:
  • Shovel flap cylinders (in case of shovel attachment)
  • Bucket tilt cylinders
  • Stick cylinders
  • Boom cylinders

Brake the machine

Stop the machine while travelling

▶ Release the travel pedals.
  ↳ The pedals go back to the neutral position.
  ↳ The travel gear stops.
  ↳ The machine stops.

When the travel pedals are in the neutral position, the hydrostatic travelling mechanism prevents the machine from rolling off.

Caution!
The machine stops suddenly if you release the travel pedals quickly!

▶ Always fasten the safety belt before you start the machine.

Apply and release the travel brake

The travel brake is applied by default when you start the machine.

▶ Push the "**Travel brake**" button on the related keypad.
  ↳ The first LED in the button goes off.
  ↳ The travel brake is released.
  ↳ The undercarriage is unlocked.

▶ Push the "**Travel brake**" button again.
  ↳ The first LED in the button comes on.
  ↳ The travel brake is applied.
  ↳ The undercarriage is locked.

The travel brake is applied if the safety lever is up or the access ladder is down (if installed) or the service trap is down (if installed).

3.4 Working with the machine

Working safely with the machine

– Before you start working, acquaint yourself with the special features of the job site and any special precautions and warning signals. Examples of particular work environments would be on-site or traffic obstructions, the load-carrying capacity of the ground and any requirements to make the job site safe from public use.
– Always maintain a safe distance from overhangs, edges, slopes and unsafe ground.
– Be particularly careful in conditions of reduced visibility and changeable ground conditions.
– Familiarize yourself with the location of power and gas lines on the job site and take particular care when working near them. If necessary, inform the responsible authorities.
– When working in areas with underground lines (gas, electricity), adhere to the laws, regulations and rules applicable at the place of use.
– Maintain a safe distance from electrical aerial lines. Do not allow the attachment to come near cables when working near electrical aerial lines. Risk of fatality! Inform yourself about required safety distances.

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3.4.3 Joystick functions when setting up the machine

Operating the stick cylinder

The stick cylinder is operated using the left joystick **4**.

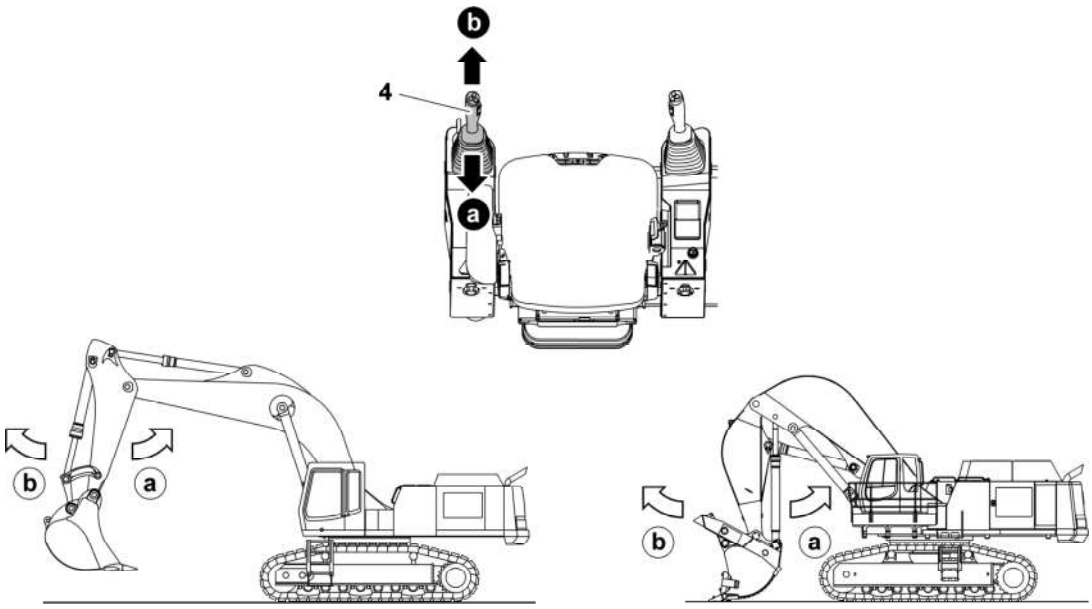

Fig. 3-73 *Operating the stick cylinder*

- ▶ Move the joystick rearward **a**.
  ↳ Stick will be drawn in.
- ▶ Move the joystick forward **b**.
  ↳ Stick will be extended.

Operating the boom cylinder

The boom cylinder is operated using the right joystick **3**.

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Turn the grapple / shear

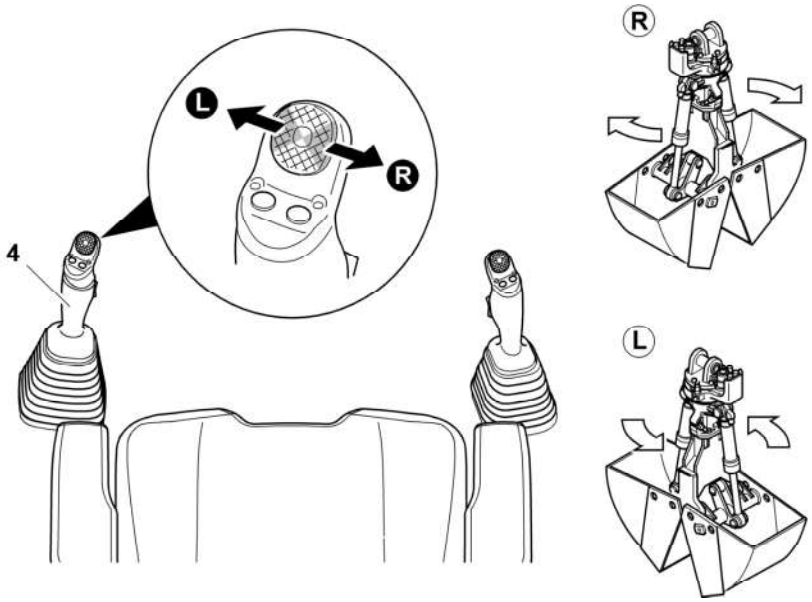
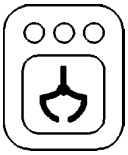


Fig. 3-87 *Turn of the grapple / shear with the analog stick*



- ▶ Push the button.
  - ↳ The LED in the button comes on.
- ▶ Push the analog stick on the left joystick **4** to the right **R**.
  - ↳ Grapple / shear turns to the right (seen from above).
- ▶ Push the analog stick on the left joystick **4** to the left **L**.
  - ↳ Grapple / shear turns to the left (seen from above).
- ▶ Push the button again.
  - ↳ The LED in the button goes off.
  - ↳ The turn function of the grapple / shear is off.

Open and close the grapple / shear

You can open and close the grapple / shear with the pedal or with the joystick.

Danger!
Risk of death or serious injury and risk of damage.
The special tools can move during their installation and/or removal.

▶ Make sure that nobody stands within the working area of the attachment during the installation and the removal of the special tools.

▶ Before you attach a grapple / shear, make sure that:

– All the necessary hydraulic lines for grapple / shear operation are installed on the stick.
– The tool is in the applicable position. Refer to the Operator's Manual of the tool manufacturer.

Attach the tool

▶ Remove the bucket.

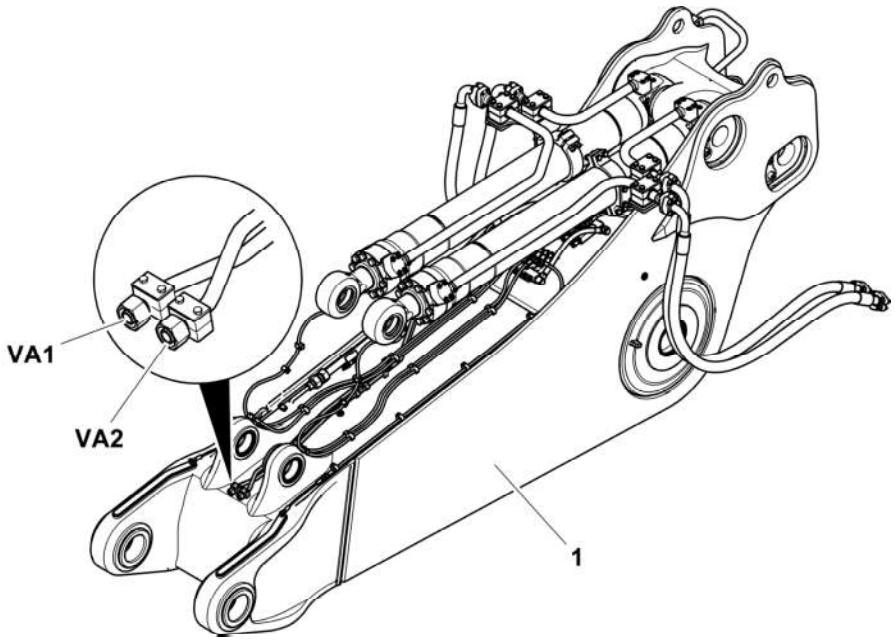


Fig. 3-96 *Pressure ports for the quick coupler*

1 Stick
VA1/2 Pressure ports for the quick coupler (if installed)

▶ If installed, make sure that the pressure ports **VA1** and **VA2** are closed.

▶ Retract the bucket cylinder to its end position.

Caution!
With the bucket removed, the cylinder operates unloaded.

▶ Operate the cylinder movement slowly and carefully to prevent damage to the cylinder.

▶ Put the attachment in position with the tool.

▶ Release hydraulic pressure as given in the related section.

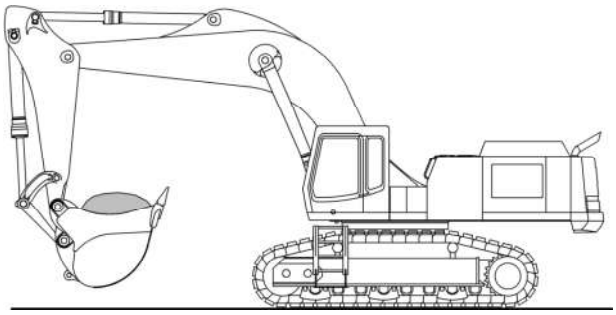


Fig. 3-107 *Raising grab material*

▶ When the backhoe bucket is full or the stick can no longer be slewed in, raise the boom and backhoe type bucket until the filled surface is parallel to the ground.

3.6.4 Loading the transport vehicle

Danger!
Risk of fatal injury due to falling grab material.

▶ Do not load the transport vehicle so high that the grab material could drop out over the walls of the vehicle.

▶ Ensure that nobody is standing in the danger area or in the transport vehicle when loading.

▶ Do not slew the equipment over the driver's cab.

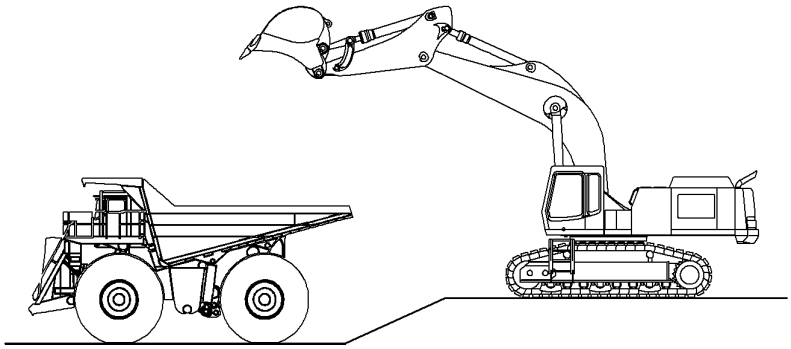


Fig. 3-108 *Emptying grab material*

❑ If possible, the machine should stand higher than the transport vehicle to avoid having to lift the grab material unnecessarily.

▶ Stop the transport vehicle in a position that allows it to be loaded from the rear or the side.

▶ Slew the machine's equipment above the loading area of the transport vehicle.

▶ Distribute the grab material evenly over the loading area of the transport vehicle by slewing the backhoe bucket and stick out, slewing the uppercarriage and possibly also moving the boom.

▶ If the backhoe bucket is not sufficiently emptied or there is still grab material in the backhoe bucket, slew the backhoe bucket in and out several times to loosen the

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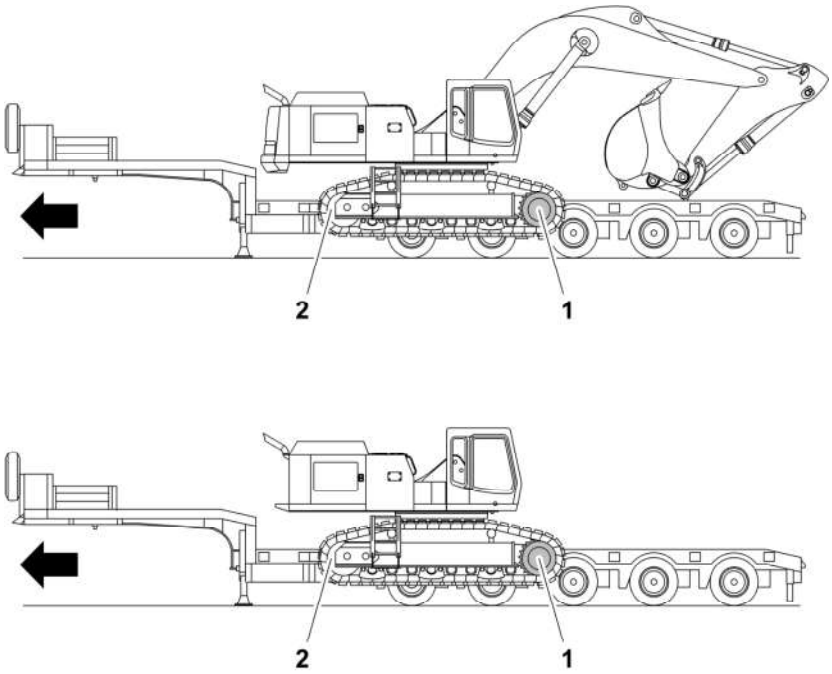


Fig. 3-120 *Example of low loader*

1 Travel gear **2** Idler

Note!
In any case, drive the machine forward onto the low loader with the idler **2** in front and the travel gear **1** in the opposite direction of the road traffic.

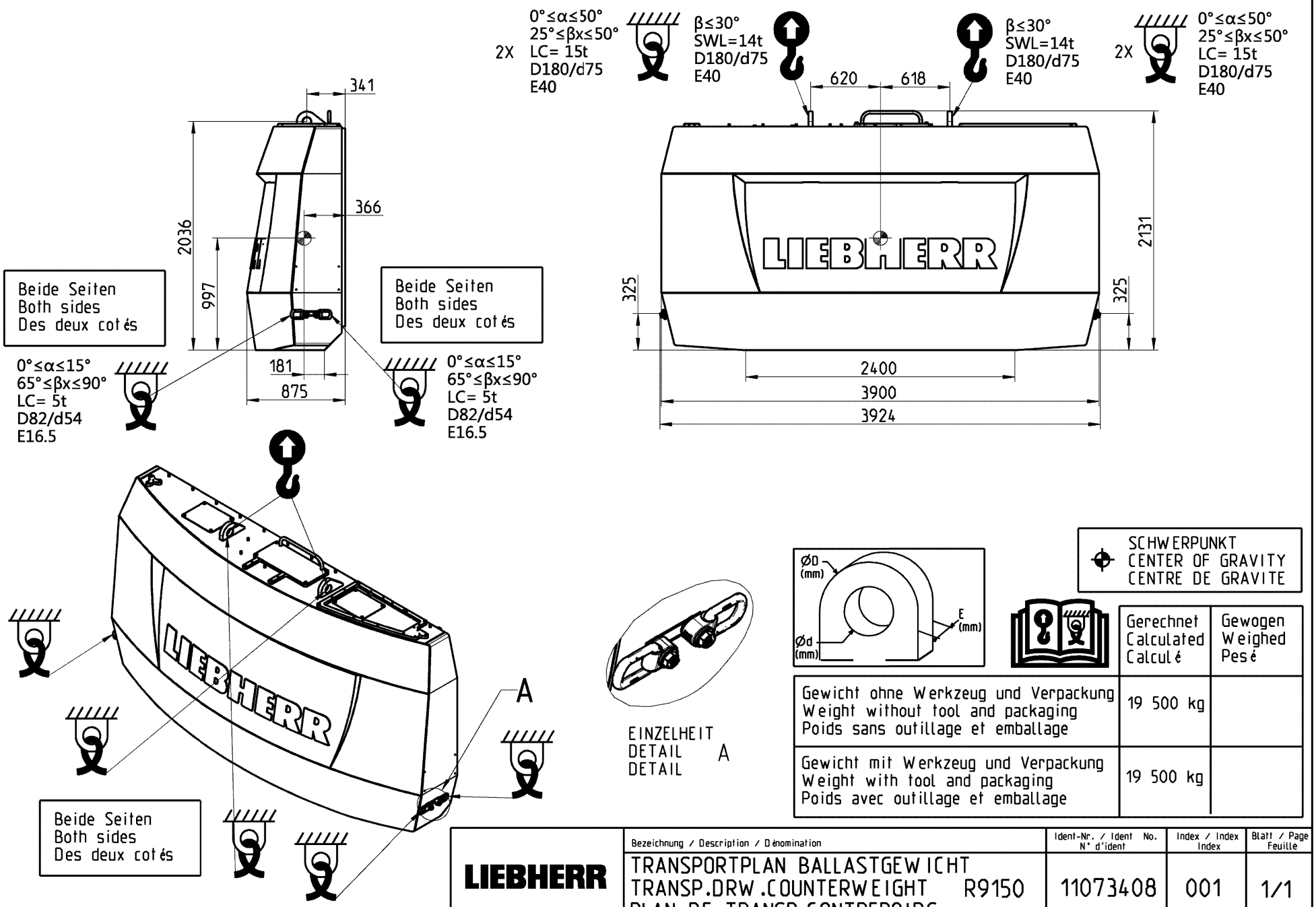
To climb a loading ramp:

Depending on the low loader type, the excavator must climb a loading ramp. In this case, the arrangements that follow must be made:

- ❑ The ramp inclination must be flatter than the maximum machine travelling angle (refer to the technical data of this manual).
- ❑ In any case, the ramp inclination angle **must be** < = 30°.
- ❑ Have the lashing material ready.
- ▶ Install applicable anti-slip devices where necessary (coefficient of friction > 0.6).
- ▶ Clean any ice, snow or mud of the crawlers before starting to drive up the ramp.
- ▶ Align the machine accurately with the low loader or the loading ramp.
- ▶ For careful and progressive driving, use the hand levers for manual travel control (refer to the related section of this manual).

Note
Have a spotter for providing the necessary signs.

- ▶ When the machine is loaded, rotate the uppercarriage carefully 180° to set the excavator with the travel gear **1** in front of machine travel direction.



	Gerechnet Calculated Calculé	Gewogen Weighed Pesé
Gewicht ohne Werkzeug und Verpackung Weight without tool and packaging Poids sans outillage et emballage	19 500 kg	
Gewicht mit Werkzeug und Verpackung Weight with tool and packaging Poids avec outillage et emballage	19 500 kg	

LIEBHERR	Bezeichnung / Description / Dénomination	Ident-Nr. / Ident No. N° d'ident	Index / Index Index	Blatt / Page Feuille
	TRANSPORTPLAN BALLASTGEWICHT TRANSP.DRW.COUNTERWEIGHT R9150 PLAN DE TRANSP.CONTREPOIDS	11073408	001	1/1

4 Malfunctions

Warning messages and fault messages:

- Various faults are displayed on screen in the form of indicator lights or symbols (see chapter “Control and operating elements”).
- Warning functions can also be supported acoustically (buzzer).

Identifying and rectifying faults and errors:

- Faults can very often be traced back to incorrect operating or maintenance of the machine.
  For each fault, therefore, read the relevant chapter in the operating instructions carefully once more.
- Analyse the cause of the fault and rectify it immediately.
- Describe the fault and all accompanying circumstances as precisely as possible if you contact LIEBHERR customer service.
  Precise information makes it possible to find and rectify the cause of the fault quickly. Additionally, therefore, precise information on the type and serial number of the machine is also required.
- Do not carry out any work which you have not been trained to do.

Fig. 4-1 *LIEBHERR service*

If the cause of the fault cannot be recognised or rectified using the error codes and fault charts, please consult LIEBHERR customer service.

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F3_3	Fuse 10 A	**F35**	Fuse 15 A
F4	Fuse 10 A / E14 - Cigarette lighter	**H10**	Buzzer
F5	Fuse 5 A / Internal light	**K01**	Relay 40 A
F6	Fuse 5 A	**K02**	Relay 40 A / Lights cab and electrical boxes S1 and S2
F7	Fuse 10 A / Supply **T1**	**K03**	Relay / Attachment light
F8	Fuse 30 A	**K04**	Relay 15 A / Windscreen wiper
F9	Fuse 30 A / Flood light electrical boxes S1 and S2	**K05**	Relay 15 A / Windshield washer engine
F10	Fuse 10 A / Light travel alarm top of cab	**K06**	Relay 15 A / Horn travel alarm
F11	Fuse 15 A	**K07**	Relay / Light travel alarm top of cab
F12	Fuse 30 A / Attachment lights	**K08**	Relay timer 15 A
F14	Fuse 10 A	**K09**	Relay 15 A
F15	Fuse 15 A / **U37** and **U38**	**K1_1**	Relay 15 A
F16	Fuse 15 A	**K1_2**	Relay 15 A
F17	Fuse 15 A	**K1_3**	Relay 15 A / Attachment horn
F18	Fuse 15 A / Supply **A164**	**K2_1**	Relay 15 A / **R32**
F19	Fuse 15 A / Supply **A164** and **A165**	**K2_2**	Relay 15 A / **R35**
F20	Fuse 5 A / Supply **A165**	**K2_3**	Relay 15 A / Attachment horn
F21	Fuse 5 A / Display	**K3_1**	Relay 15 A
F22	Fuse 10 A / Master **U31**	**K3_2**	Relay 15 A
F23	Fuse 10 A / Supply **A169**	**K3_3**	Relay 15 A
F24	Fuse 10 A / Supply **A168**	**K10**	Relay
F25	Fuse 10 A / Supply **A170**	**K11**	Relay / Alarm motor stop
F26	Fuse 10 A / Supply **A171**		

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attached to both hose ends and should only be tightened afterwards.
- When tightening the flange on high-pressure lines and hoses with bent fittings, the side with the bent fitting must always be tightened first and then the side with the straight fitting tightened afterwards.
- Any mounting clamps which are located in the centre of the hose may only be attached and tightened subsequently.
- Check daily to ensure that all clamps, covers and protective devices are properly fastened. Doing this will prevent vibration and damage during operation.
- Install the lines and hoses in such a way that they cannot chafe on other lines, hoses or parts.
- A minimum distance from other parts of approx. half the exterior diameter of the hose is recommended. The distance should not, however, be less than 10 to 15 mm.
- When replacing the lines or hoses on moving parts (e.g. from the boom to the stick), check before initial start-up that there are no chafing areas in the entire area of movement.

Disposal

Disposal of the machine

– Make sure that the individual elements of the machine are disposed of correctly after the service life in accordance with all applicable national, regional or local regulations for waste disposal and environmental protection.
– Remove fuel, lubricants and operating fluids from all components before disposal.

Disposal of gas tanks and pressurized tanks

– Release the pressure fully from the pressurized tanks before disposal.
– Remove all fluids or gas from the tanks before disposal.
– Obey the instructions of the tank manufacturer for disposal.

Disposal of fuel, lubricants, operating fluids and consumables

– Collect and store fuel, lubricants and operating fluids in applicable containers before disposal.
– Have fuel, lubricants and operating fluids disposed of in an applicable recycling point.
– Have refrigerant disposed of only by a trained air-conditioning and refrigeration technician.
– Obey the instructions of the fuel, lubricants and operating fluids manufacturer for disposal.
– Have metal parts disposed of in an applicable recycling point.
– Have plastic parts disposed of in an applicable recycling point.
– Have rubber parts disposed of in an applicable recycling point.
– Have electronic components disposed of in an applicable recycling point.

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5.4.2 Lubrication chart

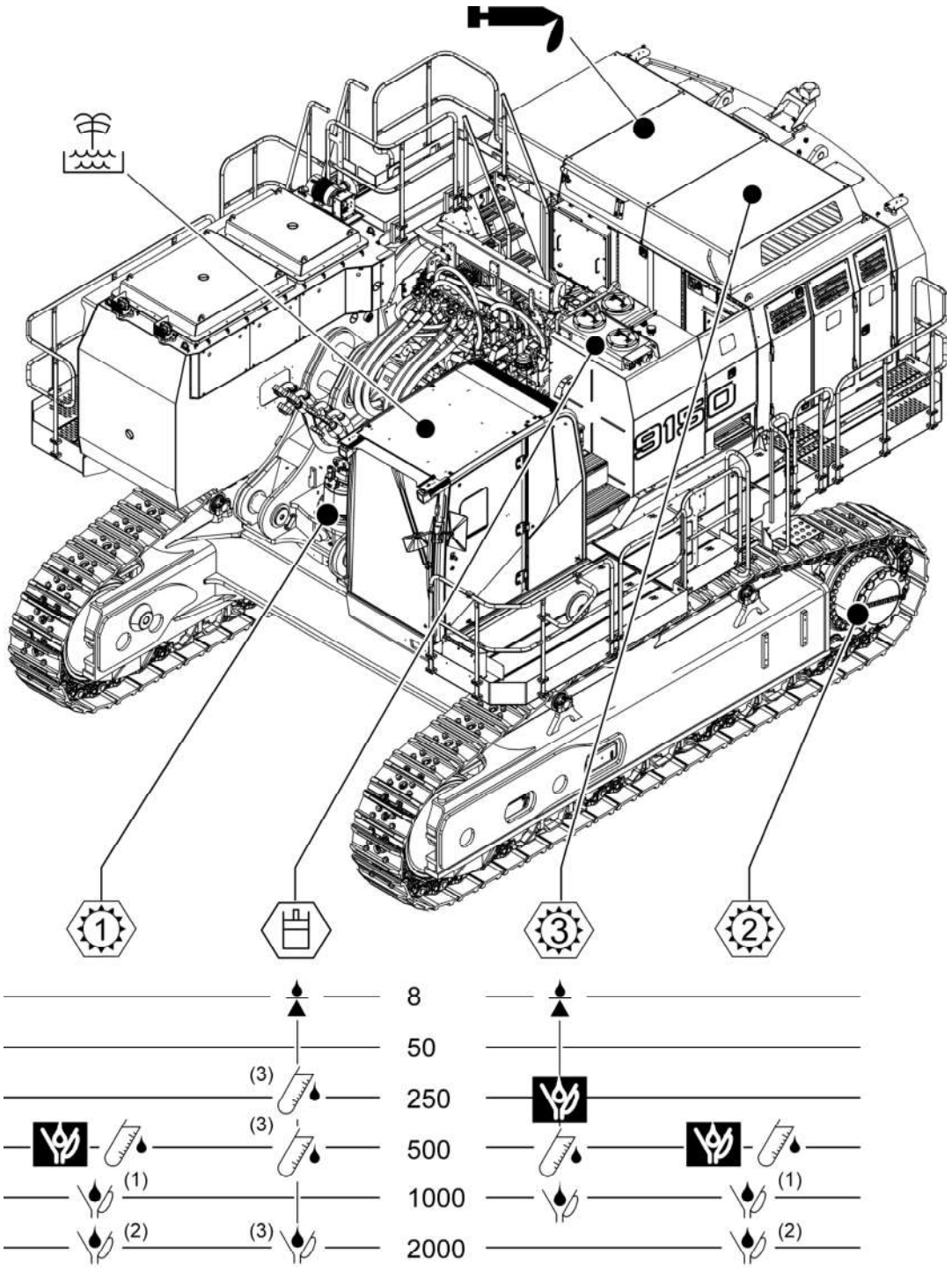

Fig. 5-8 *Lubrication chart - R 9150 E*

Symbol	Display
	Hydraulic system

Fans speed regulation settings

Hydraulic oil	fans speed regulation setting
ISO VG68	"**STANDARD**"
ISO VG100	"**STANDARD**"
ISO VG46	"**COLD**"
ISO VG32	"**EXTRA-COLD**"

Warm-up procedure

The black bar **C** indicates that the ambient temperatures are maximum 20 °C below the operating range **B**.

In the event of a cold start at an ambient temperature included in range **C**, the following warm-up instruction applies to the hydraulic oil:

▶ **1.** Start the electric motor. Carefully activate the working hydraulic circuits. Operate a hydraulic cylinder (Stick for example) and move them to the stop quickly and many times. After approx. 5 minutes, start the travel hydraulic circuits.
Warm-up duration: approx 10 minutes

For temperature below the limits **A** :

▶ **2.** Preheat hydraulic oil in the tank before starting the electric motor.

Biodegradable hydraulic oils

The use of biodegradable hydraulic oils must in any case be discussed with LIEBHER MINING EQUIPMENT COLMAR SAS.

▶ Do not mix biodegradable hydraulic oils from different suppliers and never mix with mineral oils.

▶ Do not use vegetable oils as they do not possess the necessary thermal stability.

Depending on the temperature range, LIEBHERR recommends its poly-alpha-olefin (PAO, HEPR) oils, that are biodegradable according to **CEC-L-103-12** (21 days, > 60%, primary decomposition):

Liebherr Hydraulic Plus or **Liebherr Hydraulic Plus Arctic**

If these oils are not available locally or if further specifications are required, use one of the following oils (before choosing an oil, contact our Customer Service):

Fully saturated synthetic ester-based oils, HEES

Depending on the temperature range, the viscosity grade of the HEES oil must conform to the above specifications for hydraulic oils.

Caution!
LIEBHERR recommends to limit the use of HEES oils to areas where HEES oils are mandatory by local regulations.
Lifetime of components made out of rubber material such as hoses, seals, compensators might be reduced while using HEES oils!
When mixing ester-based biodegradable hydraulic oils with mineral oils, there is a risk of agressive chemical reactions, which might damage the hydraulic equipment.

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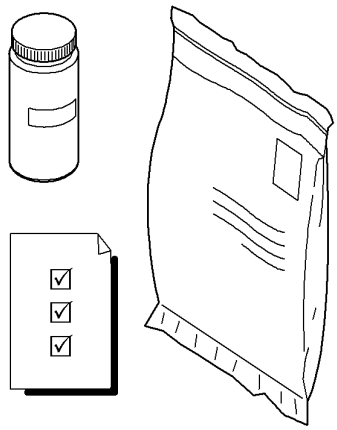
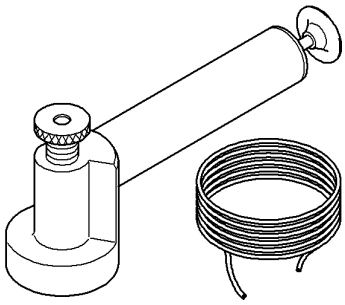
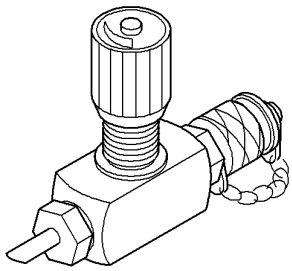
Note!
These sampling kits are prepaid kits and include the cost of the analysis.

Before ordering these sampling kits, check for sample export licence: make sure that the export of the sample is authorized from your location to Europe.

Ident Nr.	Description	Quantity	Illustration
8145660	Sampling kit for mineral and synthetic oils: – sample bottle – envelope addressed to OELCHECK GmbH – sample information sheet	1	
10029626		4	
7018368		6	
7018369		12	
7026817	Sampling kit for biodegradable oils: – sample bottle – envelope addressed to OELCHECK GmbH – sample information sheet	1	
7026088		6	
8145666	Sampling hand pump: – hand pump – sampling hose	1	
5613844	Sampling valve	1	
7019068		1	

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5.7.2 Elastic bedding

- ▶ The rubber buffers **3** must be checked and replaced at regular intervals.
- ▶ For maintenance intervals, refer to Control and maintenance chart.

5.8 Splitterbox

5.8.1 Splitterbox mounting screws

Any incorrect fastening can decrease very much the expected life of the rubber mounts.

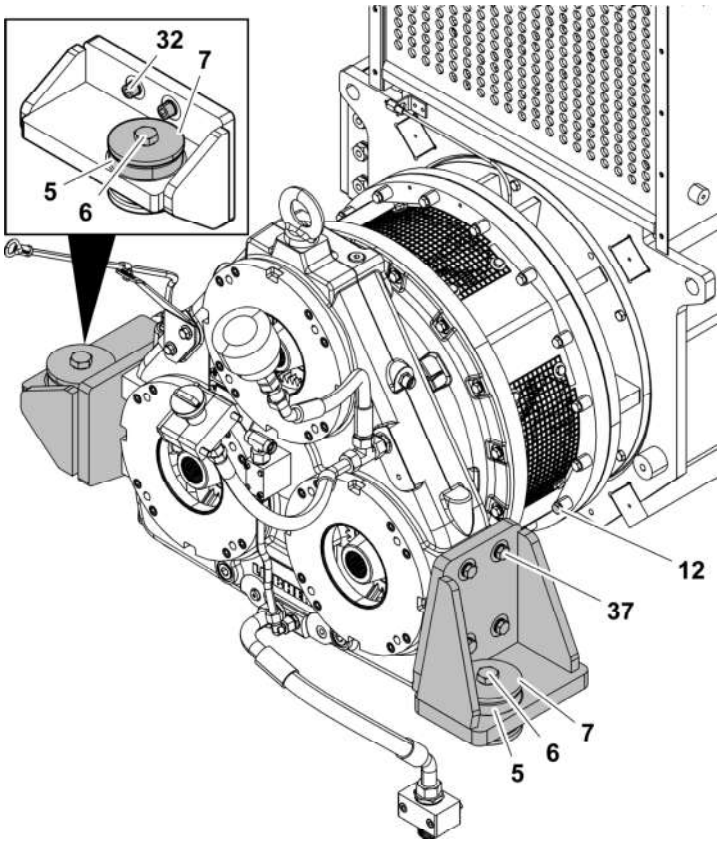

Fig. 5-26 *Splitterbox mounting screws*

		Torque	Quantity
5	Rubber buffer		2
6	Screw M24x140	965 Nm	2
7	Washer		4
12	Hex screw M12x90	110 Nm	16
32	Socket head screw M16x55	270 Nm	4
37	Hex screw M16x55	270 Nm	4

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▶ Close the breather filter.

5.10.5 Hydraulic oil coolers

Cleaning hydraulic oil coolers is necessary to get optimum hydraulic oil cooling.

▶ Clean hydraulic oil coolers with compressed air or a steam cleaner at the intervals given in the control and maintenance chart, and more often if working conditions make it necessary.

5.10.6 Leak oil filter and return filter

The leak oil filter and the return filters are located on the top of the hydraulic tank.

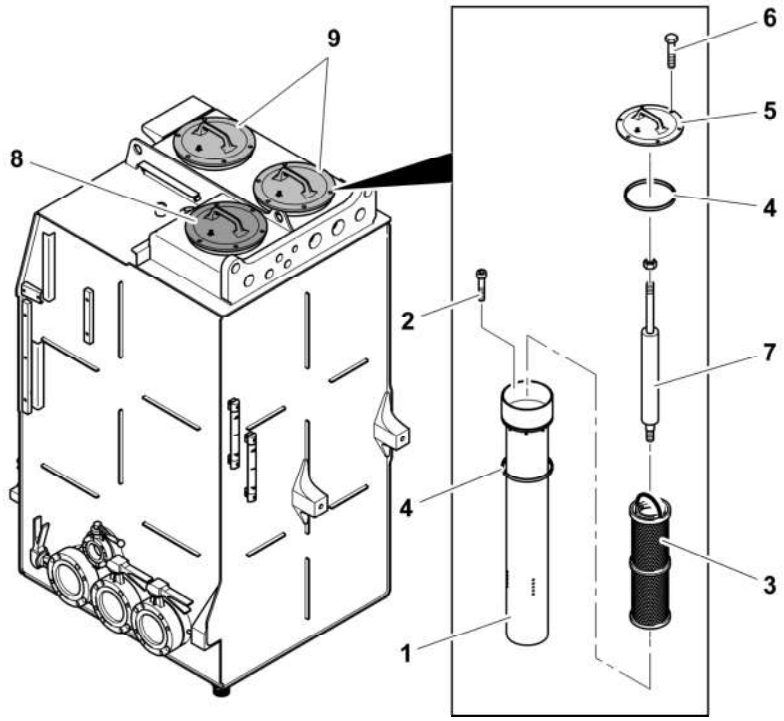

Fig. 5-35 *Oil filter parts*

1 Return pipe
2 Screw
3 Filter element
4 Seal kit
5 Cover
6 Hexagonal screw
7 Magnetic rod
8 Leak oil filter
9 Return filter

▶ Clean the magnetic rods **7** of the two types of filters at fixed intervals.

▶ Replace the filter element **3** at fixed intervals.

▶ For maintenance intervals, refer to the control and maintenance chart.

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5.10.12 Bleed the hydraulic cylinders

Danger!
If the cylinder is not correctly bled, gas bubbles can form in the system (mixture of air and hydrocarbon). At high operating pressures in the cylinder, these gases can explode (Diesel effect).

You must bled the cylinders after each cylinder replacement and after work carried out on the cylinders (replacement of seals, etc.) or the hydraulic circuits (replacement of hose, etc.).

- ▶ Start the electric motor.
- ▶ If possible, move the attachment to put the cylinder side to be bled (**not-supplied side**) in the upper position.
- ▶ Slowly extend the cylinder to the extreme position and then slowly fully retract it again. Make sure that all movements are slow and smooth. Do this process a minimum of 5 minutes.

5.10.13 Bleed the valve blocks

After working on the control circuit (servo oil circuit), you must bleed the valve blocks. You can also do this procedure when the attachment moves jerkily.

- ▶ Make sure that the breather filter is closed. Refer to the related section above.
- ▶ Start the electric motor.
- ▶ Slowly move up and down the boom four times to pressurize the hydraulic system.
- ▶ Lay down the attachment on the ground.
- ▶ Stop the electric motor.

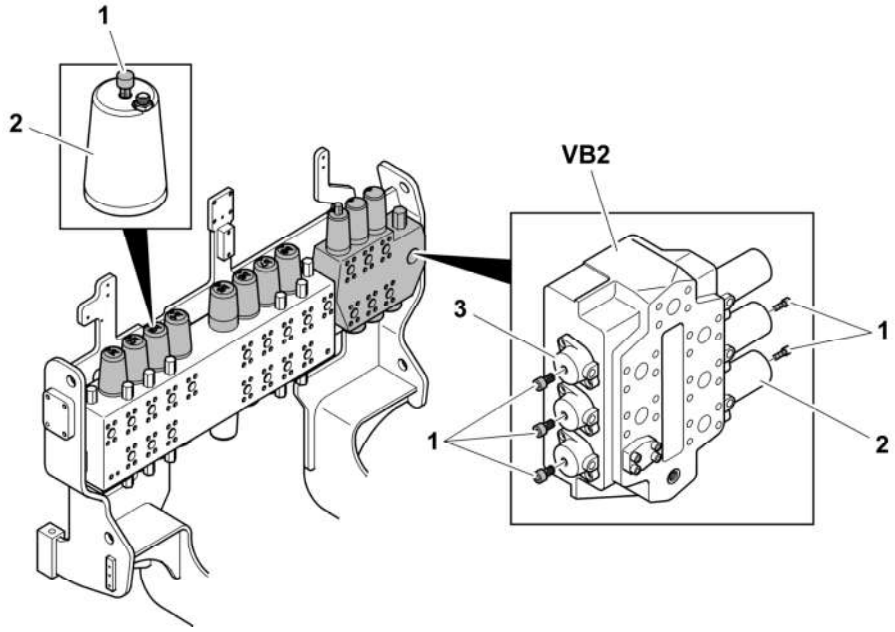

Fig. 5-45 *Bleeding of valve blocks*

Size of the screw (quality class 10.9)	Thread pitch (mm)	Valid for flange size CODE 61 (in)	Valid for flange size CODE 62 (in)	Screw with thread completely dry		Oil/grease on screw or inside the thread	
				(Nm)	(lb.ft)	(Nm)	(lb.ft)
M8	1,25	1/2	1/2	25	18	20	15
M10	1,5	3/4, 1, 1-1/4	3/4	55	41	45	33
M12	1,75	1-1/2, 2, 2-1/2	1	100	74	80	59
M14	2		1-1/4	140	103	110	81
M16	2	3, 3-1/2, 4, 5	1-1/2	230	170	180	133
M20	2,5		2			430	317

Tab. 5-9 *Tightening torques for SAE flanges*

Note!
These tightening torque values are also applicable to the mounting screws of the sealing flanges and hydraulic blocks.

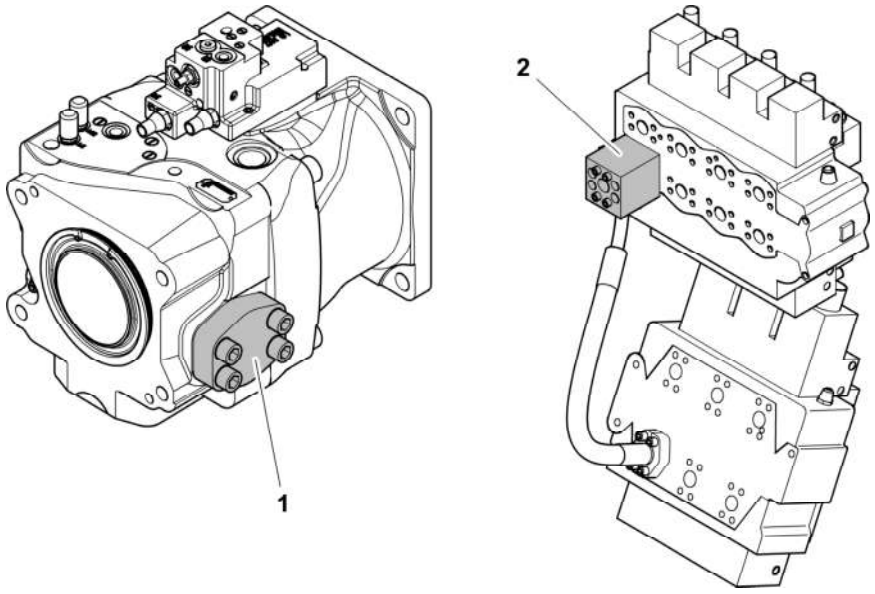

Fig. 5-53 *Sealing flange **1** and hydraulic block **2***

SAE half flanges installation

Caution!
SAE half flanges must not touch hose bearing surface.

To install half flanges:

- ▶ Pre-install first half flange (screw in only by a few threads).
- ▶ Install seal in hose.
- ▶ Install hose into bottom of mounted half flange without touching the bearing sur-

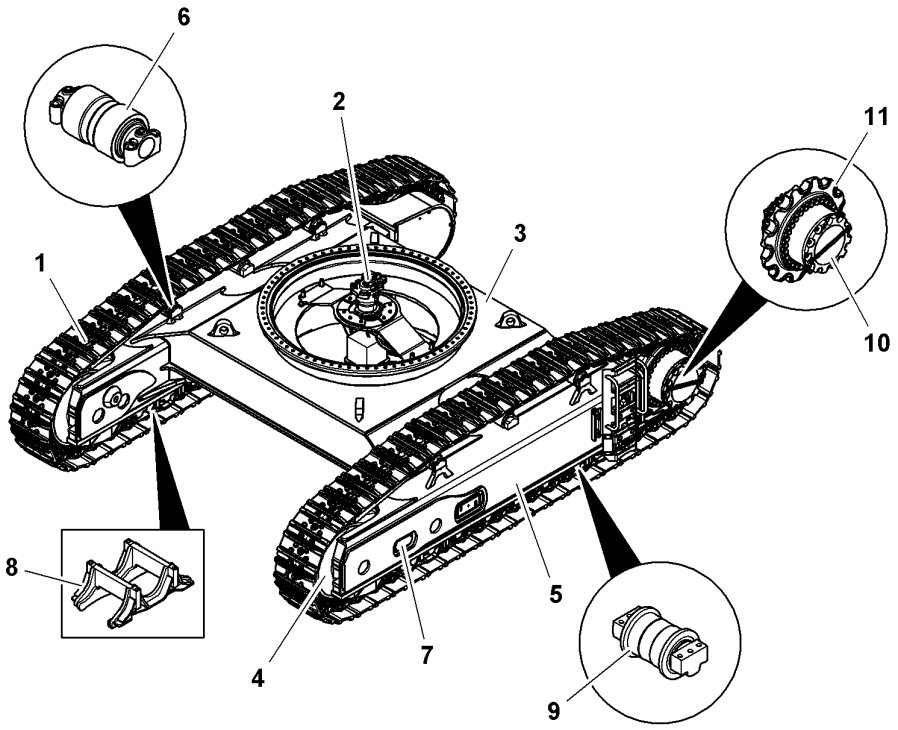

Fig. 5-62 *Undercarriage components*

1	Track chain	**7**	Cover
2	Rotary connection	**8**	Track guide
3	Central part	**9**	Track roller
4	Idler wheel with tensioning unit	**10**	Travel gear
5	Side frame	**11**	Sprocket wheel
6	Carrier roller		

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5.16 Electrical system

5.16.1 Notes on the electrical system

Danger!
Risk of injury due to formation of sparks.

- ▶ Avoid sparks and naked flame when charging batteries or working on the batteries.
- ▶ Always wear protective goggles and gloves.

- ▶ Check that the machine's electrical system is functioning correctly at regular intervals.
- ▶ Burnt-out fuses and bulbs should be replaced immediately once the cause of the defect has been rectified.
- ▶ Rectify defects such as loose connections, abraded cables or badly fastened clamps immediately.
- ▶ Before starting any work on the electrical system, including welding work on the machine, disconnect all the batteries.

Danger!
Risk of injury due to formation of sparks.

- ▶ Disconnect the negative terminal (-) first and connect it last.

5.16.2 Batteries switches

For the location of the batteries switches, you can refer to chapter 3 of this manual.

- ▶ Before starting any work on the electrical system, including welding work on the machine, switch all the batteries switches to position **"OPEN"** (principal and additional/optional batteries).

Refer to chapter 3 of this manual.

- ▶ When washing the machine, cover the electrical units (particularly the generator, cabling, electronic components and measured value sensors) to prevent water penetrating.

Note!
Batteries can become flat if the machine is out of service for longer periods.

- ▶ Before laying up the machine for longer periods, disconnect the batteries. Refer to chapter 3 of this manual.

5.16.3 Battery care

The battery must always be kept clean to ensure that it is able to function perfectly.

- ▶ Particular care should be taken to clean the pole ends and cable terminals **1** regularly and to then cover them with a thick layer of acid proof grease.

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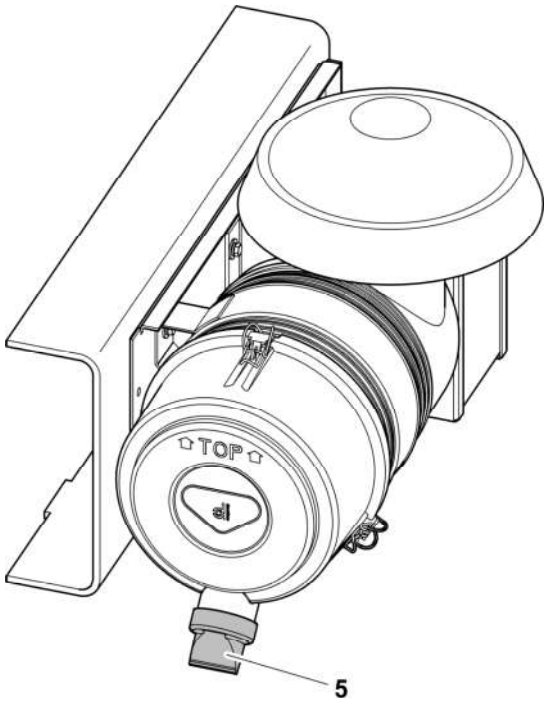

Fig. 5-85 *Aeration device*

5 Dust discharge valve

The air filters for the cab pressurization must be cleaned regularly.

Clean the air filters

- ▶ Press to open the dust discharge valve **5**.
- ▶ Regularly replace the main element and the safety element of the air filter system of this device.
- ▶ For maintenance interval, refer to the control and maintenance chart.

5.19 Greasing the machine

5.19.1 Lubrication of attachment bearing points

Automatic lubrication

The lubrication points of the working attachment, with those in the grab tool area, are connected to the centralized lubrication system of the machine. Thus, they are lubricated automatically with grease at regular intervals during the operation.

- ▶ For grease specifications, refer to the lubricant chart.

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5.20.9 Mounting bolts of removable side frames (if installed)

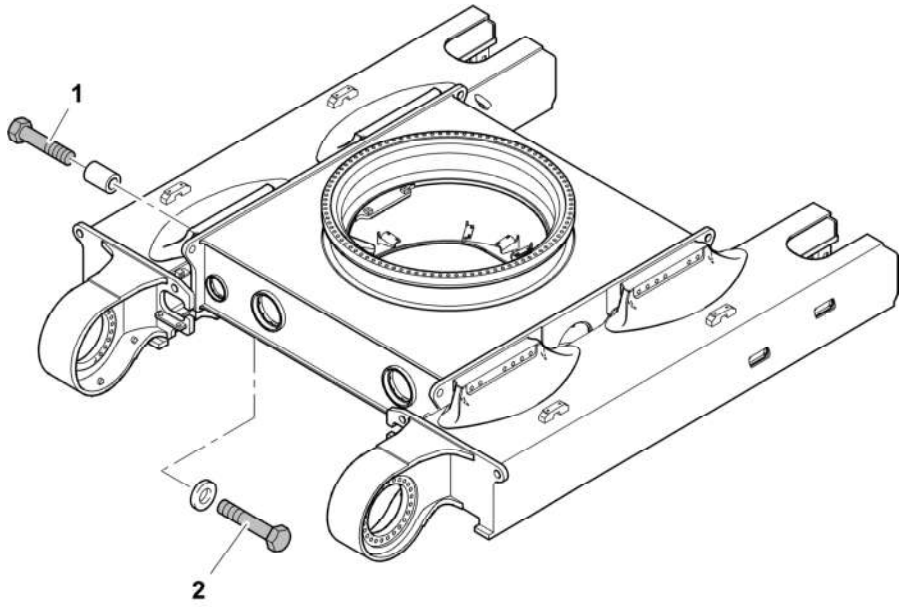

Fig. 5-94 *Side frames bolts*

		Torque	Quantity
1	Screw M33x240	2575 Nm	24 (2x12)
2	Screw M42x320	4810 Nm	8 (2x4)

▶ Apply black grease (ID. 8503279) to the head and thread of the screw **2** and to the two sides of the washer.

5.21 Quick coupler (optional)

▶ Refer to the Operator's Manual of the quick coupler manufacturer for:
– detailed description of maintenance work to be performed on this device
– maintenance intervals

5.22 Drive unit brakes and swing gear brakes

Both the drive unit brakes and the swing gear brakes are spring-applied, pressure-released multi-plate brakes. They are ventilated hydraulically and are fully sealed and integrated in the travel gear or swing gear transmission.

Their usage purely as parking brakes makes them wear-free and therefore maintenance free.

WORK TO BE PERFORMED AT 250, 750, 1250 HOURS, ... Check ❑ for first and only interval *or* Check ❍ for repeat interval	Check	Initials	Comments
General comments:			

Tab. 5-11 *250 Hours maintenance schedule - R 9150 E*

WORK TO BE PERFORMED AT 1000, 3000, 5000 HOURS, ... Check ❑ for first and only interval *or* Check ❍ for repeat interval	Check	Initials	Comments
Replace filter element of the return filters (if hydraulic hammer is used)	❍		
Replace filter element of the leak oil filter	❍		
Replace filter element of return-line filter for the hydraulic hammer (optional equipment)	❍		
Replace the hydraulic tank breather filter	❍		
Replace the hydraulic tank breather filter (if hydraulic hammer is used)	❍		
Replace control oil filter element	❍		
Replace swing pumps replenishing oil filter elements	❍		
Do a visual check of the oil cooler protection filters, clean or replace if necessary (optional equipment)	❍		
Replace filter elements of bypass filter (optional equipment)	❍		
Check and adjust primary and secondary pressure relief valves	❍		
ELECTRICAL SYSTEM			
Do a visual check of the head and floodlights, clean and adjust if necessary	❍		
Press to open dust discharge valve on aeration devices for cabin and electrical boxes (optional equipment)	❍		
Replace main element on aeration devices for cabin and electrical boxes (at least once a year) (optional equipment)	❍		
Replace safety element on aeration devices for cabin and electrical boxes, after 3 services of main element (optional equipment)	❍		
Do a visual check of electric harness, sensors for damage and/or rubbing zone	❍		
Do a detailed check of fuses and circuit breakers	❍		
Do a visual check of wiring system damage	❍		
Check battery electrolyte level (refill if necessary) and clean battery terminals	❍		
HIGH / LOW VOLTAGE SYSTEM			
Check the function of anti-condensing heaters from S2 box (current of continuity)	❍		
Clean up the electric rotary connection	❍		
Check the carbon brushes of electric rotary connection, replace if necessary	❍		
Lubricate the contact bow of the slip ring	❍		
Grease the bearings of the slip ring	❍		
CABIN			
Do a visual check of the cabin for oil/fluids leaks	❍		
Operate air conditioner every week for 10 minutes	❍		

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WORK TO BE PERFORMED AT 2000, 4000, 6000 HOURS, ... Check ❑ for first and only interval *or* Check ❍ for repeat interval	Check	Initials	Comments
FIRE FIGHTING SYSTEM			
Do a visual check of the fire fighting system condition (optional equipment, refer to the fire fighting system documentation) - If any issue contact fire fighting local dealer	❍		
Follow the inspection intervals recommended by the specific Health and Safety rules existing in country and/or on mine site	❍		
START THE ELECTRIC MOTOR TO CHECK THE FOLLOWING ACTIONS			
General: Maintenance work must include the check of the correct functions of hydraulic and electric systems before starting operation	❍		
Attachment: Check function of the working attachment lubrication system during operation	❍		
Attachment: Check if the damping system on equipment is working correctly	❍		
Uppercarriage: Check position of the hydraulic shut-off valve	❍		
Uppercarriage: Check movement and locking of the access ladder (optional equipment)	❍		
Uppercarriage: Check that the swing movement of the uppercarriage is locked when the access ladder is lowered (optional equipment)	❍		
Swing Gear: Check function and operation of the swing brake	❍		
Swing Ring: Check function of the swing ring bearing lubrication system during operation	❍		
Swing Ring: Check function of the swing ring teeth lubrication system during operation	❍		
Electrical system: Clean and check LCD screen of the display for proper function when starting	❍		
Electrical system: Check indicator lights and gauges on the control panel when starting	❍		
Electrical system: Check for warning and fault messages on display (monitoring, grease, air conditioning, ...). If necessary refer to chapter 4 in the Operating Manual to identify and rectify faults and errors.	❍		
Cabin: Check if the safety lever is working properly	❍		
Cabin: Check the horn	❍		
Cabin: Check for green flash light on control module if fire fighting system is installed	❍		
Cabin: Check the heater function (before the cold season)	❍		
Cabin: Check the pressure switch function on the dryer / accumulator unit	❍		

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6.2 Centralized lubrication system

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Operating Manual

Centralized Lubrication Systems

R9150

Product identification

Manufacturer: SKF Lubrication Systems Germany GmbH

Type: R9150

Type no.: 1133

Address

Heinrich-Hertz-Str. 2-8

69190 Walldorf - Germany

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2.13 Energies

	• Electricity
	• Temperature (hot or cold surfaces)
	• Position energy (raised components)
	• Parts subject to pressure (operating pressure, oil pressure, grease pressure, air pressure, etc.) • Bursting reservoir if filled by a high-performance pump
	• Parts subject to spring tension

2.14 Lubricants

- Greases
- Oils

Transport lifecycle	
Residual risks	**Remedy**
Tilting or falling of parts during transport, e.g. over inclines.	Secure parts against tilting or falling during transport (e.g. using tapes, belts, ropes, etc.).
Dropping of lifted parts or tools.	No people may remain under suspended loads. Keep unauthorized persons away. Secure suspended loads using suitable hoisting equipment (e.g. tapes, belts, ropes, etc.).

2.15 Existing residual risks

Installation life cycle	
Residual risks	**Remedy**
People slipping due to floor contamination with spilled or leaked lubricant	Take care when filling. Bind and remove leaked or spilled lubricant immediately with a suitable agent. Follow the operational instructions for handling lubricants and contaminated parts.

3.5 Initial commissioning / daily start-up

Ensure that:

- The machine manufacturer's instructions regarding the lubricants to be used are observed.
- All safety devices are completely available and functional.
- All connections are correctly connected.
- All parts are correctly installed.
- All warning labels on the centralized lubrication system are completely available, highly visible and undamaged.
- Illegible or missing warning labels are to be replaced without delay.
- The system pressure specified for proper operation is adhered to and neither exceeding nor falling below specification.

3.6 Cleaning

- Risk of fire and explosion when using inflammable cleaning agents. Only use non-flammable cleaning agents suitable for the purpose.
- Do not use any aggressive cleaning agents.
- Do not use steam jet or high pressure cleaners. Otherwise electrical components may be damaged. Observe the protection classes, e.g. IP (International Protection) and NEMA (National Electrical Manufacturers Association), required for proper operation.
- Cleaning work on energized components may be carried out by electrical specialists only.
- Do not touch cables or electrical components with wet or damp hands.
- Mark damp areas accordingly.

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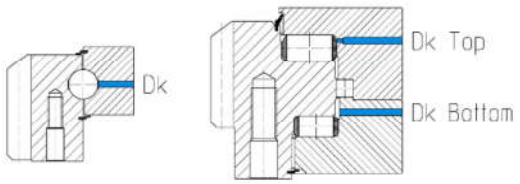
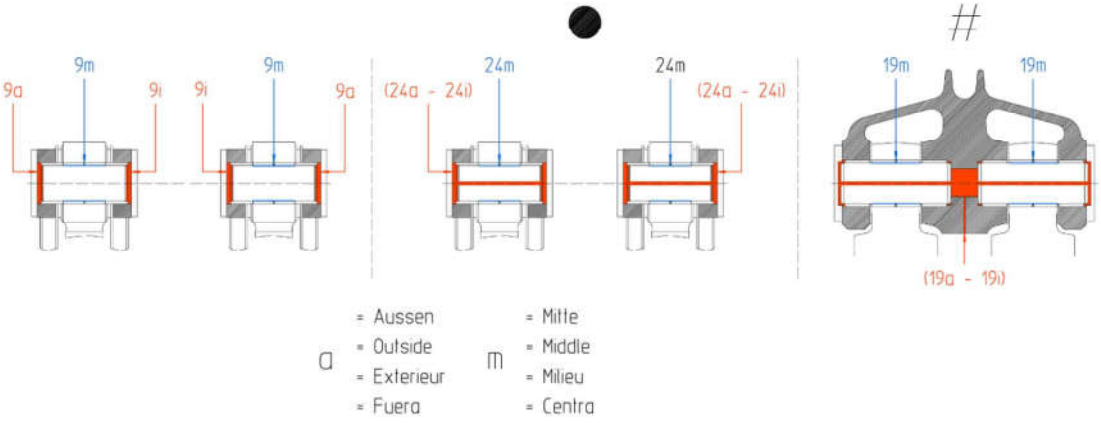
Characteristics of lubrication points on the excavator





All the necessary information regarding the greasing points and quantities are available in chapter 21 of the Liebherr Service Manual.

Fault signals

Each time a fault arises, an acoustic signal will be given by the controller (buzzer) and the two flashing lights on the pump stations will be activated. Buzzer and flashing lights can be deactivated by pressing the ENTER key.

In two cases this will not be possible:

- very low grease level in the barrel (LL)
- both sensors for monitoring the lubrication of the slewing rim are defective

In these cases, buzzer and flashing lights will be deactivated when switching off the motor, however, will be activated again when starting the motor.

Adjusted values

For service personnel with PC, corresponding software and authorization: