

## Operating manual

Hydraulic excavator  
R 9150 - R 9150B

from serial number 38079

### Document identification

ORIGINAL MANUAL

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### Product identification

**Manufacturer:** Liebherr-Mining Equipment Colmar SAS  
**Type:** R 9150 - R 9150B  
**Type no.:** 1657 / 1857

### Address

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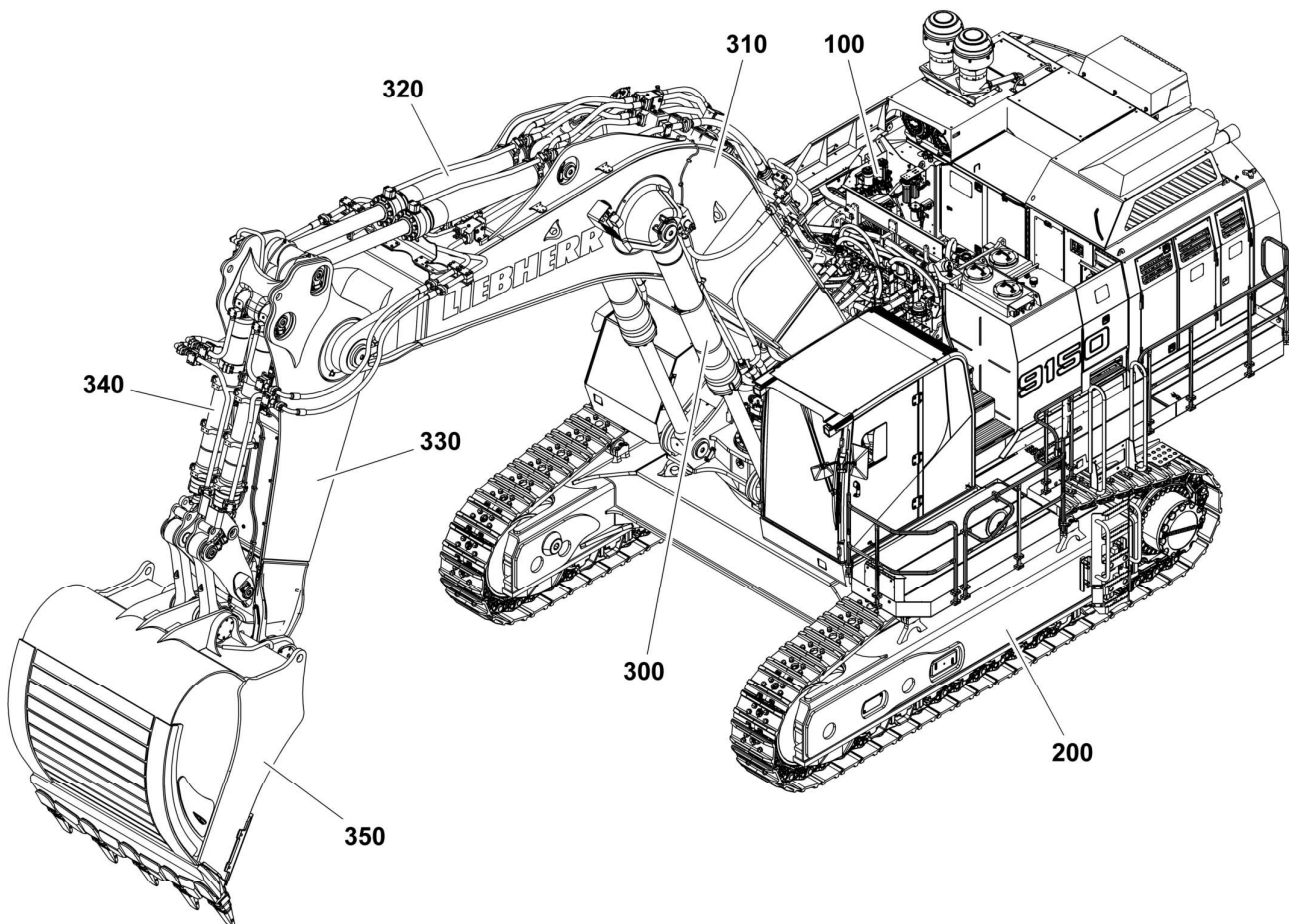
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# 1 Product description

## 1.1 Assembly - overview

This section comprises an overview of the machine and descriptions of the components shown.

### 1.1.1 Machine and construction equipment



**Fig. 1-1** Machine and construction equipment - backhoe attachment

100	Uppercarriage	320	Stick cylinder
200	Undercarriage	330	Stick
300	Boom cylinder	340	Bucket tilt cylinder
310	Boom	350	Backhoe bucket



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## Safety-First Working Conditions

### Safe Service Access

The R 9150 B is fitted with ergonomic access for fast and safe maintenance. All service points are within reach from one side and at machine level. The R 9150 B's upperstructure is accessible via a robust fixed ladder and integrates one large central platform equipped with slip resistant surfaces. The wide catwalks facilitate maintenance and ensure comfort during all the operations.

### Secure Maintenance

All components have been located to allow for effortless inspection and replacement. Numerous service lights are perfectly located in the service areas to guaranty suitable maintenance conditions, day or night. Emergency stops have been strategically placed in the cab, engine compartment and at ground level. The R 9150 B eliminates hazards to ensure a safe environment for the service staff during maintenance.



### Improved Accessibility Ease of Maintenance

- Wide walkways with slip-resistant surfaces
- Emergency ladder available outside the cab
- Wide open service access
- Reflective stripes on counterweight
- 45° hydraulic driven access stair (optional)

### Working Environment Control

- Rear and side camera system
- LCD color screen to display cameras view
- 9 Long-range working LED lights located on attachment and upperstructure

### Commitment to Employees Safety

- Safe and protected access to the components
- Major components centralized to be easily accessible
- E-stops located for the operator and maintenance staff
- Ground-level fluid maintenance hub

## Efficient Machine Protection

### Protection Against Fire Ignition

The engine compartment integrates a bulkhead wall that separates the engine from the hydraulic pumps. This reduces the risk of hydraulic oil entering the engine compartment. The turbochargers and exhaust systems are heat shielded, and all the hydraulic hoses are made from a fire resistant material.

### Automatic Fire Suppression System

The R 9150 B can be equipped with a fully integrated fire suppression, employing a dual agent solution to prevent and protect the machine. The fire suppression system has both automatic and manual release capabilities, emergency stop devices are strategically located on the machine to be easily accessible in any case by the operator.

# Optional Equipment

## Undercarriage

- Narrow track pad width
- Large track pad width
- Removable side frames
- Rock protection for travel drive
- Protection for undercarriage center frame
- Rock protection for idler wheel
- Rock protection for sprocket
- Full length chain guide

## Uppercarriage

- Hydraulically operated 45° access stair
- Electric-powered refueling pump
- Heavy counterweight (22,000 kg / 48,500 lb)
- Increased fuel tank capacity (24h operation)
- Grid protection for front headlights
- Semi-automatic swing brake with joystick control
- Rock protection for swing gear and grease lines
- Wiggins fast fueling system
- Wiggins fast fueling system with Multiflo Hydra-Flo®
- Wiggins couplings for ground level access service
- Steel grease lines on swing ring
- Swing ring scrapers
- External grease refill station (hydraulic-powered)
- Hydraulic connection with quick coupler for external grease refill station
- Right-hand bumper
- External starting device

## Hydraulic System

- Oil cooler inlet screen

## Operator's Cab

- 4-point seat belt
- Cab elevation (500 mm / 1'6" / 1,200 mm / 3'9" / 1,600 mm / 5'3")
- Cab pressurization / cab pressurization with HEPA filter
- FOPS top guard with additional sun protection
- Operator comfort package
- Front protective grid
- Pre-heating system for cab
- Roof glazing
- External louvers

## Attachment

- Piston rod guard for bucket cylinder (BH)
- Piston rod guard for hoist cylinder (BH/FS)
- Piston rod guard for stick cylinder (FS)
- Quick change coupling

## Specific Solutions

- Arctic package (-20 °C / -4 °F, -35 °C / -31 °F, -50 °C / -58 °F)
- Sound attenuation package
- Hydraulic arrangement for special application (hammer / shear / tooth ripper / grapple / coupler)
- Arrangement for object handling operation

## Safety

- Additional LED lighting with timer (for main access)
- Automatic fire suppression system
- Additional emergency stop (ground level)

## General

- Maritime transport packaging

- For demolition work, digging and crane operations etc., always use protective devices specifically designed for the purpose.
- For terrain which is difficult to gain an overview of and whenever necessary, ask for the assistance of a spotter. Only permit one person to give you signals.
- Authorize only experienced people to attach load and to give indications to the machine operator. This people must be in the operator's sight or in radio contact with him.
- Depending on the attachment combination, there is a risk of collision between the work tool and the machine (uppercarriage and undercarriage). The greatest degree of care must be taken to avoid damage.
- Depending on the attachment combination, there is a risk of collision between the work tool and the cab, the cab protection or the boom cylinders. The greatest degree of care must be taken to avoid damage when the hoe teeth come within this area.
- Depending on the attachment combination, there is a risk of collision between the work tool and the attachment parts. The greatest degree of care must be taken to avoid damage.
- Depending on the attachment combination, there is a risk of collision between the lift ring of the attachment and the cab or the cab protection. Before operating, ensure that there is no risk of collision, especially on excavator with cab elevation. If necessary remove the lift ring.
- In case of a thunderstorm:
  - lower the attachment to the ground and if possible anchor the digging tool into the soil.
  - leave the cab and move away from the machine before the storm breaks out. Otherwise, you must stop the excavator, turn off the radio and keep inside the closed cab until the end of the storm.
- Auxiliary control units can have various functions. Always check their functions when starting up the machine.
- Stop the swinging motion of the uppercarriage when lowering the attachment into a ditch without striking the attachment on the ditch walls.
- Inspect the machine for damage if the attachment has been swung into a wall or any other obstacles.
- Applications in which the attachment is to be used to strike the material being extracted are not permitted, even when working in a longitudinal direction.
- Repeated strikes against an object leads to damage to the steel structures and machine components.
- Please refer to your Liebherr dealer if special teeth for heavy-duty or special applications are required.
- Do not attach too large bucket or bucket with side cutters or that are during operations with rocky material. This would prolong the work cycles and may lead to damage to the bucket as well as further machine components.
- With the 2x45° offset articulation, the offset position may only be employed if the working tool or the attachment does not touch the material.
- Operation of the offset articulation to drill into the material is not permitted.
- Do not lift the machine during operation. Should this happen, lower the machine slowly back to the ground.
- Do not let the machine fall heavily on the ground and do not hold it back with the hydraulics. This would damage the machine.
- During operation with the attachment it is forbidden to raise the machine with the dozing blade (e.g. carving at the ceiling when tunnelling).
- Do not dig under the undercarriage. Take all necessary measures to prevent ground collapse under the machine.

surrounding areas before welding, drilling, firing or grinding.

Ensure adequate ventilation. Risk of fire or explosion.

- Before welding repairs on other parts, always disconnect the battery. Always remove the negative terminal first and reconnect it last.
- Nevertheless if welding repair should be done on components which may contain inflammable gases (welded counterweight, hydraulic tank, fuel tank, ...), these components must be previously and sufficiently ventilated with pressurized air to avoid all fire or explosion hazard
- Before welding, connect the ground cable as close as possible to the welding point, so the welding current will not run through parts like the swing ring, rotary connection, gears, bushings, bearings, hinges, joints, hydraulic hoses, sockets, rubber parts or seals.

### Process materials

- When working with oils, greases and other chemical substances, observe the appropriate current safety regulations for the product.
- Ensure that process materials and replacement parts are disposed of in a safe and environmentally acceptable manner.
- Take care when handling hot process materials (Risk of burning and scalding).

### Repair work

- Do not attempt to lift heavy parts. Use devices which are suitable for this purpose and which have sufficient load capacity. When replacing single parts and larger subassemblies, carefully secure them on lifting devices so that they do not present a risk. Only use suitable and correctly functioning lifting devices and load take-up devices with adequate load capacity.  
Do not stand or work under swinging loads.
- Do not use lifting devices which are damaged or do not have sufficient load carrying capacity.  
Wear work gloves when working with wire cables.
- Authorize only experienced people to attach load and to give indications to the crane operator. This people must be in the operator's sight or in radio contact with him.
- When working above body height, use safe climbing devices and working platforms which are appropriate for the job.  
Do not use machine parts as climbing devices if they are not designed for this purpose.  
When working at height, wear a harness to prevent falling.  
For further information, see section "Maintenance anchor points" or contact Liebherr customer service.
- Ensure that all grips, steps, rails, platforms and ladders are free of dirt, snow and ice.
- Pneumatic cylinders do not have to be used as handles. Open doors and covers carefully, so that pneumatic cylinders do not hit their stops, because this could cause mechanical damages.
- Make sure the equipment on which you will operate is securely supported before working (e.g. replacing teeth). Prevent metal touching metal when doing this.
- For safety reasons, never open and remove a track chain unless having previously totally released the pretension of the chain tensioning unit.
- Never lay under the machine if it is raised with work equipment and has not been securely supported with appropriate supports.



**Plate 100: Warning according to Proposition 65 (for the U.S. market)**



**Plate 101: Lashing point label**

Indicates the location of lashing points on the excavator.



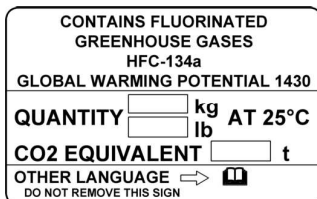
**Plate 102: Lifting point label**

Indicates the location of lifting points on the excavator.



**Plate 103: Anchor point label**

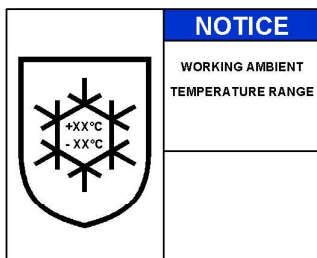
Indicates the location of anchor points on the excavator.



**Plate 104: Label for the air conditioning system**

This label is installed on the air conditioning compressor. It gives the following information about the material contained in the system:

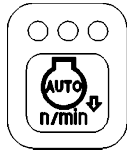
- type
- designation
- quantity
- Global Warming Potential



**Plate 105: Arctic package label (optional equipment)**

Gives the applicable working ambient temperature range if the machine has an optional arctic package.

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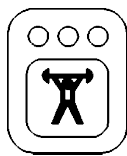
### Auto idle

The auto idle function reduces automatically the engine speed, e.g. when the machine is on but you do not operate it.

- ▶ Push the "Auto idle" button.
  - ↖ The auto idle function is on, but it is not activated.
  - ↖ The LED on the button comes on.
- ▶ If you let the joysticks and pedals in neutral position during the specified auto idle interval:
  - ↖ The auto idle function is activated.
  - ↖ The engine speed is automatically reduced.
  - ↖ The E / P mode and the engine speed are stored. The related symbol flashes on the display.

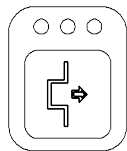
You can set the auto idle interval in the submenu "Auto idle control" of the monitoring display.

- ▶ If you push on the "Increase engine speed" button while the auto idle function is activated:
  - ↖ The engine speed does not change.
  - ↖ The new step is stored.
- ▶ If you push on the "Decrease engine speed" button while the auto idle function is activated:
  - ↖ If the new step is higher than the auto idle speed, the engine speed does not change and the new step is stored.
  - ↖ If the new step is lower than the auto idle speed, the auto idle function is deactivated.
- ▶ If you operate the joysticks or the pedals:
  - ↖ The auto idle function is deactivated.
  - ↖ The engine speed is set to the stored value.
- ▶ Push the "Auto idle" button again.
  - ↖ The auto idle function is off.
  - ↖ The LED on the button goes off.



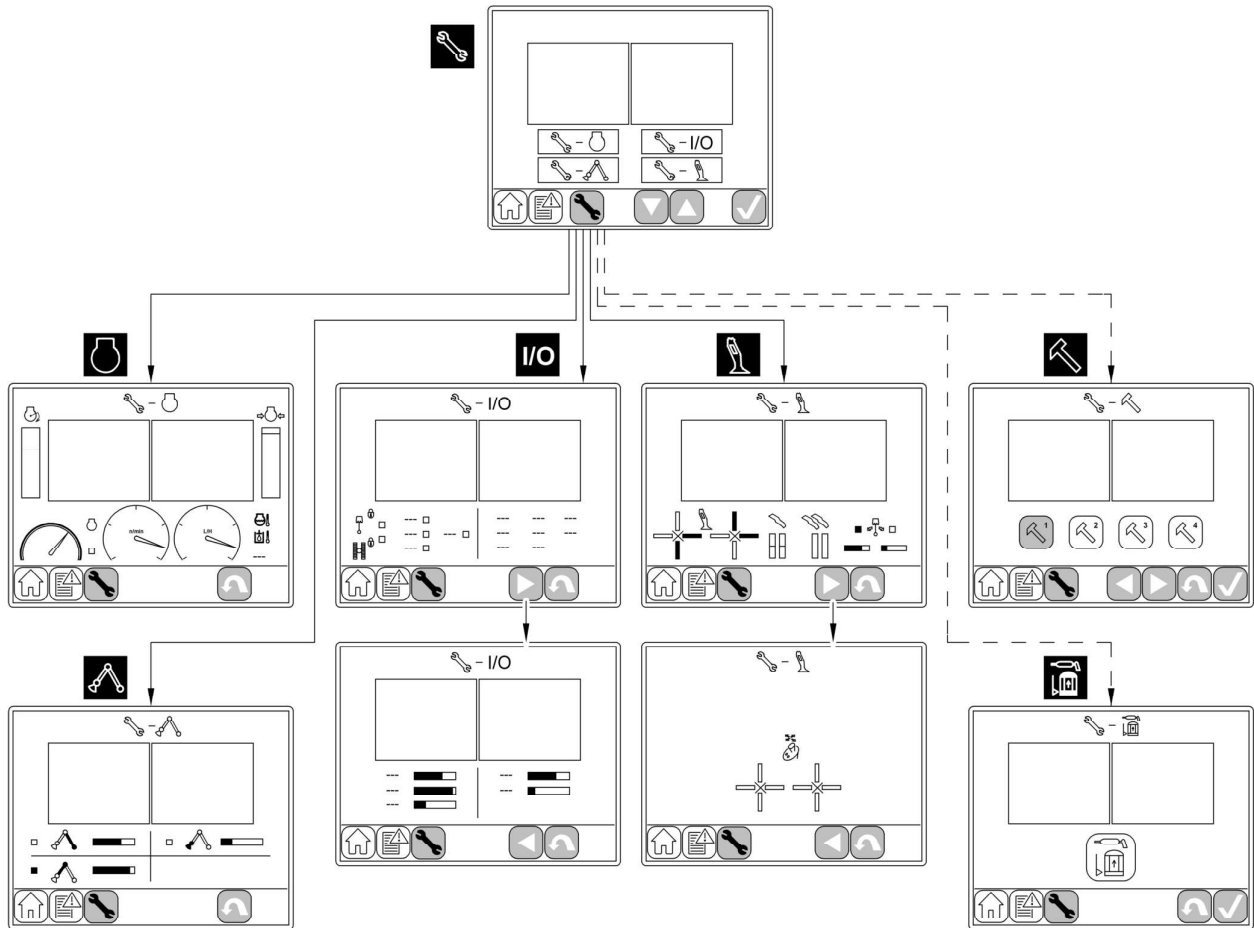
### Automatic stick draw in (for shovel attachment only) (optional equipment)

- ▶ Push the button.
  - ↖ The function is on, but it is not activated.
  - ↖ The LED in the button comes on.
  - ↖ If necessary during the work of the machine, the function is automatically activated and helps draw in the stick.
- ▶ Push the button again.
  - ↖ The function is off.
  - ↖ The LED in the button goes off.



### Quick coupler (optional)

- ▶ Refer to the Operator's Manual of the quick coupler manufacturer.



**Fig. 3-15** Submenus of the menu "Check"

**Submenus:**

**Engine**



This submenu shows in real time different parameters values of the engine.

**Inputs Attachment**



This submenu shows the status of digital and analogical inputs of the machine attachment.

**Inputs / Outputs**



This submenu shows the status of digital and/or analogical:

- control inputs and/or movement inputs of the machine
- control general outputs of the machine



- ▶ 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:

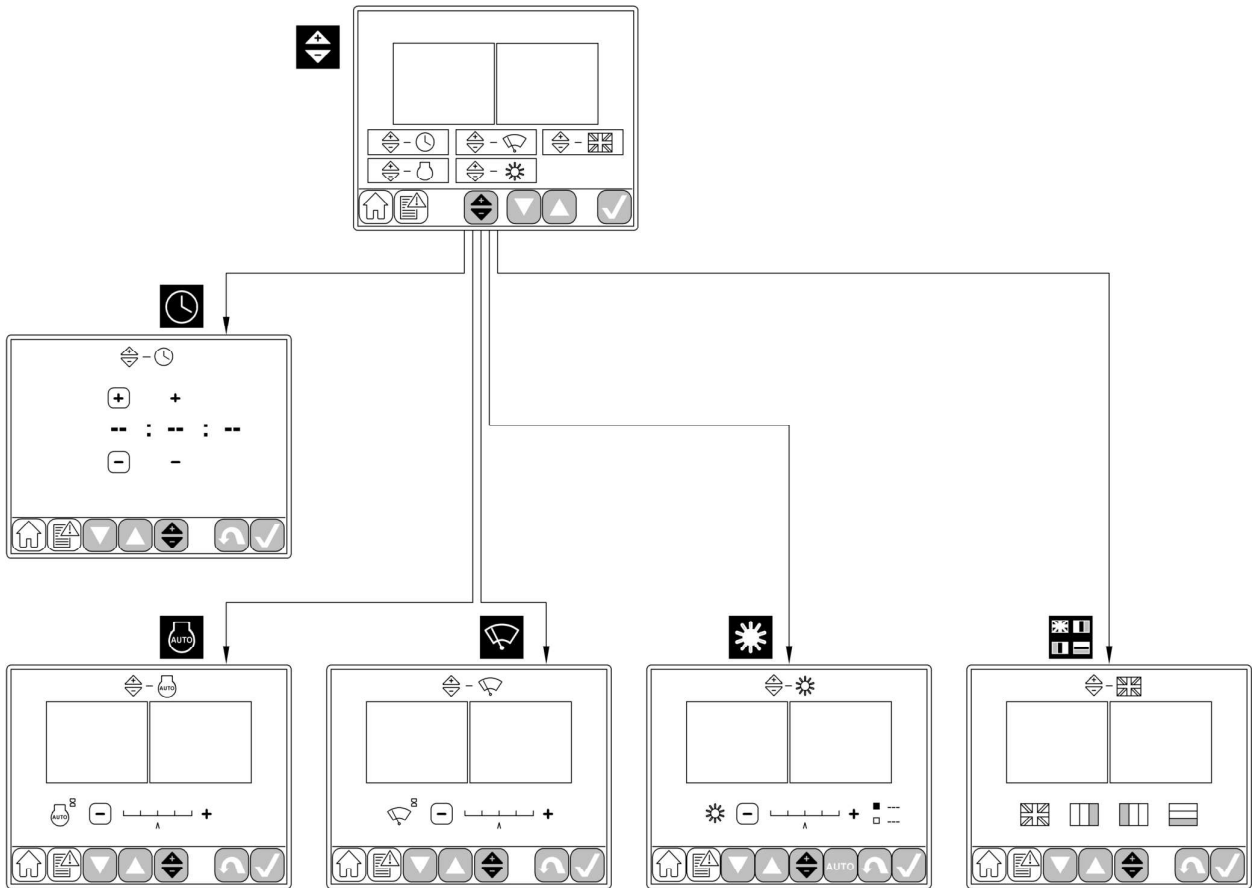


Fig. 3-17 Submenus of the menu "Settings"

### Submenus:

#### Time



This submenu is used to set the time.

**Grease level low**

This symbol is shown if the grease level falls below the minimal level.

- ▶ Stop operation and turn the engine to off.
- ▶ Find and rectify the cause of the problem.
- ▶ Add grease to get the correct level.

**Greasing failure**

This symbol is shown if a failure occurs on the lubrication system.

- ▶ Stop operation and turn the engine to off.
- ▶ Find and rectify the cause of the problem.

**Greasing module not in operation**

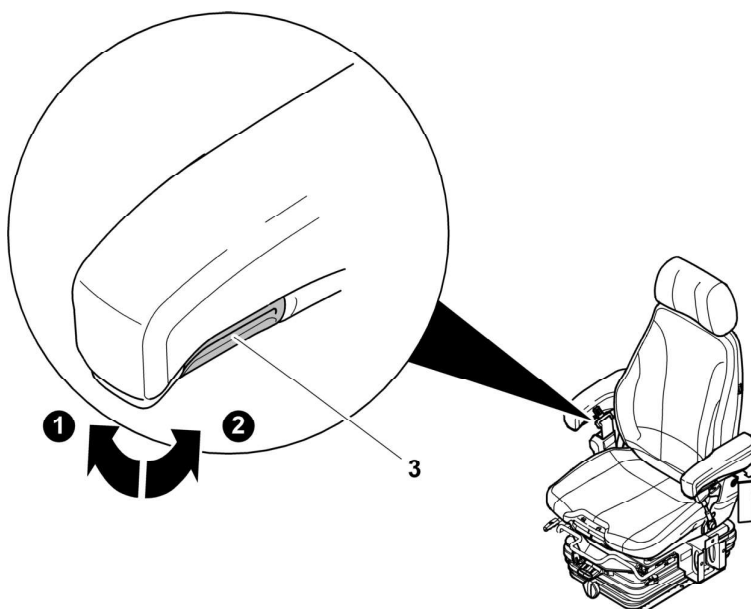
Only available with the greasing module **A15**, this symbol is shown if a failure occurs on the module.

## 3.2 The access and the outfit of the cab

### Safely getting up

- Proceed with the same precautions to climb up or down onto the machine, as to install yourself at the operator's seat.
- When getting up or down, position the machine on even, horizontal ground. The upper structure should be positioned with the undercarriage in such a way that the steps and ladders are aligned with each other.
- Ensure that steps, ladders and hand-rails (grips) are in good condition. In particular, you should ensure that they are free of dirt, oil, ice and snow.  
**NOTE:** To ensure that the doors open properly in all weather conditions, the door seals must be dusted with talc or silicon at least every two months or more often if required. The door hinges and locks should be greased regularly.
- Face the machine when getting in or out and always use three-point support, i.e. two hands and one foot or two feet and one hand must always be in contact with the access system at the same time.
- If you are able to reach the door handle with your free hand, open the doors before you climb any higher. External influences, such as wind, can make it more difficult to open doors. Because of this, always use your hand for control when opening doors. Ensure that the door is latched open to prevent it slamming open and shut.
- In case of bad weather conditions, be particularly vigilant to realise the climbing and descent from the cab with the best safety conditions, and do or give the instructions to the execution of prior preparations to be accomplished, as enunciated above, in order to displace yourself safely.
- Be particularly vigilant with those prerequisites conditions.
- For cab with a side door:
  - Now continue to climb up, still using the three-point support and sit down in the operator's seat as soon as you enter the cab.
  - Fasten the safety belt (if available), unlock the door, using the planned lever, and close it immediately using the door handle, before tilting down the safety lever, and start the machine.

### Setting the armrests

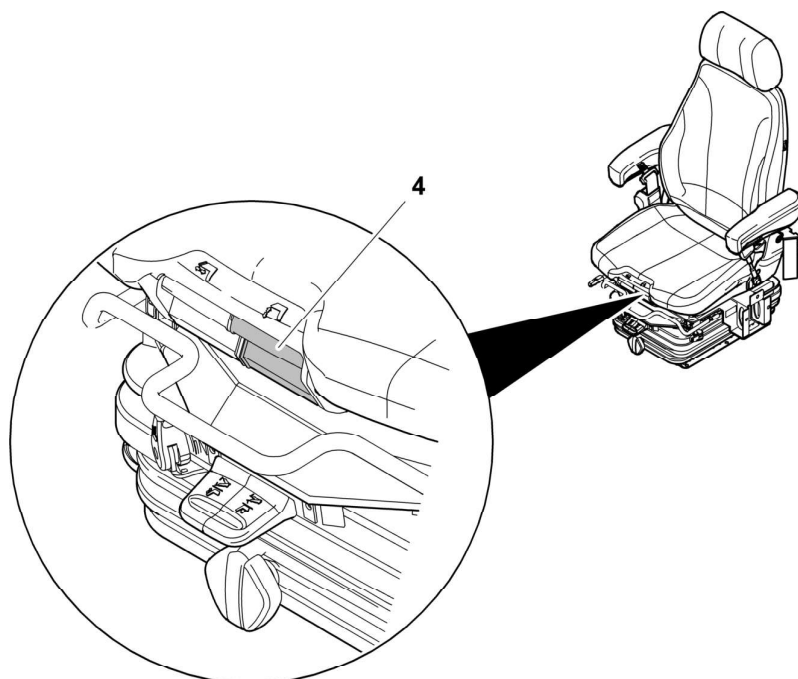


*Fig. 3-29* Setting the armrests

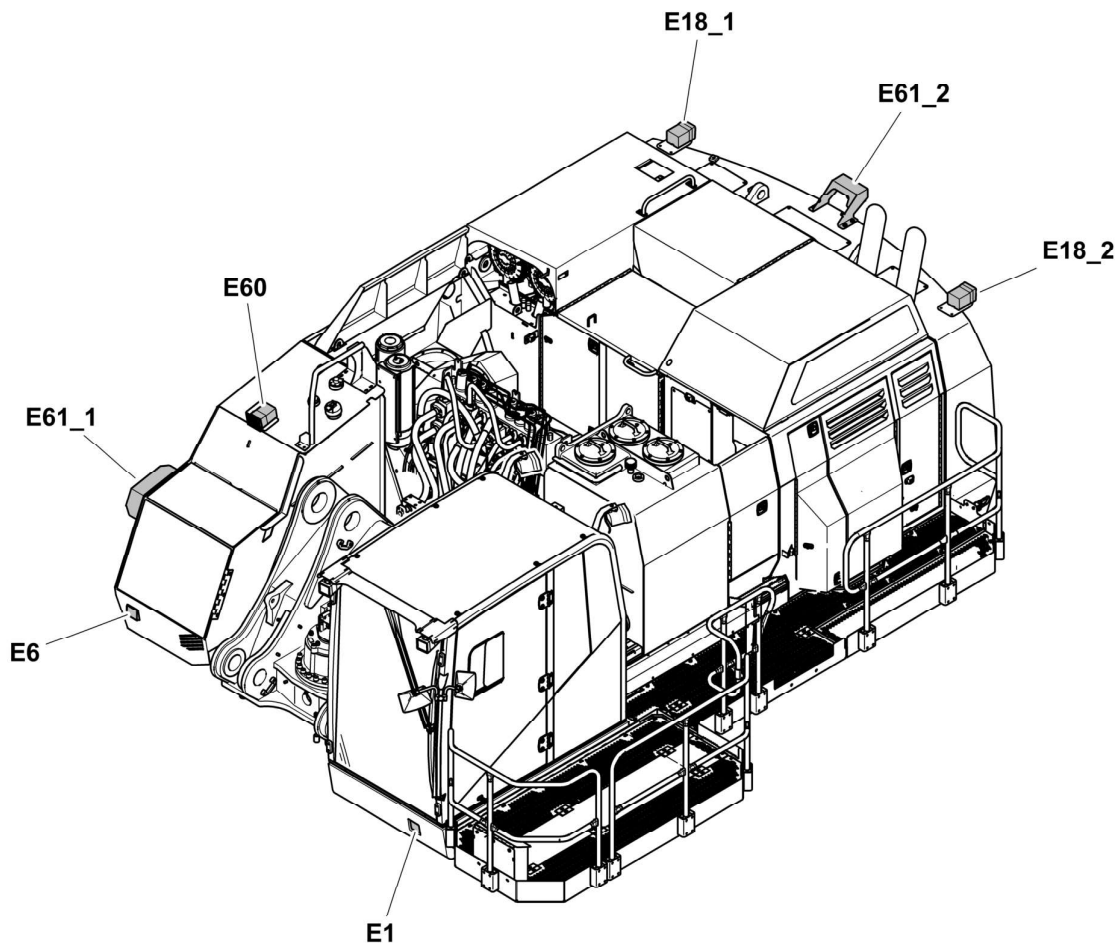
#### To adjust the seat armrest:

- ▶ Turn the knurled head screw 3 in direction 1 to slope the armrest upwards.
- ▶ Turn the knurled head screw 3 in direction 2 to slope the armrest downwards.

### Setting the seat



*Fig. 3-30* Setting the seat



**Fig. 3-39** *Uppercarriage lighting configuration*

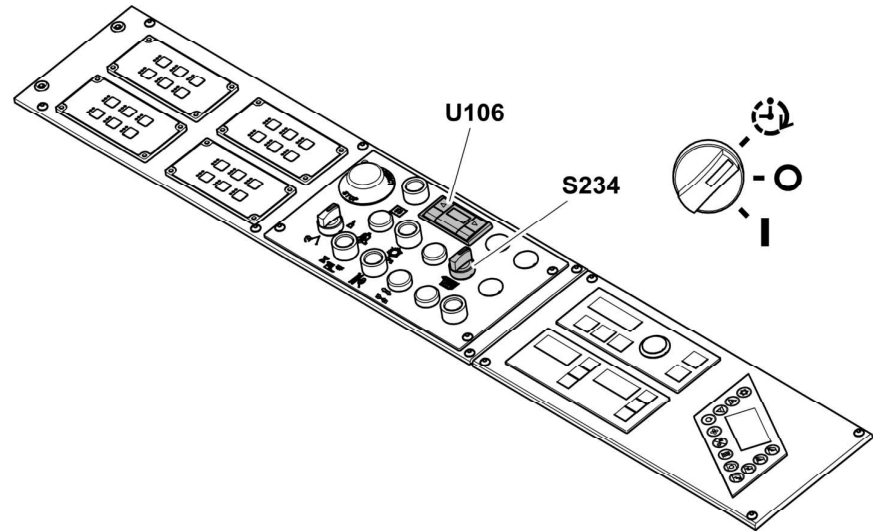
- E1** Front working light / Uppercarriage
- E6** Front working light / Fuel tank
- E18\_1/2** Rear working lights / Counterweight (if installed)
- E60** Front working light / Fuel tank (if installed)
- E61\_1** Camera lighting / Fuel tank
- E61\_2** Camera lighting / Counterweight

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## Cab preheating system (optional equipment)

To get a correct cab temperature in case of cold weather, the optional cab preheating system can start automatically even if the machine is stopped (for example: before the start of the first shift or between two shifts).

The system operates with a coolant heater and the standard cab heater. Depending on the machines, it can also have an additional cab heater, which is installed above the operator seat.



**Fig. 3-51** Cab preheating actuators

**S234** Rotary switch for the additional cab heater

**U106** Control unit of the coolant heater

### Duration of the cab preheating procedure



#### Caution!

Special preheating batteries (and the principal batteries if applicable) supply electrical power to the coolant heater and the cab heater(s) while the machine is stopped!

Risk of batteries discharge.

- ▶ Take the specified maximum time into account to set the cab preheating.

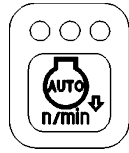
If you also do a preheating procedure as given in the section "Starting aids" of this manual:

- ▶ Do not do these two preheating procedures one after the other. Do them at the same time.

The standard procedure must not take more than 70 minutes.

### Cab preheating procedure

Depending on the position of the rotary switch **S234**, you can start and stop the cab preheating:



- ▶ Push the "Auto idle" button.
  - ↖ The auto idle function is on, but it is not activated.
  - ↖ The LED on the button comes on.
- ▶ If you let the joysticks and pedals in neutral position during the specified auto idle interval:
  - ↖ The auto idle function is activated.
  - ↖ The engine speed is automatically reduced.
  - ↖ The E / P mode and the engine speed are stored. The related symbol flashes on the display.

You can set the auto idle interval in the submenu "Auto idle control" of the monitoring display.

- ▶ If you push on the "Increase engine speed" button while the auto idle function is activated:
  - ↖ The engine speed does not change.
  - ↖ The new step is stored.
- ▶ If you push on the "Decrease engine speed" button while the auto idle function is activated:
  - ↖ If the new step is higher than the auto idle speed, the engine speed does not change and the new step is stored.
  - ↖ If the new step is lower than the auto idle speed, the auto idle function is deactivated.
- ▶ If you operate the joysticks or the pedals:
  - ↖ The auto idle function is deactivated.
  - ↖ The engine speed is set to the stored value.
- ▶ Push the "Auto idle" button again.
  - ↖ The auto idle function is off.
  - ↖ The LED on the button goes off.

## Notes after starting the engine



### Danger!

Danger of suffocation.

- ▶ When operating in enclosed spaces, only run the engine in areas with sufficient ventilation.
- ▶ Open doors and windows to ensure sufficient supplies of fresh air.



### Caution!

- ▶ Bring the engine and hydraulic oil up to operating temperature. The controls operate sluggishly at low oil temperatures.
- ▶ Move the machine carefully in an open space to test the function of the travel and swing brakes.
- ▶ Check that the attachment is operating perfectly.

**H169** Temperature of Diesel engine coolant

### Level of special fuel tank of coolant heater

As it will be difficult to restart the system in case of fuel exhaustion, the warning light **H168** comes on if the level in the special fuel tank is too low.

If the warning light **H168** comes on:

- ▶ Stop the Diesel engine.
- ▶ Stop the coolant heater using the control unit **U106**.
- ▶ Refer to chapter 5 of this manual to fill the special fuel tank of the coolant heater.



### Danger!

- ▶ Do not fill the special fuel tank of the coolant heater and the machine fuel tank if the Diesel engine and the coolant heater are not switched to off.

### Coolant heater with no special fuel tank (optional)

In option, the fuel supply of the coolant heater can directly come from the machine fuel tank. In this case, there is no warning light **H168**.

- ▶ Check the fuel level on the display.

### Temperature of Diesel engine coolant

The warning light **H169** is on as long as the coolant temperature is too low to start in good conditions.

- ▶ Do not start the Diesel engine as long as the warning light **H169** is on.

The preheating of Diesel engine coolant stops automatically.

- ▶ After the coolant heater switch off, wait for 5 minutes before switch to off the batteries (to let the fan stop because of risk of device overheating).
- ▶ Do not disconnect the batteries if the fan and/or the pump of the coolant heater are on.

### Preheating of hydraulic oil (if installed)

This procedure is applicable only if the optional preheating of the hydraulic oil is installed.

#### If not installed

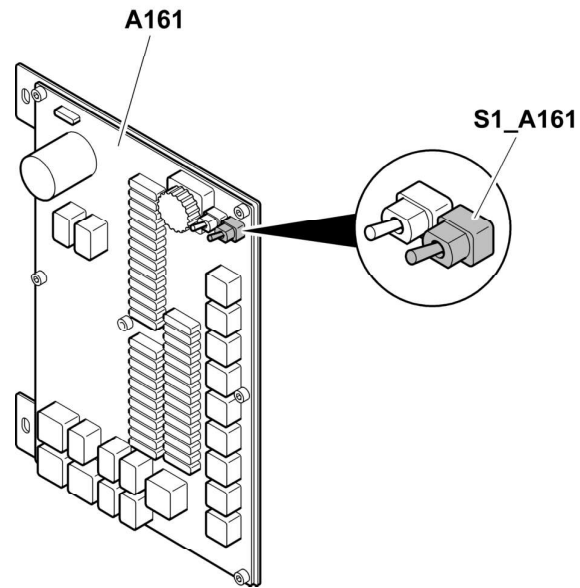
- ▶ Move to the next basic equipment.

#### If installed

The preheating of the hydraulic oil works with immersion resistors. They are supplied by an external electric power supply (Gen-Set) which is not provided with the machine. According to the local power supply, the Gen-Set must supply a minimum of:

- 6,5 kVA, 400 V, 50 Hz
- 6,5 kVA, 480 V, 60 Hz

At this step, the preheating of the Diesel engine coolant is already in progress and the machine is switched to off.

**Safety start of the Diesel engine****Fig. 3-71** Safety control for the Diesel engine start**A161** Electrical plate in **E1005****S1\_A161** Safety switch

The electrical plate **A161** is located in the cab connection box **E1005**. You can also refer to chapter 4 of this manual.

- ▶ Turn the ignition key **S1** to the stop position.
- ▶ At the same time, push the switch **S1\_A161**.
  - ↪ The Diesel engine starts in safety operation.
  - ↪ The machine stays in this mode until you turn the ignition key **S1** to position "0".

the soil.

- leave the cab and move away from the machine before the storm breaks out. Otherwise, you must stop the excavator, turn off the radio and keep inside the closed cab until the end of the storm.
- Auxiliary control units can have various functions. Always check their functions when starting up the machine.
- Stop the swinging motion of the uppercarriage when lowering the attachment into a ditch without striking the attachment on the ditch walls.
- Inspect the machine for damage if the attachment has been swung into a wall or any other obstacles.
- Applications in which the attachment is to be used to strike the material being extracted are not permitted, even when working in a longitudinal direction.
- Repeated strikes against an object leads to damage to the steel structures and machine components.
- Please refer to your Liebherr dealer if special teeth for heavy-duty or special applications are required.
- Do not attach too large bucket or bucket with side cutters or that are during operations with rocky material. This would prolong the work cycles and may lead to damage to the bucket as well as further machine components.
- With the 2x45° offset articulation, the offset position may only be employed if the working tool or the attachment does not touch the material.
- Operation of the offset articulation to drill into the material is not permitted.
- Do not lift the machine during operation. Should this happen, lower the machine slowly back to the ground.
- Do not let the machine fall heavily on the ground and do not hold it back with the hydraulics. This would damage the machine.
- During operation with the attachment it is forbidden to raise the machine with the dozing blade (e.g. carving at the ceiling when tunnelling).
- Do not dig under the undercarriage. Take all necessary measures to prevent ground collapse under the machine.
- The operation of Liebherr Mining machines in the following Mining applications is not approved or condoned by Liebherr:
  - Batter pulling (also known as Scaling), without exception.
  - Double benching (also known as Split benching or Double flitching) when the material is un-blasted and non-fragmented material which requires the boom down (rod side) pressure to exceed 50 bar.

The use of these Mining methods will result in increased fatigue levels to steel structures and components of the respective Liebherr Mining Machine and therefore will significantly reduce the expected lifetime of structures and/or components.

### Working safely with the machine used for demolition application

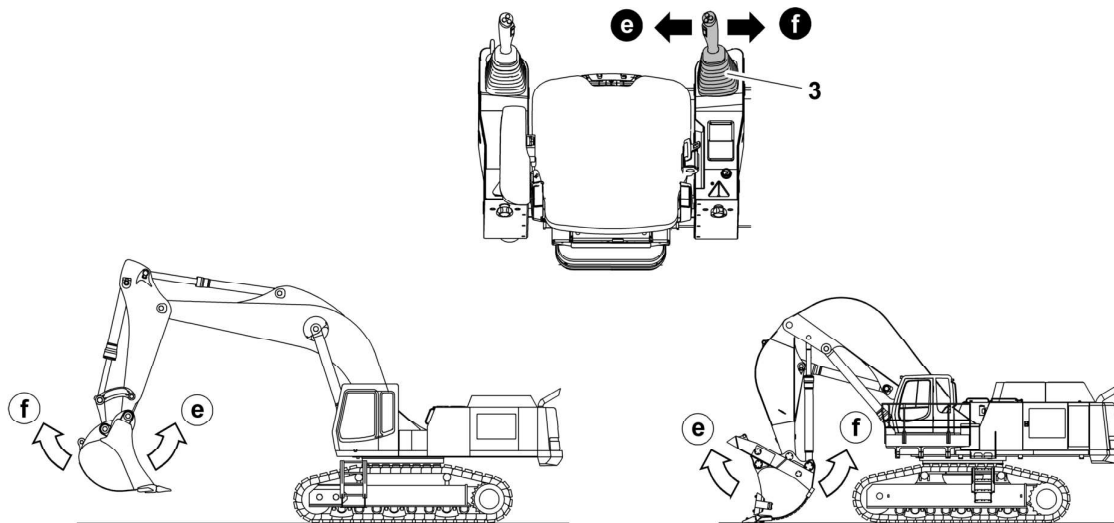
- Machines used for demolition application are subject to specific conditions and must be fitted with special safety devices (for further information, contact Liebherr customer service).
- If the machine can be used for demolition application, you must also obey the additional safety instructions that follow.

### Before the operation of the machine

- Make sure that no persons are in the hazard area of the machine.

## Operating the bucket

The bucket is operated using the right joystick **3**.



**Fig. 3-86** Operating the bucket cylinder

- ▶ Move the joystick to the left **e**.  
↳ Bucket will be tilted inwards.
- ▶ Move the joystick to the right **f**.  
↳ Bucket will be tilted outwards.

### Shake the bucket (with backhoe attachment only)

You can shake the bucket to remove dirt collected in the backhoe bucket.

- ▶ Operate very quickly the right joystick **3** as follows:
  - Move the joystick fully to the right or to the left.
  - Move the joystick to the neutral position.
  - Move the joystick fully to the right or to the left again.

While you do this sequence, the bucket shakes.



#### Caution!

Repetitive shakings cause fast wear of the components.

### Operating the bottom dump bucket for shovel attachment



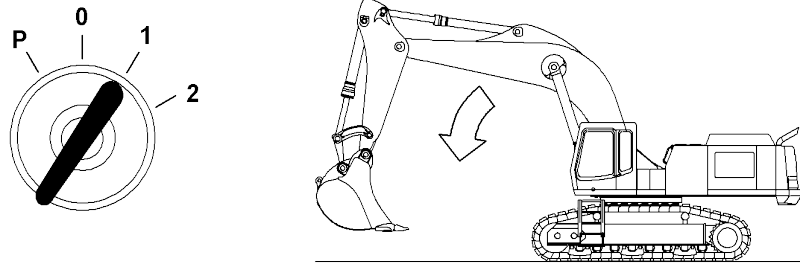
#### Danger!

Additional operating and control elements (joysticks/pedals) can have different functions.

- ▶ Always check functions of operating and control elements when you start a machine which has an additional attachment.

### Manual flap control

If the selection function is installed, you can control the bottom dump shovel bucket



**Fig. 3-100** Lowering the attachment when engine is not running

- ▶ Turn the ignition key to contact position **1**.
- ▶ Operate the joysticks or the foot pedals until the attachment has lowered.

The attachment can be lowered because of the control oil unit's pressure reserve. This reserve is limited and is only sufficient for small movements of the pilot control devices.

- ▶ Only operate the joystick in the directions for lowering the attachment.

### 3.4.5 Overload warning device (optional equipment)

If installed, the overload warning device tells when the machine is at its maximum lift capacity. In this case, a visual warning comes on in the cab and you can hear a warning signal.

This option is available only for backhoe machines.



#### **Danger!**

Although the overload warning device is installed on the machine, it is only an information. It does not stop the machine.

Thus, loads lifting remains the responsibility of the operator.

As a first step:

- ▶ Make sure that you obey all the precautions to prevent accidents.
- ▶ Check the permitted lift capacity of the machine on the dedicated rated lift capacity chart in the cab.

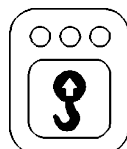
The load values can change if attachment parts and/or working tools are attached or not. Thus:

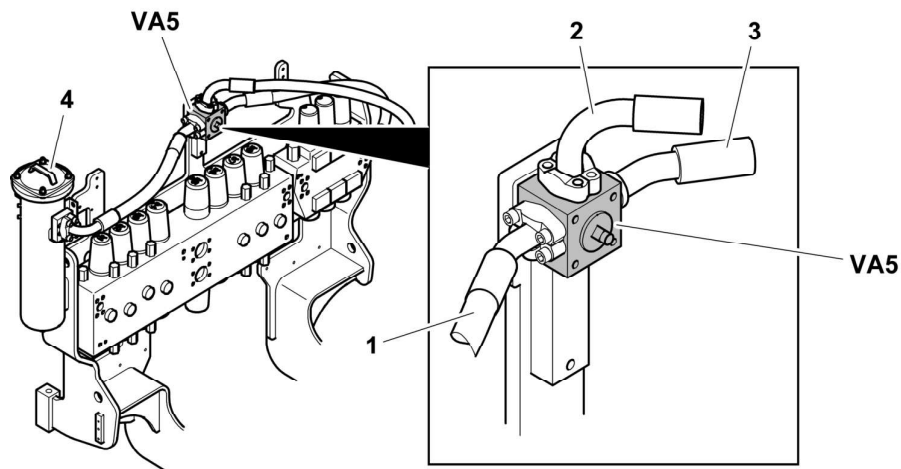
- ▶ Make sure that the attachment parts weights you use are always included in the rated lift capacity chart.

#### **Start the overload warning device**

You can start the overload warning device with the keyboard.

- ▶ Push "**Overload warning device**" button.
  - ↖ The overload warning device is activated.
  - ↖ All the LED in the button come on.





**Fig. 3-108** Three-way valve VA5

- |   |  |
|---|--|
| <p>1 Not used (hydraulic hose connected to the hammer return-line filter)</p> <p>2 Hydraulic hose connected to the grapple / shear</p> <p>3 Hydraulic hose connected to the valve block</p> | <p>4 Hammer return-line filter</p> <p><b>VA5</b> Three-way valve</p> |
|---|--|

- ▶ Turn three-way valve **VA5** to connect hose 2 to hose 3.

### Select the tool

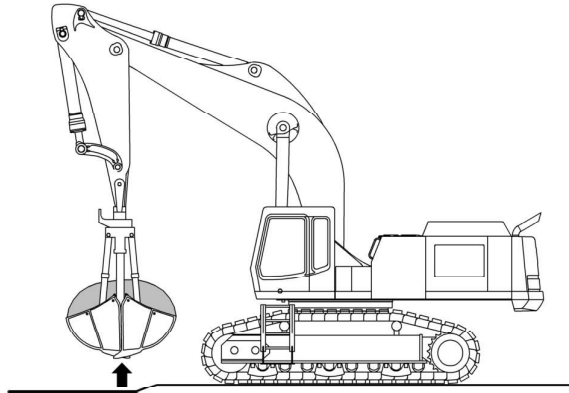
- ▶ Select the correct tool that you want to install as given in the section "Select the special tool" of this manual.

### Remove the tool

- ▶ Retract the tool cylinder to its end position.
- ▶ Release hydraulic pressure as given in the dedicated section of this manual.
- ▶ Move up the safety lever.
- ▶ Close all the manual valves.
- ▶ Disconnect the hydraulic lines.
- ▶ Remove the tool.

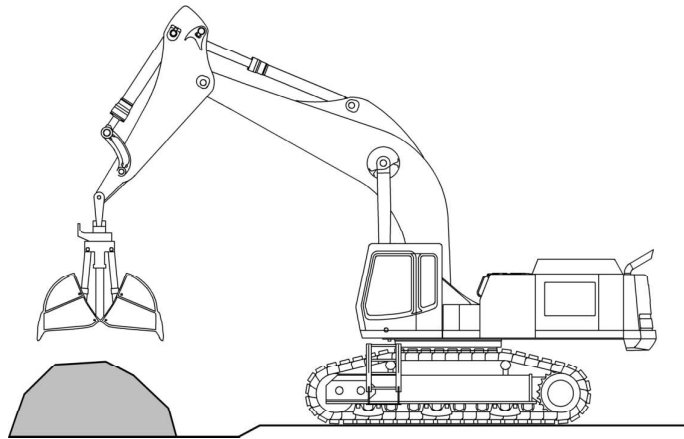
**Danger!**

The device could lift out when closing the shell bucket.



**Fig. 3-121** Raising grab material

- ▶ Close the grab shells fully.
- ▶ Raise the boom.
- ▶ Move the machine to the unloading area (e.g. transport vehicle).

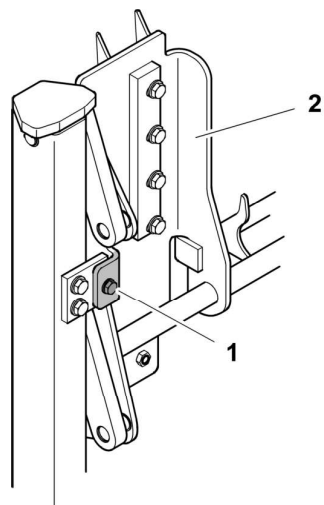


**Fig. 3-122** Emptying grab material

- ▶ Slew the stick out as far as possible to prevent any risk due to the swinging grab.
- ▶ Open the grab shells, empty the grab material.

### 3.6.7 Hoisting work

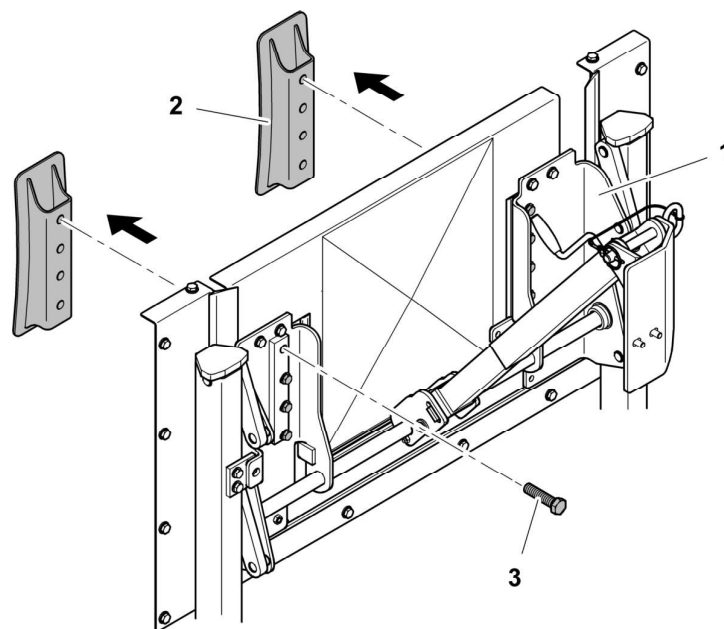
Hoisting work is understood as being lifting, transporting and unloading loads using a securing method (rope, chain etc.) and where personnel are required to assist in securing and unloading the load. This includes, for example, the lifting and unloading of pipes, shaft-top supporting rings or containers.



**Fig. 3-132** Locking screw

- 1 Locking screw
- 2 Spindle support bracket

► Remove locking screw 1 from spindle support bracket 2.



**Fig. 3-133** Attach the spindle support to the Diesel Exhaust Fluid (DEF) tank

- 1 Spindle support bracket
- 2 Bracket of the Diesel Exhaust Fluid (DEF) tank
- 3 Brackets screws

► Attach the two spindle support brackets 1 to brackets 2 of the Diesel Exhaust Fluid (DEF) tank with the related screws 3.

**Note!**

Warranty may become void if failure to recognize and comply with the recommended travel operating procedures, as outlined in this document, is noted.

### 3.7.5 Excavator lifting and lashing operations

**Danger!**

For safety reasons, always consider the precautions given in this section.

#### Lifting precautions

Lift element:

- always checking and respecting the lifting configuration indicated on the corresponding transport drawing,
- only with the provided lifting appliances,
- with adequate and approved lifting devices of other kind (cables, chains, slings) if necessary,
- only after mounting the lifting appliances in accordance with the regulations,
- only at the declared threads or lugs shown on the assembly drawing,
- with the best possible equal load distribution,
- only being sure that the lifted element has been already dismantled,
- only after having drained tanks (hydraulic, fuel...),
- if no specific value is indicated on the corresponding transport drawing, always respecting the angles given on the sticker for lifting and lashing operations (refer to the description below).

#### Additional lifting precautions for backhoe buckets

When you lift the backhoe bucket, also obey the precautions that follow:

- Only use the lifting points shown in the stickers placed on the bucket.
- You can use the bucket teeth as lifting points.
- Be careful about the position of the center of gravity of the bucket.
- The bucket has two possible transport positions. The height B1 gives the correct transport position as shown in the transport drawing.
- If the height B1 is more than 3,6 m, turn over the bucket safely.

#### Additional lifting precautions for shovel buckets

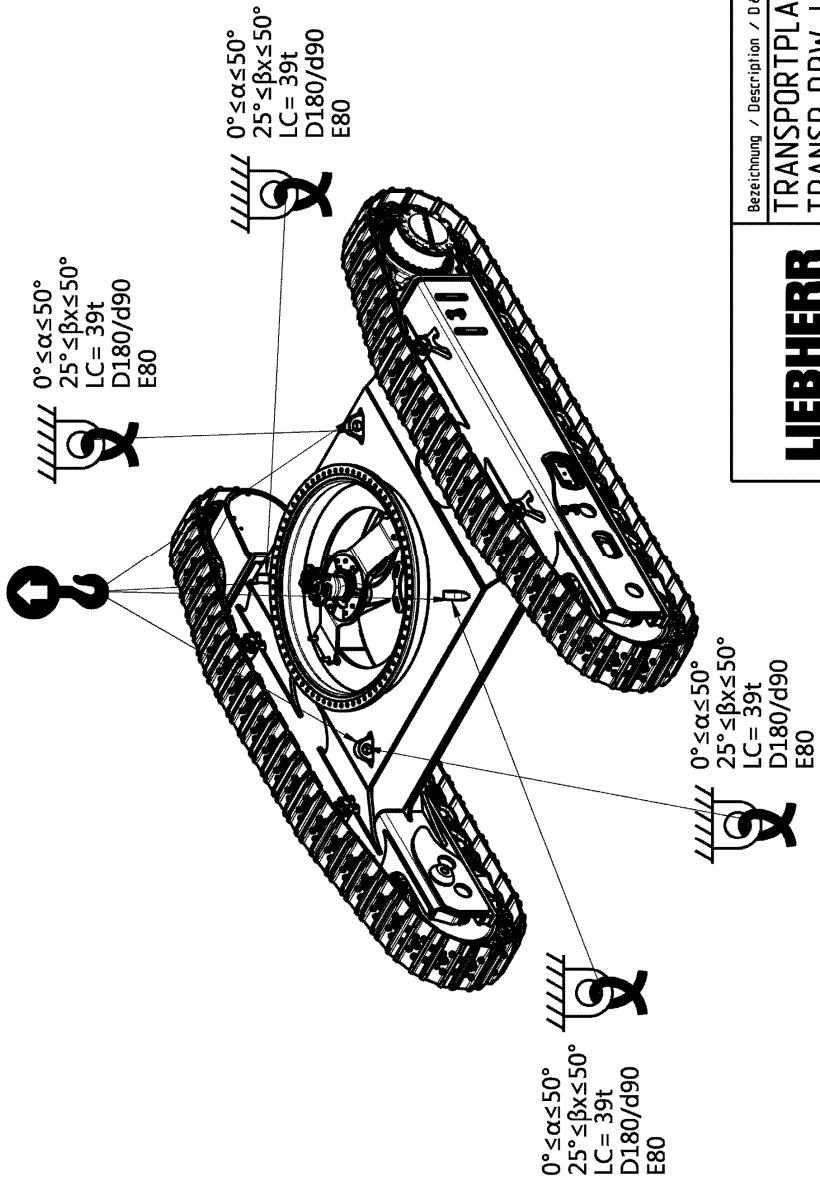
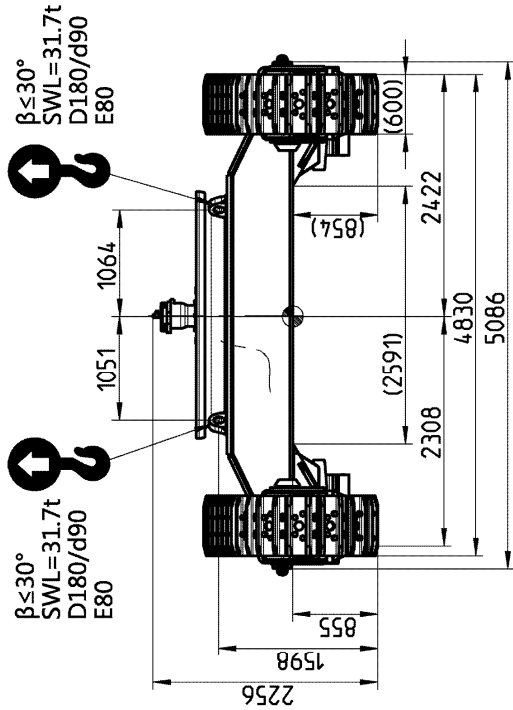
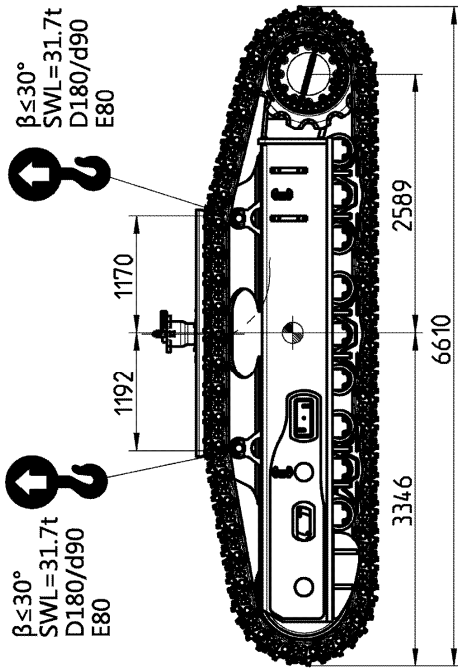
When you lift the shovel bucket, also obey the precautions that follow:

- Only use the lifting points shown in the stickers placed on the bucket.
- Do not use the bucket teeth as lifting points.
- Do not use the welded beam to lift the bucket.
- Be careful about the position of the center of gravity of the bucket.

#### Lashing precautions

Lash element:

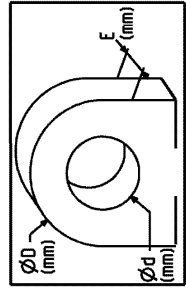
- always using necessary and appropriate devices or tools (e.g. elevating platform) in order to ensure safe lashing,



Mit 750mm Schakenketten  
 With 750mm pad-links track chains  
 Avec chaines à maillons de 750mm

SCHWERPUNKT  
 CENTER OF GRAVITY  
 CENTRE DE GRAVITE

	Gerchnet Calculated Calculé	4.3050 kg	
	Gewogen Weighed Pesé	4.3050 kg	



<b>LIBHERR</b>	Bezeichnung / Description / Dénomination <b>TRANSPORTPLAN UNTERWAGEN</b> <b>TRANSP.DRW .UNDERCARRIAGE</b> <b>PLAN DE TRANSP.CHASSIS</b>		Ident.-Nr. / Ident. N° d'ident	Index / Index Index	Blatt / Page Feuille
	R9150		11073377	001	1/1
	R9150		11073377	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.



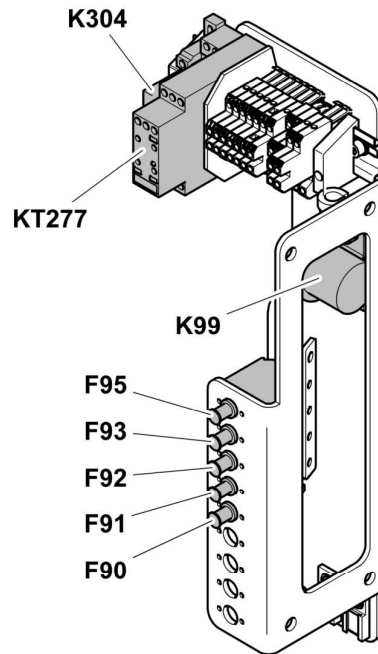
*Fig. 4-1 LIEBHERR service*

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

<b>A1002</b>	Electrical plate
<b>A1004</b>	Electrical plate
<b>SUPP_E1005</b>	Electrical plate

The cab connection box **E1005** is located in the cab, behind the operator seat. This box has different electrical plates with fuses and relays.

### Electrical plate SUPP\_E1005



**Fig. 4-5** Fuses and relays of electrical plate SUPP\_E1005

<b>F90</b>	Fuse 15 A	<b>F95</b>	Fuse 15 A
<b>F91</b>	Fuse 15 A	<b>K99</b>	Relay
<b>F92</b>	Fuse 15 A	<b>K304</b>	Relay
<b>F93</b>	Fuse 15 A	<b>KT277</b>	Relay

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- Make sure the equipment on which you will operate is securely supported before working (e.g. replacing teeth). Prevent metal touching metal when doing this.
- For safety reasons, never open and remove a track chain unless having previously totally released the pretension of the chain tensioning unit.
- Never lay under the machine if it is raised with work equipment and has not been securely supported with appropriate supports.
- Always jack the machine up in such a way that any weight displacement does not jeopardize stability and prevent metal touching metal while doing this.
- Work on the suspension, brake and steering systems may only be carried out by trained specialist personnel.
- If the machine has to be repaired on a slope, secure the crawler with chocks and connect the upper structure to the chassis using stop bolts.
- Only personnel with special training and experience may work on hydraulic equipment.
- When searching for leakage, wear protective gloves. A fine jet of liquid under pressure can penetrate the skin.
- Do not unscrew any lines or connections before you have set aside the equipment, switched off the engine and depressurized the hydraulic system. After switching off the engine, with the start key in contact position and with the safety lever down into its lowest position, you must operate all pilot control devices (joystick and pedals) in all directions in order to reduce the actuating and dynamic pressures in the work circuits. You must then reduce the internal tank pressure as described in these operating instructions.

## Electrical system

- Check the electrical system regularly.  
Have all faults, such as loose connections, blown fuses and lamps and clogged or abraded cables rectified by personnel.
- Only use original fuses with approved current strength.
- For machines with electrical neutral and high tension leads:
  - switch the machine off immediately in the event of malfunctions in the power supply.
- Work on the machine's electrical equipment may only be carried out by skilled electrical personnel or by trained personnel under the supervision of an electrician in accordance with electrical regulations.
- When working on live parts, ensure that a second person is available to operate the emergency-off or the main switch and overvoltage release. Cordon off the working area with a red and white safety chain and a warning sign. Only use insulated tools.
- When working on neutral and high tension subassemblies, after releasing the voltage, briefly disconnect the supply cable at earth and electronic devices such as capacitors using an earthing rod.
- First test the released parts to make sure that they are off circuit, earth them and then disconnect them briefly. Insulate adjacent live parts.
- Disconnect the battery before working on the electrical system or carrying out any electric arc welding on the machine.  
First disconnect the negative, then the positive pole. When reconnecting, proceed in the reverse order.

## Hydraulic accumulator

- All work on the hydraulic accumulators must be carried out by trained specialist



Engine oil	fans speed regulation setting
SAE30 (ISO VG100)	"STANDARD"
SAE 10W (ISO VG46)	"EXTRA-COLD" or "COLD"

### Hydraulic oils for hydraulic system

#### Requirements

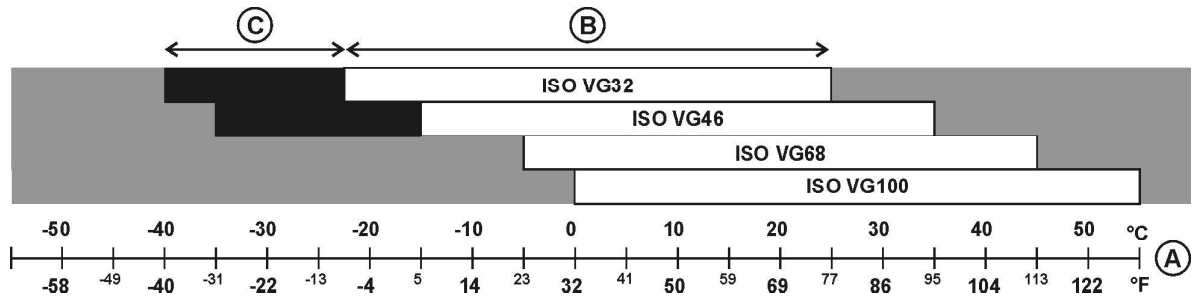


Fig. 5-12 Hydraulic oil for hydraulic system

- A Ambient air temperature
- B Operating range
- C Extra-cold start range if excavator fitted with operating Liebherr arctic kit (with warm-up instruction)



**Caution!**

Minimum ambient air temperature for extra-cold start depends on oil type and brand and equals to oil pourpoint temperature +5 degrees K.

Hydraulic oils must contain dispersant and detergent additives and conform to one of the following specifications:

DIN	ISO
51524-2 (HLP, HLP-D)	ISO 11158 (HM)
51524-3 (HVLP, HVLP-D)	ISO 11158 (HV)

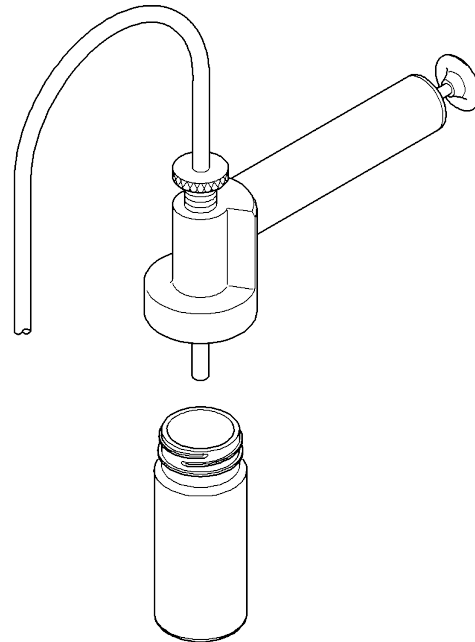
**Additional requirements:**

Test/Requirement	Standard/Reference	Required level/Performance
Shear stability	DIN 51350-6 CEC L 45-A-99	KRL/C < 15%

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- top-up oil quantity since last sample
- sampled oil type
- ▶ Send the sample in oil-proof adapted material.
- ▶ Check for the required sample delivery time and for sample export licence (if the laboratory is located out of the country, make sure that the export of the sample is authorized from your location to the laboratory).
- ▶ Do not wait before sending the sample to the laboratory.
- ▶ Record and save sampling operations and results.

**If you get the oil sample with a sampling pump:**



**Fig. 5-17** Sampling pump

- ▶ Use a sampling pump if you get the sample directly in the tank or on the component (machine stopped).
- ▶ Always use a new sampling hose.
- ▶ Cut the sampling hose to the correct length (e.g. dipstick length plus 20 mm).
- ▶ First, let sufficient oil flow to flush the sampling hose.
- ▶ If you get the oil sample in the tank, take the sample in the middle of the tank.

**If you get the oil sample through a sampling valve:**

- ▶ Always use a new sampling hose.
- ▶ First, let sufficient oil flow to flush the sampling hose.
- ▶ Get the oil sample in the mid-stream, i.e. first let a small amount of oil flow through the valve before sampling it.

**Sampling material**

- ▶ You can order LIEBHERR approved sampling material to get the samples:

## 5.7 Diesel engine

- ▶ Refer to the Diesel engine Liebherr operation and maintenance manual for detailed description of maintenance to be performed.
- ▶ In addition, accurately obey the items that follow and perform all maintenance work according to the intervals given in the control and maintenance chart.

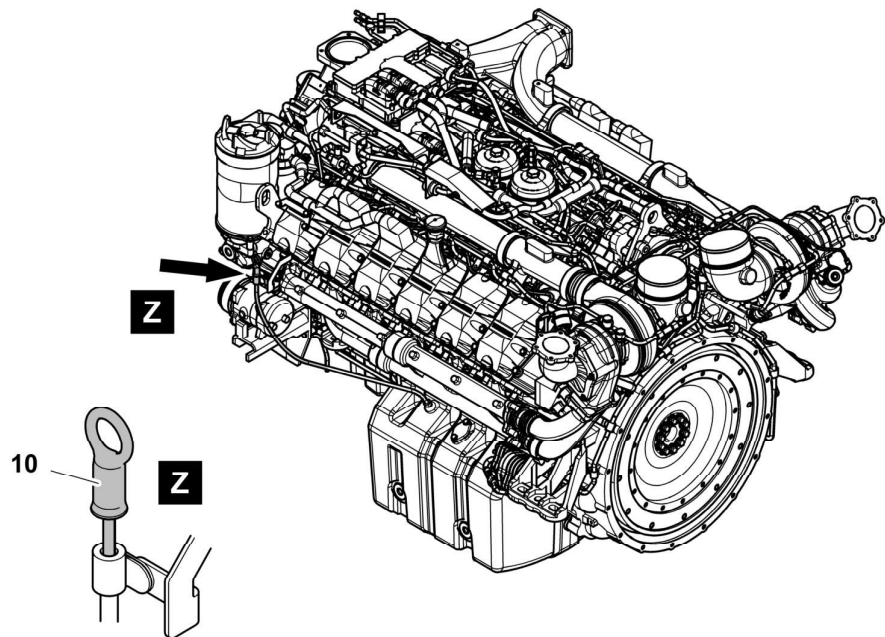
### 5.7.1 Check the oil level of the Diesel engine



#### **Danger!**

The Diesel engine oil is hot when it is at operating temperature!  
Risk of burning.

- ▶ Avoid contact with hot oil and components containing oil as it can cause dangerous burns.

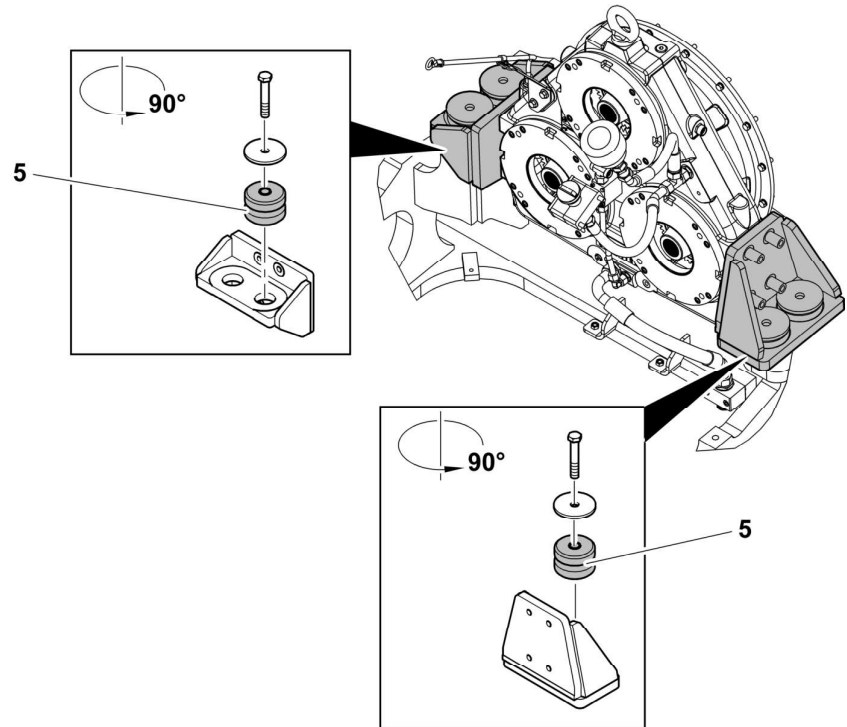


**Fig. 5-24** Dipstick

#### **10** Dipstick

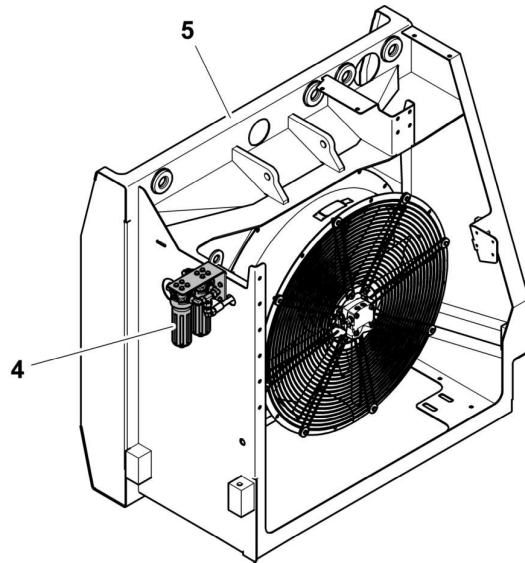
- ▶ Park the machine on level ground.
- ▶ Make sure that the Diesel engine oil is at operating temperature.
- ▶ Stop the Diesel engine.
- ▶ Wait for 5 minutes.
- ▶ Check the oil level with the dipstick **10**.

## 5.8.2 Elastic bedding



**Fig. 5-34** Splitterbox elastic bedding

- ▶ The four rubber buffers **5** at the splitterbox side must be checked and replaced at regular intervals.
- ▶ For maintenance intervals, refer to control and maintenance chart.



**Fig. 5-44** Fuel fine filters assembly

- 4 Fuel fine filter
- 5 Engine cooler box

The fuel fine filters **5** are installed on the outer side of the engine cooler box **5**.

- ▶ Check the fuel prefilter **2** for water and debris each day.
- ▶ Drain the fuel-water separator on fuel prefilter **2** each day.
- ▶ For the replacement intervals of fuel prefilter and fuel fine filter, see control and maintenance chart.

### Drain the fuel-water separator

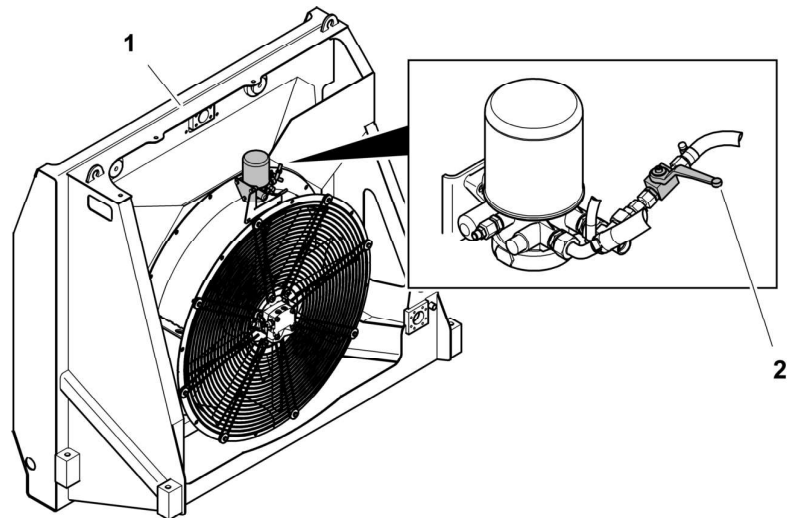
The fuel-water separator is installed on the fuel prefilter.

## 5.12 Pneumatic system

Compressed air is necessary to spray the Diesel Exhaust Fluid (DEF) into the exhaust gas.

### 5.12.1 Release the pressure from the pneumatic system

If necessary, you can isolate the Selective Catalytic Reduction (SCR) system from the compressed air supply.



**Fig. 5-54** Manual valve

- 1 Oil cooler box
- 2 Manual valve

The manual valve **2** is installed on the oil cooler box **1**.

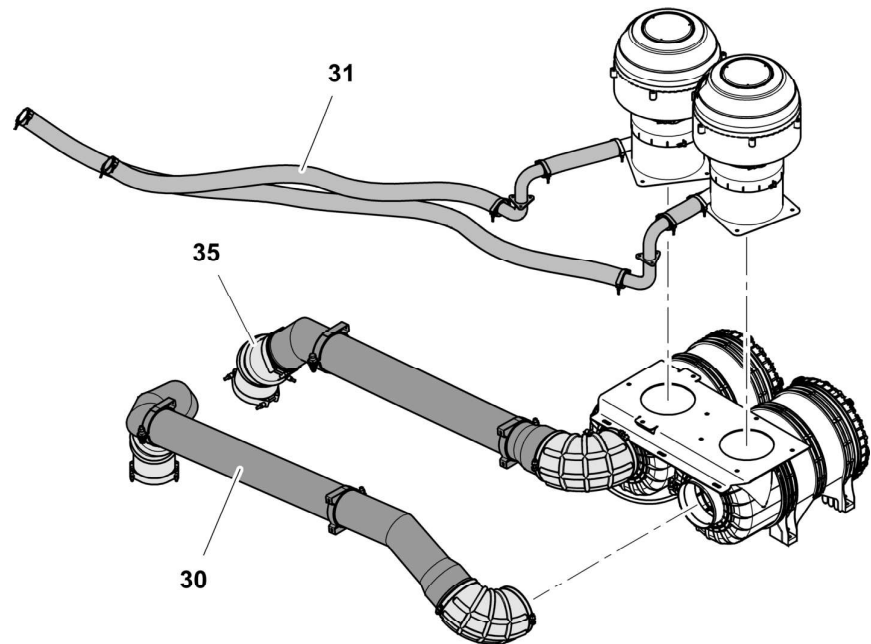
► Open the manual valve **2** to release the pressure from the pneumatic system.

### 5.12.2 Air tank

#### Drain the air tank

Condensation in the air tank is automatically discharged through a drain valve when the pressure in the system decreases. But we recommend to also drain the air tank manually at regular intervals.

### 5.13.5 Check the air intake system, hoses, elbow tubes, clamps



**Fig. 5-65** Air intake hoses, tubes and elbow tubes

- 30** Tubes between the filters and the engine
- 31** Tubes between the precleaner and the exhaust system
- 35** Elbow tubes

The hoses and tubes **30**, **31** and the elbow tubes **35** between the filter housings and the engine must be checked for damage, wear, tightness and leaks when the filter elements are replaced.

- ▶ If necessary, retighten the screws on the clamps.
- ▶ Do a visual check of the air intake system at the intervals given in the control and maintenance chart.
- ▶ Do a sealing control of the air intake system at the intervals given in the control and maintenance chart.
- ▶ Do also a sealing control of the air intake system each time you replace a component of the air intake duct.
- ▶ Use the Liebherr special tool which is dedicated for this purpose to do the sealing control of the air intake system.

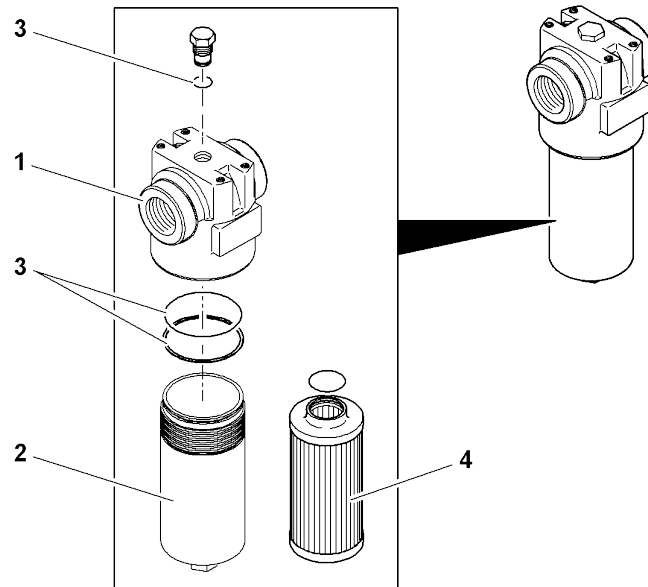
## 5.14 Hydraulic system

Maintenance work on the hydraulic system is restricted mainly to the hydraulic tank. All other units on the system do not require any special maintenance.

Strict cleanliness is of particular importance for the hydraulic system.

- ▶ Obey the intervals given to:

## Replace the filter element



**Fig. 5-73** Piloting and replenishing oil filters parts

- |   |                |   |                |
|---|----------------|---|----------------|
| 1 | Filter head    | 3 | O-ring         |
| 2 | Filter housing | 4 | Filter element |

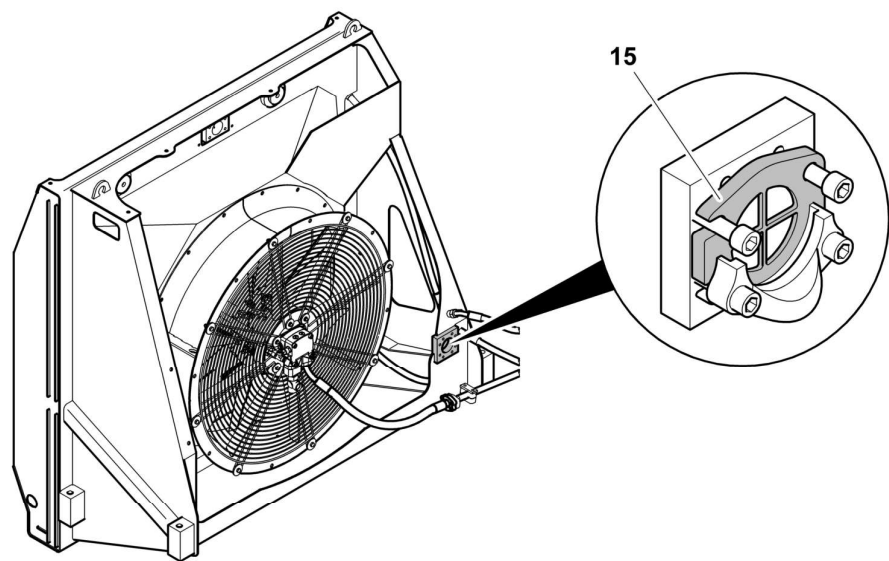
- ▶ Release the hydraulic pressure as given before.
- ▶ Make sure the filter head **1** and housing **2** are in good conditions.
- ▶ Make sure sealings and o-ring **3** are correctly installed.
- ▶ Lightly lubricate the threads of the filter housing **2**.
- ▶ Manually, fully tighten the filter housing **2** in the filter head **1**.
- ▶ Close the breather filter.

### 5.14.8 High pressure filters in working circuit

Three high pressure filters are installed on the inlet ports of the control valves.

- ▶ Check condition of the seal ring **3** and change them if defective.
- ▶ Remove the used filter element **4**.
- ▶ Examine the inlet and the outlet in the filter housing **5**. Clean if necessary.
- ▶ Put a new filter element **4** vertically into the housing **5**.
- ▶ Install the seal ring **3** again.
- ▶ Install the cover **2** again.
- ▶ Tighten nuts **1** with stud screws **6**.

### 5.14.15 Oil cooler protection filters (optional equipment)



**Fig. 5-84** Oil cooler protection filter

Protection filters **15** can be installed between the valve bank and the oil cooler in order to reduce the impact on the operating conditions of the excavator in case of possible hydraulic component failure.

- ▶ Check and clean filters regularly.
- ▶ Check filters in case of hydraulic component failure.
- ▶ Change filter in case of impact or mesh rupture.
- ▶ For maintenance intervals, see control and maintenance chart.



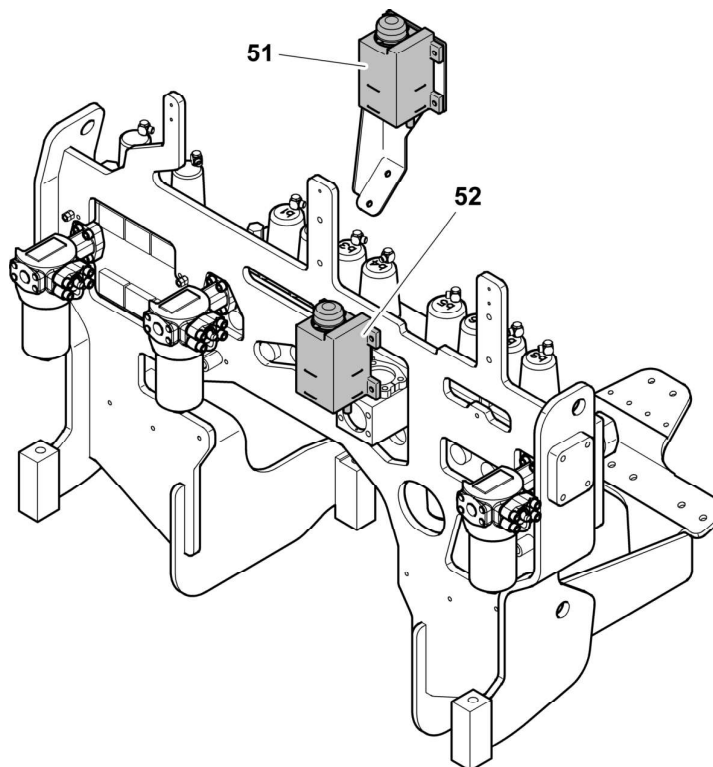
#### Caution!

If filters maintenance isn't correctly carried out, filters clogging due to regular operation of the excavator could lead to following risks:

- cooling capacity drop,
- negative impact on oil quality.

#### To check or change a filter:

- Shutoff valve between hydraulic tank and pumps must be closed.

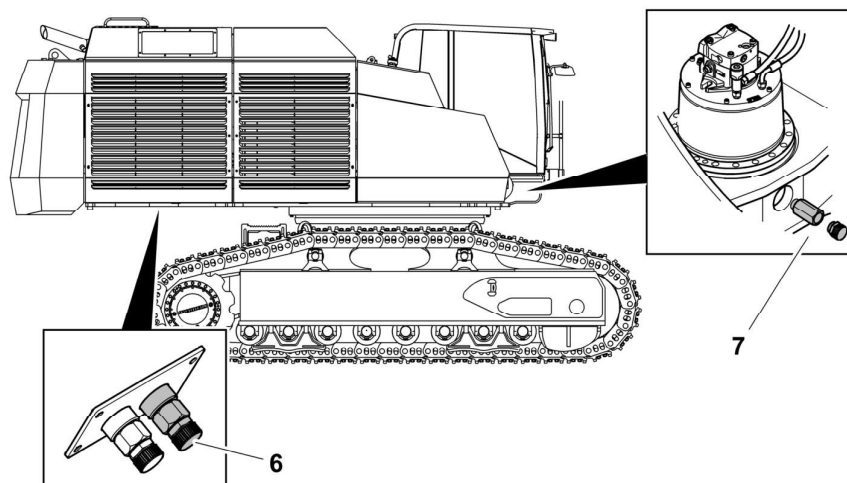


**Fig. 5-92** Expansion tanks of swing gears

- 51 Expansion tank of front swing gear
- 52 Expansion tank of rear swing gear

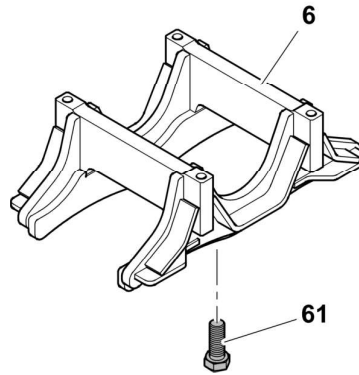
- ▶ For oil specifications and quantity, refer to the lubrication chart.
- ▶ For oil change intervals, refer to the control and maintenance chart.

**Drain the oil**



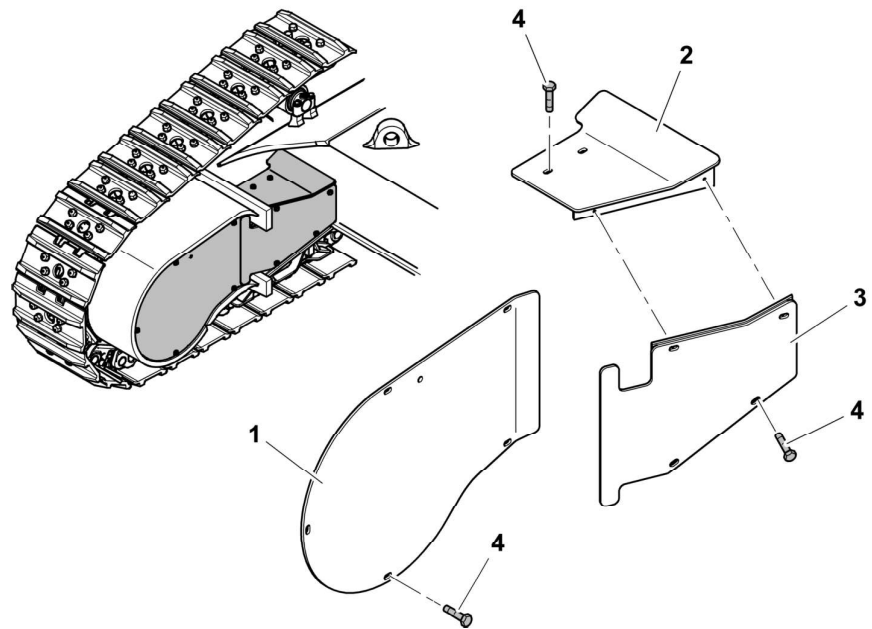
**Fig. 5-93** Swing gears connections of the service station

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**Fig. 5-104** Track guide

		<b>Torque</b>
<b>6</b>	Track guide	-
<b>61</b>	Screw M24x220 x quantity 14 (22 in option) for each side	965 Nm



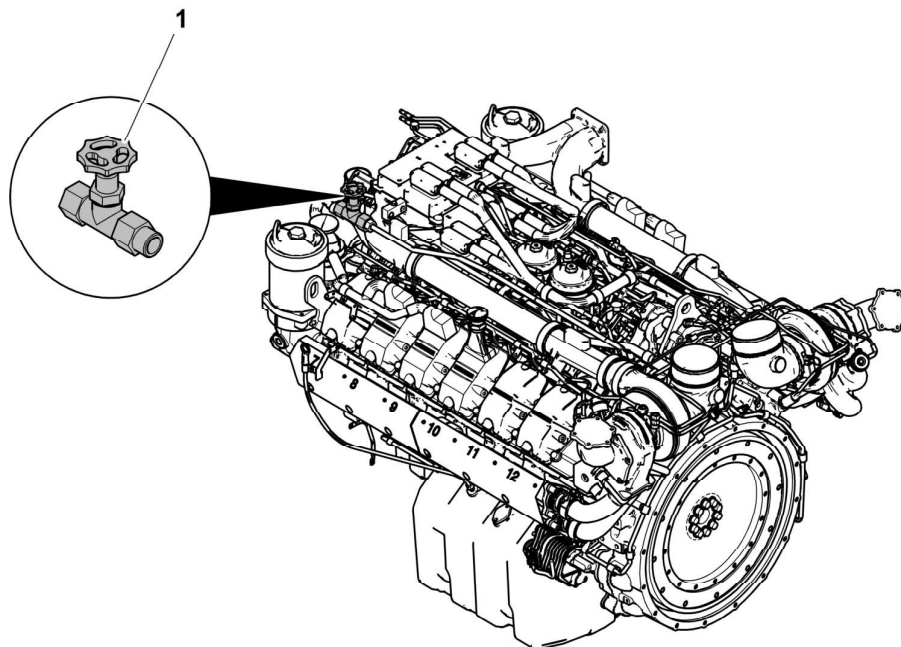
**Fig. 5-105** Travel motor protection

Depending on the machines, the quantity of the screws **4** can be different.

		<b>Torque</b>
<b>1</b>	Travel motor protection	-
<b>2</b>	Travel motor protection	-
<b>3</b>	Travel motor protection	-
<b>4</b>	Screw M12x35 x quantity 11/14 for each side	110 Nm

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### 5.18.1 Heating system

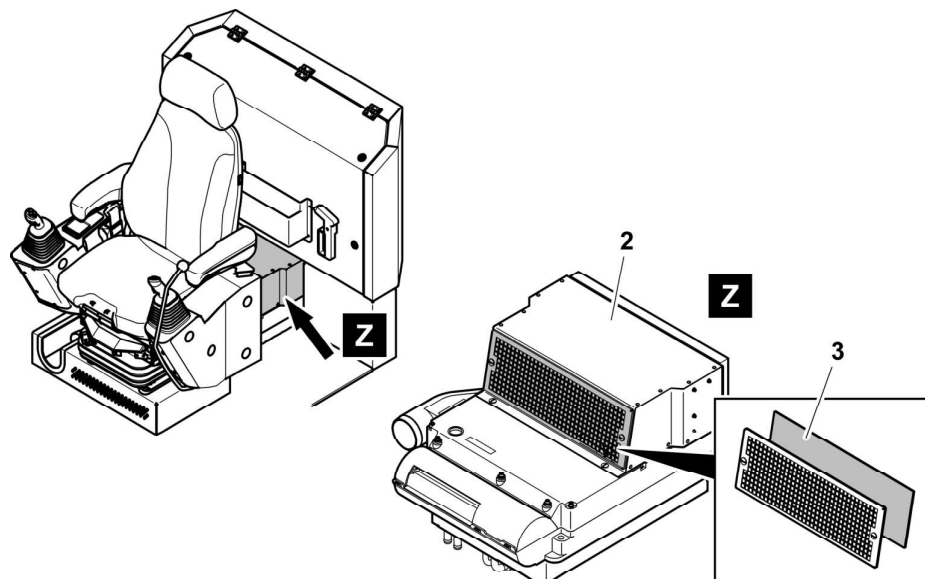


**Fig. 5-113** Coolant shutoff valve on the Diesel engine

1 Coolant shutoff valve

Independently from weather conditions:

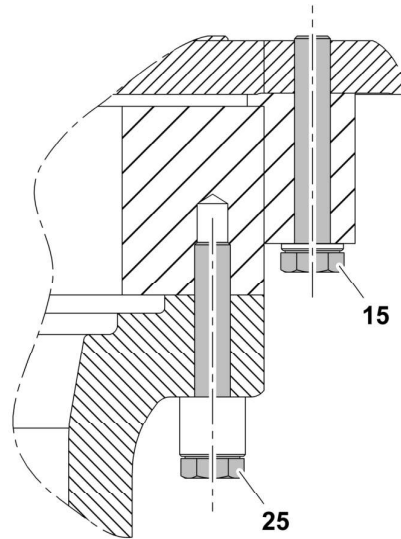
- ▶ Make sure that the coolant shutoff valve **1** located on the Diesel engine is always open.
- ▶ Close the shutoff valve **1** when you change the coolant.



**Fig. 5-114** Heater/evaporator

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### 5.21.2 Mounting bolts of the swing ring

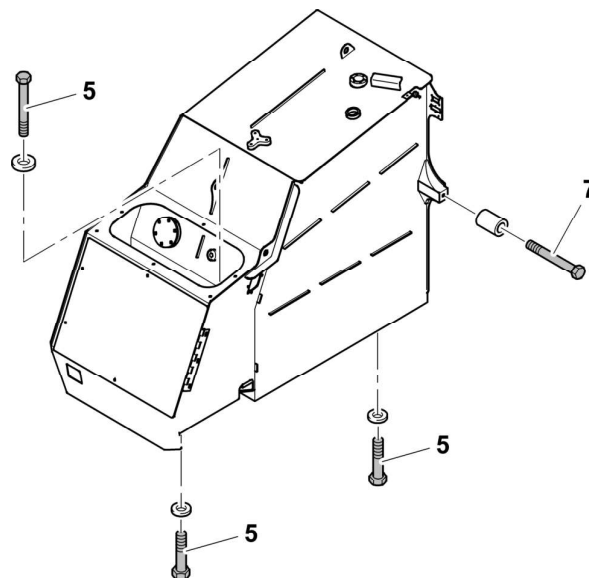


**Fig. 5-124** Swing ring bolts

Depending on the machines, the length and the quantity of the screws 15 and 25 can be different.

		Torque	Quantity
15	Screw M30x180/230	1920 Nm	60/70
25	Screw M30x180/190/230	1920 Nm	72

### 5.21.3 Mounting bolts of the fuel tank

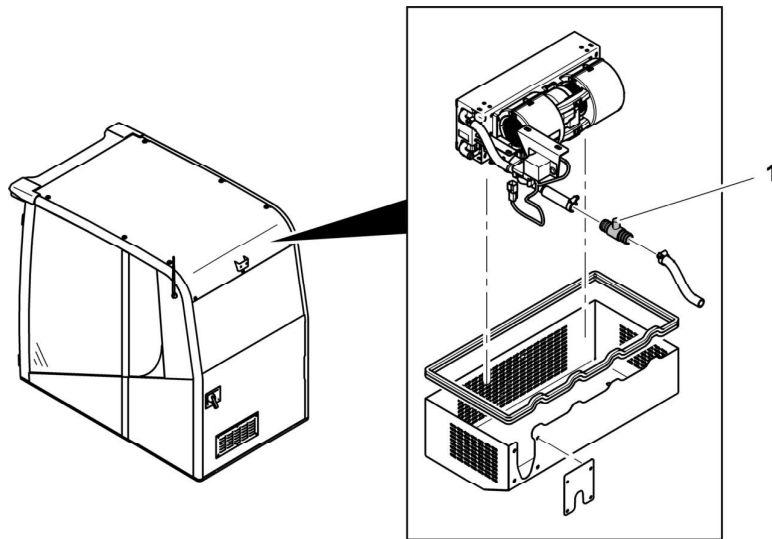


**Fig. 5-125** Fuel tank bolts

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- ▶ Loosen the bleeding screw **1**.
- ▶ Let the air escape until free-air coolant flows out.
- ▶ Tighten the bleeding screw **1**.
- ▶ Start the water pump of the coolant heater with the button **S258** which is adjacent to the heater.
- ▶ Let the pump work. Stop it with the button **S258**.
- ▶ Do a check of free-air coolant through bleeding screw **1**. Tighten it back.
- ▶ Close the expansion tank of the Diesel engine cooling system.

### Bleed the additional cab heater (if installed)



**Fig. 5-135** Bleeding valve of the additional cab heater (if installed)

#### 1 Bleeding valve

- ▶ Start the machine.
- ▶ Make sure that the Diesel engine is at operating temperature.
- ▶ Start the additional cab heater.
- ▶ Loosen the bleeding valve **1**.
- ▶ Let the air escape until free-air coolant flows out.
- ▶ Tighten the bleeding valve **1**.

Depending on the machines, a coolant shutoff valve can be installed on the Diesel engine. If necessary, you can use this valve to isolate the additional cab heater from coolant supply.

- ▶ Refer to section "Start the coolant heater" of the "Starting aids" in chapter 3.

### 5.27.4 250 Hours Maintenance Schedule - R 9150 - R 9150B

Serial Number: Fleet Number: SMU Hours: Travel Hours:	Completed by:  Date and Signature:
--	--

WORK TO BE PERFORMED AT 250, 750, 1250 HOURS, ...	Check	Initials	Comments
<b>Check <input type="checkbox"/> for first and only interval or Check <input type="radio"/> for repeat interval</b>			
<b>UPPERCARRIAGE</b>			
Do a visual check of mirrors and cameras, clean and adjust if necessary	<input type="radio"/>		
Do a visual check of the non-slip surfaces for wear and damage	<input type="radio"/>		
<b>DIESEL ENGINE AND SPLITTERBOX</b>			
Check engine oil level	<input type="radio"/>		
Sample and analyse engine oil	<input type="radio"/>		
Check coolant level	<input type="radio"/>		
Check Diesel Exhaust Fluid (DEF) level	<input type="radio"/>		
Do a visual check of the precleaner	<input type="radio"/>		
Check oil level in the splitterbox	<input type="radio"/>		
Change oil in splitterbox	<input type="checkbox"/>		
<b>HYDRAULIC SYSTEM</b>			
Sample and analyse hydraulic oil and change oil if necessary (if filled with HEES biodegradable oil)	<input type="radio"/>		
Clean magnetic rods of return-line filter for the hydraulic hammer (optional equipment)	<input type="radio"/>		
<b>ELECTRICAL SYSTEM</b>			
Press to open dust discharge valve on aeration devices for cabin and electrical boxes (optional equipment)	<input type="radio"/>		
Do a visual check of the head and floodlights, clean and adjust if necessary	<input type="radio"/>		
<b>AIR PRESSURE SYSTEM</b>			
Drain air tanks	<input type="radio"/>		

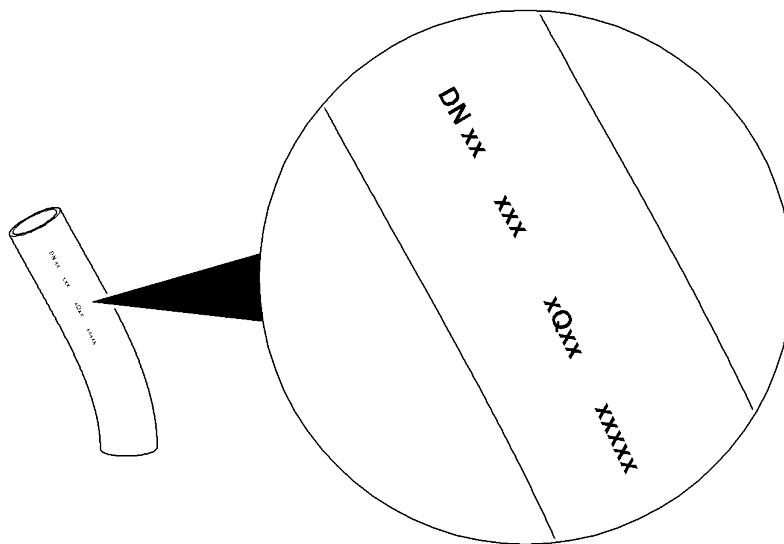
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<b>WORK TO BE PERFORMED AT 1000, 3000, 5000 HOURS, ...</b>	<b>Check</b>	<b>Initials</b>	<b>Comments</b>
<b>Check <input type="checkbox"/> for first and only interval or Check <input type="radio"/> for repeat interval</b>			
<b>Attachment:</b> Do a visual check for missing, broken or loosen mounting screws of the handrails, pin covers fastening and greases connections, tighten if necessary	<input type="radio"/>		
<b>Uppercarriage:</b> Do a visual check for missing, broken or loosen mounting screws of the counterweight, tanks, Powerpack, control valve console, cab, cab elevation, catwalks, handrails, grease box, ladder, tighten if necessary	<input type="radio"/>		
<b>Swing gear:</b> Do a visual check for missing, broken or loosen mounting bolts of the swing gear and hydraulic motors, tighten if necessary	<input type="radio"/>		
<b>Swing ring:</b> Do a detailed check for missing, broken or loosen mounting screws and protective nuts of swing ring, tighten the bolts	<input type="checkbox"/>		
<b>Diesel engine:</b> Do a visual check for missing, broken or loosen mounting screws of the thermic protection on exhaust manifold fastening, tighten if necessary	<input type="radio"/>		
<b>Diesel engine:</b> Do a visual check for missing, broken or loosen mounting bolts of the starter motors, alternator and AC compressor, tighten if necessary	<input type="radio"/>		
<b>Diesel engine:</b> Do a detailed check for missing, broken or loosen mounting screws of the splitterbox, tighten the screws	<input type="radio"/>		
<b>Hydraulic:</b> Do a detailed check for missing, broken or loosen mounting screws of pumps, motors, clamps, ..., tighten the screws	<input type="radio"/>		
<b>TRACK COMPONENTS</b>			
Clean track chains (after the end of each shift)	<input type="radio"/>		
Do a visual check of the tensioning cylinders, idler, carrier and track rollers for leaks	<input type="radio"/>		
Do a visual check of the track chains tension	<input type="radio"/>		
<b>TRAVEL GEAR</b>			
Do a visual check of the gear for leaks, if there are leaks, check oil level	<input type="radio"/>		
Sample and analyse gear oil, change oil if necessary	<input type="radio"/>		
Change gear oil (if filled with COB-2, COB-3 or COB-4 gear oil)	<input type="radio"/>		
Sample and analyse lifetime sealing interspace oil, change oil if necessary (optional equipment)	<input type="radio"/>		
Change lifetime sealing interspace oil (optional equipment)	<input type="radio"/>		
<b>UNDERCARRIAGE</b>			
Do a visual check of all parts for damages and cracks - If necessary fill out the "Structural Inspection" form in Service Manual - Chapter 4	<input type="radio"/>		
If installed, do a detailed check and lubricate the integrated jacking system	<input type="radio"/>		
<b>ATTACHMENT</b>			

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<b>WORK TO BE PERFORMED AT 2000, 4000, 6000 HOURS, ...</b>	<b>Check</b>	<b>Initials</b>	<b>Comments</b>
<b>Check <input type="checkbox"/> for first and only interval or Check <input type="radio"/> for repeat interval</b>			
Change gear oil (if filled with COB-2, COB-3 or COB-4 gear oil)	<input type="radio"/>		
Sample and analyse lifetime sealing interspace oil, change oil if necessary (optional equipment)	<input type="radio"/>		
Change lifetime sealing interspace oil (optional equipment)	<input type="radio"/>		
If installed, change the oil of the external travel brake	<input type="radio"/>		
<b>UNDERCARRIAGE</b>			
Do a visual check of all parts for damages and cracks - If necessary fill out the "Structural Inspection" form in Service Manual - Chapter 4	<input type="radio"/>		
If installed, do a detailed check and lubricate the integrated jacking system	<input type="radio"/>		
<b>ATTACHMENT</b>			
Do a visual check of the bucket teeth and wear kit for wear	<input type="radio"/>		
Do a visual check of the grease supply at each lube point	<input type="radio"/>		
Do a visual check of cable harness and sensors for damage	<input type="radio"/>		
Do a visual check of all parts for cracks - If necessary fill out the "Structural Inspection" form in Service Manual - Chapter 4	<input type="radio"/>		
Do a visual check of the pin covers fastening	<input type="radio"/>		
<b>UPPERCARRIAGE</b>			
Do a visual check of oil, grease or fuel for leaks	<input type="radio"/>		
Do a detailed check of all structural parts for cracks - If necessary fill out the "Structural Inspection" form in Service Manual - Chapter 4	<input type="radio"/>		
Do a detailed check and lubricate covers, doors hinges, locks as well as access ladder cylinders bushings and swivel pins	<input type="radio"/>		
Do a visual check if fan guards are in place and secured	<input type="radio"/>		
Do a visual check of mirrors and cameras, clean and adjust if necessary	<input type="radio"/>		
Do a functional test of the camera system and global view around machine (including mirrors)	<input type="radio"/>		
Do a visual check of the non-slip surfaces for wear and damage	<input type="radio"/>		
Do a detailed check of all the anchor points and the tightening of the hand-rails mounting screws, only by authorized specialist personnel (at least once a year)	<input type="radio"/>		
<b>SWING GEAR</b>			
Do a visual check of the swing gears for leaks and oil level in expansion tanks	<input type="radio"/>		
Sample and analyse gear oil, change oil if necessary	<input type="radio"/>		
Change gear oil (if filled with COB-1 gear oil)	<input type="radio"/>		

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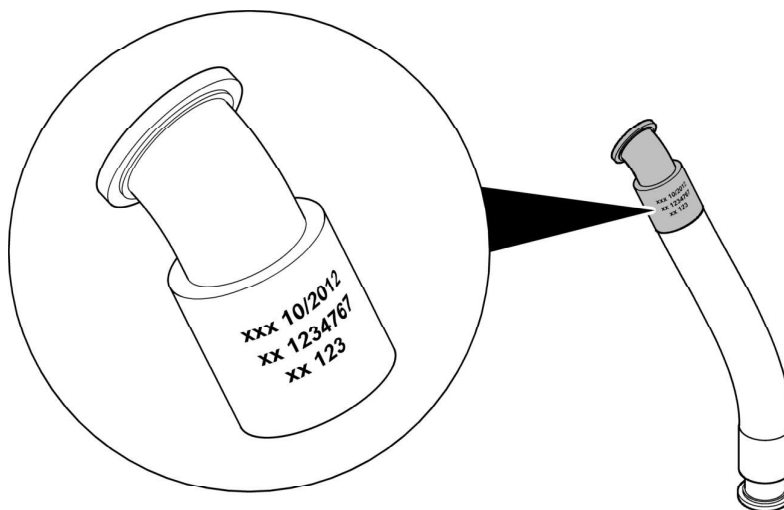


**Fig. 6-2** Marking of hose

**Hose assembly marking**

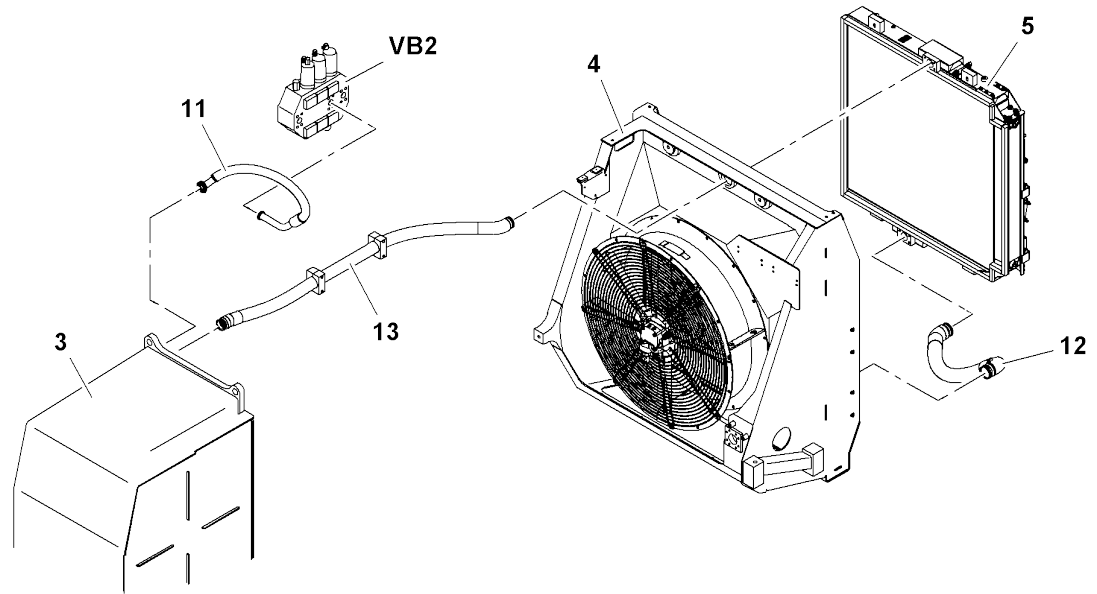
The hose assembly is marked on the fittings with:

- the manufacturer identification
- the date when the hose assembly has been made
- the hose identification number
- the service pressure



**Fig. 6-3** Marking of hose assembly

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**Fig. 6-8** Return lines

<b>3</b>	Hydraulic tank	<b>12</b>	Hydraulic hose
<b>4</b>	Oil cooler box	<b>13</b>	Hydraulic hose
<b>5</b>	Oil cooler	<b>VB2</b>	Valve block 2
<b>11</b>	Hydraulic hose		

- ▶ Disconnect, drain and clean all the hydraulic hoses.
- ▶ Move to next section about the leak oil circuit.

- 9 Hydraulic hose
- a Refer to section "Leak oil circuit of working pumps"
- CP3 PowerPack collecting pipe
- P6.1 Engine cooling pump
- P6.2 Oil cooling pump

- ▶ Remove the complete leak oil filter 1. Refer to the section above and to the Operating manual.
- ▶ Make sure during removal that contaminated oil does not go into the tank.
- ▶ Carefully clean the oil inlet compartment where the filter is installed.
- ▶ Carefully clean the housing of the filter 1 and the related magnetic rod.
- ▶ Replace the filter if necessary. Refer to the Operating manual.
- ▶ Disconnect, drain and clean all the hydraulic hoses.
- ▶ Open, drain and clean the collecting pipe CP3.
- ▶ Move to next section about the working pressure circuit.

### Working pressure circuit

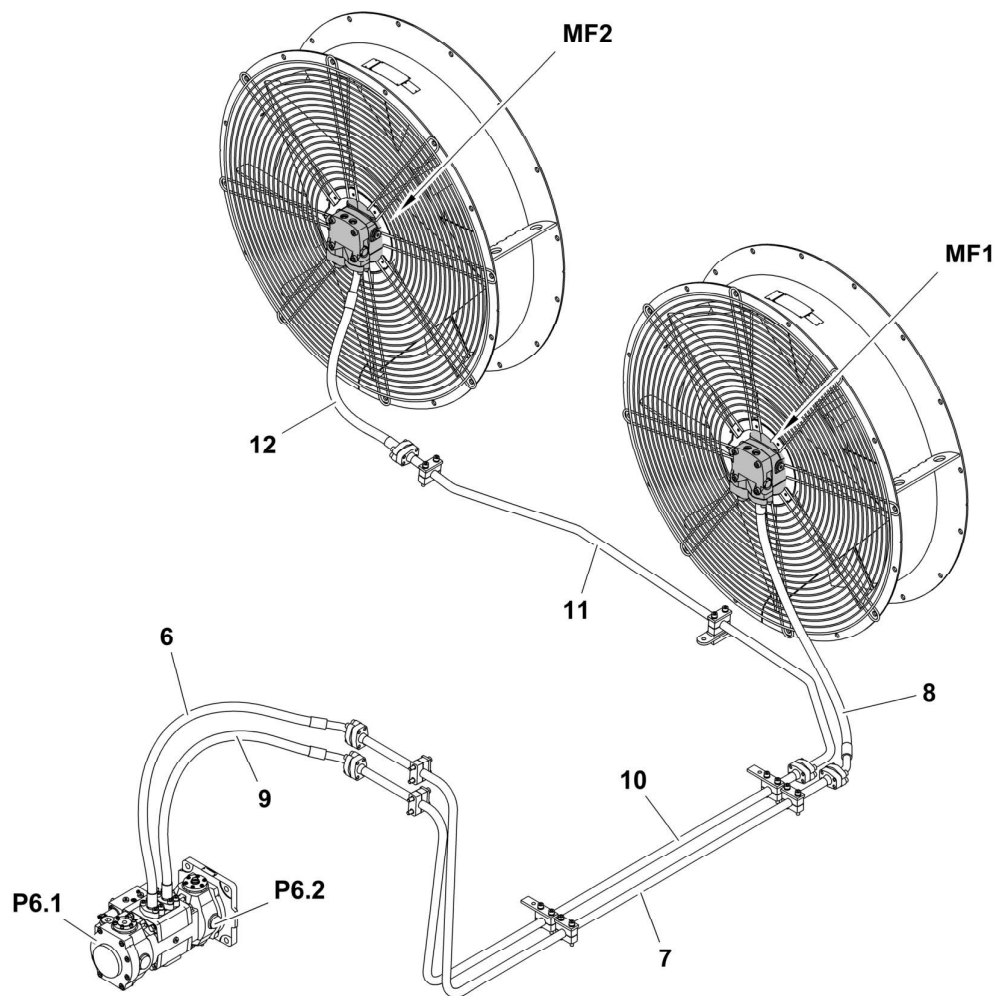
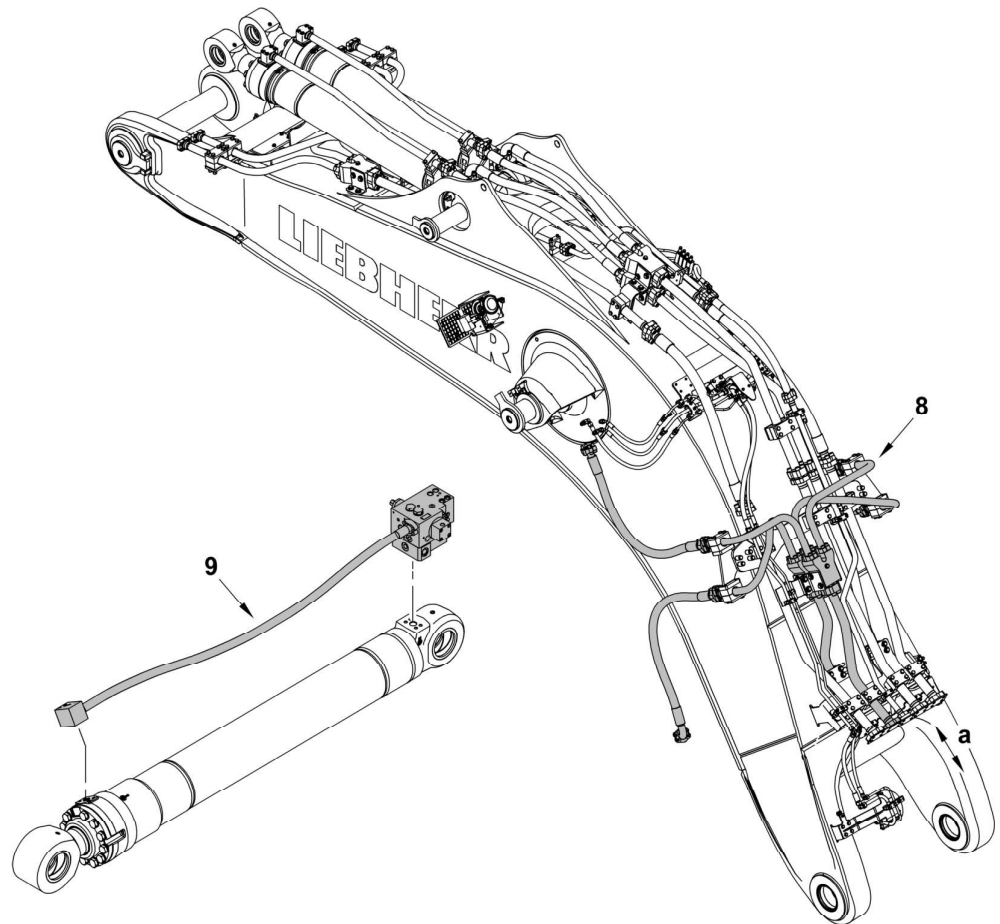


Fig. 6-19 Working pressure lines of fan motors

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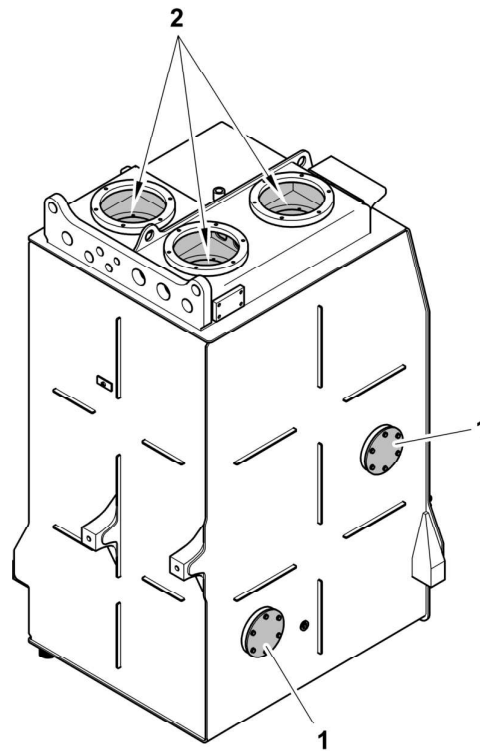
**Fig. 6-29** Hydraulic lines on the boom

**8** Hydraulic lines installed on the boom

**9** Hydraulic pipe installed on the boom cylinders

- ▶ Disconnect, drain and clean all the hydraulic hoses, pipes and distribution blocks.
- ▶ Do the restart procedure before you put the machine in operation (refer to the related section).

## 6.2.11 Clean the hydraulic tank



**Fig. 6-39** Hydraulic tank cleaning

- 1 Access covers of the hydraulic tank
- 2 Oil inlet compartments

- ▶ Remove the access covers 1 from the hydraulic tank.
- ▶ Look for particles and unwanted material in the tank and in the internal collecting pipes.
- ▶ Clean the tank manually with lint-free cleaning cloths.
- ▶ Flush the tank if necessary.
- ▶ Make sure that the oil inlet compartments 2 are clean.

## 6.2.12 Restart the machine

You must do the procedures that follow before you restart the machine.

- ▶ Make sure that:
  - All defective components are replaced or repaired.
  - All unwanted material and/or particles are removed from the circuit parts.
  - The hydraulic oil filters are in good condition or replaced.
  - All the parts you disconnected, drained and cleaned as given above are connected back.
- ▶ Fill the hydraulic system again. Refer to the Operating manual.

- **Check :**

Upon entering the Check menu, the statuses of the analogue sensors are shown.

B 6 9	O K				
B 7 1	O K				
B 1 8 4	O K				
B 5 0 - 1	O K				
B 5 0 - 2	E R R				
					←

To represent Sensor values in mA, press and hold both "Up" and "Down" arrow buttons for more than three seconds. This will only apply when a service or inspector dongle is plugged.

B 6 9	1 2 mA	B 7 1	3 4 mA		
B 1 8 4	1 6 mA	B 5 1	1 2 mA		
B 5 0 _ 1	2 1 mA				
B 5 0 _ 2	1 9 mA				
B 1 5 0 - 1	9 mA				
B 1 5 0 - 2	9 mA				←

## 6. Appendix

- **Error List :**

G1: Press P1 stay low
G2: Press P2 stay low
G3: No feedback P3 line
G4: No press drop P1
G5: No press drop P2
G14: Lev sensor P1 NC
G17: Lev sensor P3 NC
G28: Grease lev P1 few
G29: Grease lev P3 few
G33: Grease lev P1 low
G34: Grease lev P3 low
G36: Pilot press low
G37: No feedback B150 - 1
G38: No feedback B150 - 2

- in a potentially explosive atmosphere, unless the centralized lubrication system or its components are expressly suitable for it and have been approved accordingly.
- in a working environment or condition that corresponds to the required protection types IP (International Protection) and Nema (National Electrical Manufacturers Association) only in parts or not at all.
- to use the CLS to feed, forward, or store hazardous substances and mixtures in accordance with annex I part 2-5 of the CLP regulation (EC 1272/2008).
- For the supply, transport, stockpiling of gases, liquefied gases, dissolved gases, vapours, and fluids whose vapour pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at the maximum admissible operating temperature.
- to use the CLS to feed, forward, or store glycol- or polyglycol based oils and greases.
- to use inadmissible components or components expressly not suitable for the purpose.

## 2.6 Unauthorised activities

The following activities may be carried out by SKF manufacturer specialists or authorized persons only due to potential sources of faults that may not be visible for the user, or due to legal regulations:

- Removal, replacement or changes to the centralized lubrication system or components integrated or connected to it.
- Changes to the control printed circuit board or the power supply board exceeding the adjustment of lubrication and pause times or the replacement in case of defects.
- Dismantling of individual components of the centralized lubrication system.
- Changes to the power supply or to the admissible input voltage.
- Changes to the admissible or specifically required operating pressure for the supplied centralized lubrication system.

## 2.7 Conversions or modifications

Unauthorized conversions or modifications may result in unforeseeable impacts on safety and functionality. Therefore, any unauthorized reconstructions or changes are expressly prohibited.

## 2.8 Inspections

**The following inspections were carried out prior to delivery:**

- Electrical inspections following EN 60204-1 (depending on the type of component supplied)
- Tests made in accordance with ATEX (depending on the type of component supplied)
- Safety and functional tests (depending on the type of component supplied)

- If transported separately (e. g. repair) lift the motor by means of the transport lugs or eye bolts. Ensure that transport lugs or eye bolts are firmly seated. Do not carry any further load on the transport lugs or eye bolts. Do not transport motors on the fan cover.
- Assemble the pumps and other components only outside of the operating range of moving parts, at an adequate distance from sources of heat or cold.
- Dry wet, slippery surfaces.
- Cover hot or cold surfaces accordingly.
- Prior to performing work, de-energize and depressurize the pump and secure it against unauthorized switch-on. Work on electrical components must be carried out by electrical specialists only. Observe any waiting periods for discharging, if necessary.
- Carry out electrical connections only according to the information in the valid wiring diagram and taking into account the relevant regulations, the local connection conditions and legal prescriptions (e.g. DIN, VDE). Electrical connections must be done in such way that no forces are transferred to the product (tension-free connection).
- Do not touch cables or electrical components with wet or damp hands.
- Maintenance and repair work can be subject to restrictions at low or high temperatures (e.g. changed flow properties of the lubricant). Therefore, where possible, try to carry out maintenance and repair work at room temperature.
- Carry out all works on electrical components using adequate, voltage insulated and technically proper tools only.
- Fuses must never be bridged but have to be replaced by the same type of fuse always. Determine the cause of the failure of the fuse.
- Ensure correct earthing of the electrical system.
- Undertake drilling at non-critical, non-load bearing parts only. Use any available boreholes. Do not damage lines and cables when drilling. It is essential to observe the machine manufacturer's installation instructions and to consult the machine designer in case of doubts.
- Observe possible abrasion points. Protect the parts accordingly.
- Other units of the machine or vehicle must not be damaged or impaired in their function by the installation of the centralized lubrication system.
- All components used must be designed for:
  - maximum operating pressure
  - lubricant to be supplied
  - maximum/ minimum temperature
  - corresponding supply voltage available on site
  - operating and ambient conditions at the location of use
  - required lubricant volume
- Parts of the centralized lubrication system must never be subjected to torsion, shearing or bending.
- Check all parts prior to use for contamination and clean, if necessary. Lubricant lines should be primed with lubricant prior to installation. This makes the subsequent ventilation and commissioning of the system easier.

## 8 Technical data and operating instructions

### 8.1 Operating pressure / operating temperature

All system components must be designed for the maximum operating pressure and must be secured by an adequate pressure relief valve against too high system pressures. For details see operating or installation instructions and data sheets of the respective product.

### 8.2 Installation position, sound pressure level, weight, dimensions

For details see operating or installation instructions and data sheets of the respective product.

### 8.3 Tightening torques

For details see operating or installation instructions and data sheets of the respective product.

### 8.4 Output / connections

For details see operating or installation instructions and data sheets of the respective product. Deviating conditions such as NLGI class, temperature and counter pressure may lead to a deviation in the flow rate. This should be taken into account when designing the lubrication points.

### 8.5 Filling possibilities

For details see operating or installation instructions and data sheets of the respective product.

### 8.6 Electrical connection (electrically driven products)

Following the respective applicable installation prescriptions for electrical systems. For details see operating or installation instructions and data sheets of the respective product.

#### IP type of protection

##### Motor and system:

For IP or NEMA protective class see type identification plate of motor or system respectively the Technical Data chapter of the individual components. For details see operating or installation instructions and data sheets of the respective product.

### 8.7 Air pressure and air quality (air-operated products)

Filtered and oiled air according to DIN ISO 8573-1 not higher than class 5

Inlet air pressure 5.5 – 7 bar

Maximum particle density 10 mg / m<sup>3</sup>

Water content (pressure dew point) + 7 °C

Oil content (maximum oil concentration) 25 mg / m<sup>3</sup>

**Please follow the instructions of the respective product.**

Level II

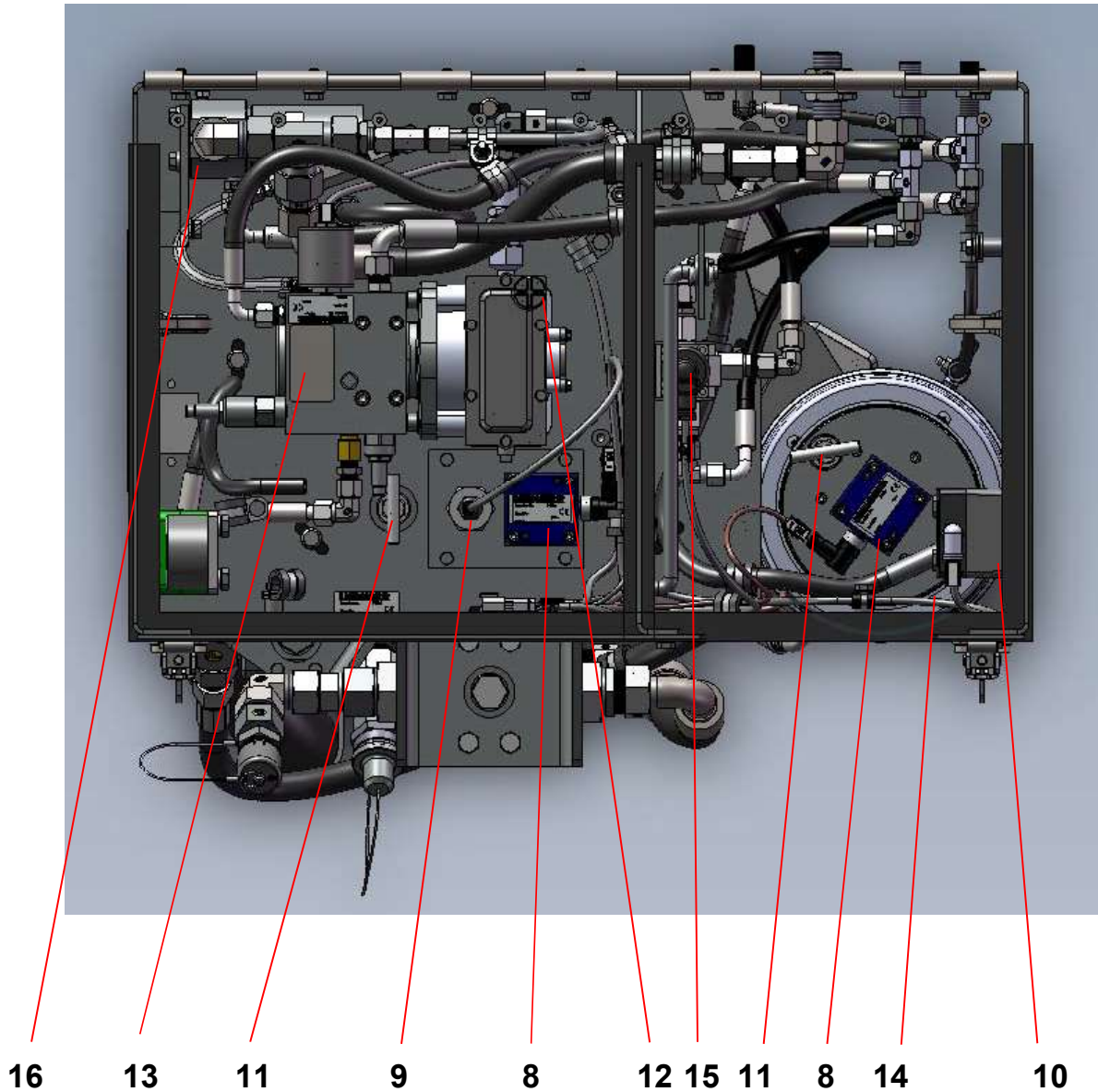


Fig. 9 Central lubrication pump 80+8L – level II (top)

- 8 Level sensor
- 9 High-level sensor
- 10 Pressure switch
- 11 Dip stick (grease reservoir)
- 12 Dip stick (pump gear)
- 13 Pump P1 – Model FlowMaster II
- 14 Pump P3 – Model P203
- 15 Solenoid Valve 3/2-Way (Y79) – only applied for level II
- 16 Hydraulic relief (vent) valve – only applied for level II

For information and descriptions of the components, refer to chapter 13.

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