

**en**

**Operator's manual**

Hydraulic excavator

**Document ID**

	ORIGINAL OPERATOR'S MANUAL
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### 1.1.3 Undercarriage

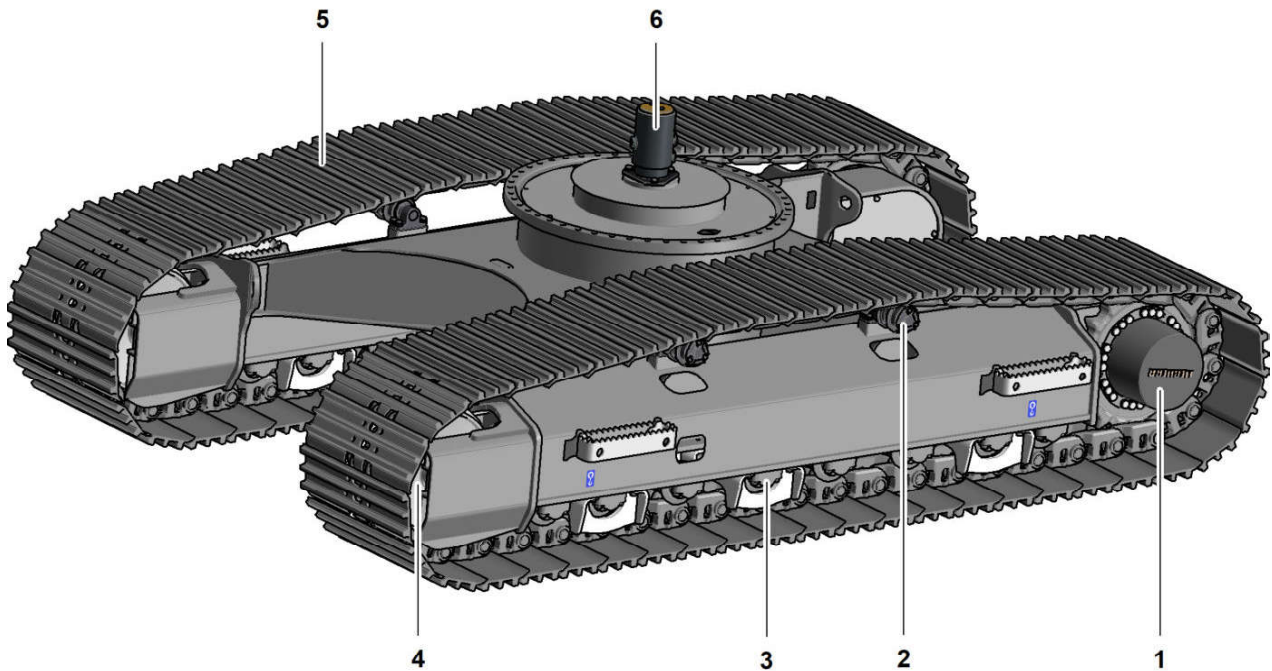


Fig. 4: Undercarriage

- |   |                                   |   |              |   |                   |
|---|-----------------------------------|---|--------------|---|-------------------|
| 1 | Travel gearbox and sprocket wheel | 3 | Track roller | 5 | Track             |
| 2 | Carrier roller                    | 4 | Idler-wheel  | 6 | Rotary connection |



## Operator's Cab

<b>Cab</b>	ROPS safety cab structure (roll-over protection system according to ISO 12117-2:2008) with windscreen, totally or partially retractable (only upper part), under cab roof, LED work headlights integrated in the ceiling, a door with a sliding window (can be opened on both sides), large stowing box and several stowing possibilities, shock-absorbing suspension, laminated right hand side and roof windows, all windows tinted, separate extensible window shades for the sunroof window and windscreen, cigarette lighter and 24 V plug, 12 V plug, cup holder, mobile phone storage net
<b>Operator's seat</b>	Liebherr-Comfort seat, airsprung with automatic weight adjustment, vertical and longitudinal seat damping including consoles and joysticks. Seat and armrests adjustable separately and in combination (adjustable in width, height and inclination), seat heating as standard
<b>Arm consoles</b>	Oscillating consoles with seat, tiltable console left
<b>Operation and displays</b>	Large high-resolution operating unit, intuitive, colour display with touchscreen, video-compatible, numerous setting, control and monitoring options, e.g. air conditioning control, fuel consumption, machine and attachment parameters
<b>Air-conditioning</b>	Automatic air-conditioning, recirculated air function, fast de-icing and demisting at the press of a button, air vents can be operated via a menu. Recirculated air and fresh air filters can be easily replaced and are accessible from the outside. Heating-cooling unit, designed for extreme outside temperatures, sensors for solar radiation, inside and outside temperatures The air conditioning system contains fluorinated greenhouse gases
Refrigerant	R134a
Global warming potential	1,430
Quantity at 25 °C*	1,260 g
CO <sub>2</sub> equivalent	1.80 t
<b>Vibration emission**</b>	
Hand/arm vibrations	< 2.5 m/s <sup>2</sup> , according with ISO 5349-1:2001
Whole-body vibrations	< 0.5 m/s <sup>2</sup>
Measuring inaccuracy	According with standard EN 12096:1997
<b>Noise emission</b>	
ISO 6396	L <sub>PA</sub> (inside cab) = 72 dB(A)
2000/14/EC	L <sub>WA</sub> (surround noise) = 105 dB(A)

## Undercarriage

<b>Versions</b>	
S-HD	Gauge 2,890 mm
LC-V	Gauge 2,390 mm/2,890 mm
<b>Drive</b>	Liebherr swashplate motor with brake valves on both sides
<b>Transmission</b>	Liebherr planetary reduction gear
<b>Maximum travel speed</b>	Low range 2.9 km/h High range 4.6 km/h
<b>Drawbar pull on crawler</b>	363 kN
<b>Track components</b>	D7G, maintenance-free
<b>Track rollers/Carrier rollers</b>	S-HD: 10/2 LC-V: 10/3
<b>Tracks</b>	Sealed and greased
<b>Track pads</b>	Triple grouser
<b>Holding brake</b>	Wet multi-disc (spring applied, pressure released)
<b>Brake valves</b>	Integrated into travel motor
<b>Lashing eyes</b>	Integrated



## Equipment

<b>Type</b>	Combination of resistant steel plates and cast steel components
<b>Hydraulic cylinders</b>	Liebherr cylinders with seal and guidance systems
<b>Bearings</b>	Sealed, low maintenance
<b>Lubrication</b>	Liebherr central lubrication system
<b>Hydraulic connections</b>	Pipes and hoses equipped with SAE split-flange connections
<b>Buckets</b>	Standard equipped with Liebherr tooth system

\* Valid for standard machine without operator's cab elevation and without height adjustable cab

\*\* For the risk assessment according to 2002/44/EC see ISO/TR 25398:2006

## Buckets Machine stability per ISO 10567\* (75% of tipping capacity)

	Cutting width mm	Capacity ISO 7451 m <sup>3</sup>	Weight <sup>3)</sup> kg	Weight <sup>4)</sup> kg	S-HD-Undercarriage (with track pads 600 mm)				LC-V-Undercarriage (with track pads 600 mm)			
					Stick length (m)				Stick length (m)			
					without quick coupler		with quick coupler		without quick coupler		with quick coupler	
2.15	2.60	2.15	2.60	2.15	2.60	2.15	2.60					
<b>with counterweight 8.4 t</b>												
HD <sup>1)</sup>	1,600	2.15	1,870	1,830	▲	▲	▲	▲	▲	▲	▲	▲
	1,650	2.25	1,910	1,870	▲	▲	▲	▲	▲	▲	▲	▲
	1,800	2.50	2,000	1,960	▲	▲	▲	▲	▲	▲	▲	▲
	1,800	2.75	2,080	2,040	▲	▲	▲	▲	▲	▲	▲	▲
	1,850	3.00	2,130	2,090	▲	■	▲	■	▲	▲	▲	▲
HDR <sup>2)</sup>	1,650	2.00	2,490	2,530	▲	▲	▲	▲	▲	▲	▲	▲
	1,650	2.25	2,570	2,610	▲	▲	▲	▲	▲	▲	▲	▲
	1,650	2.50	2,660	2,700	▲	▲	▲	▲	▲	▲	▲	▲
<b>with counterweight 9.4 t</b>												
HD <sup>1)</sup>	1,600	2.15	1,870	1,830	▲	▲	▲	▲	▲	▲	▲	▲
	1,650	2.25	1,910	1,870	▲	▲	▲	▲	▲	▲	▲	▲
	1,800	2.50	2,000	1,960	▲	▲	▲	▲	▲	▲	▲	▲
	1,800	2.75	2,080	2,040	▲	▲	▲	▲	▲	▲	▲	▲
	1,850	3.00	2,130	2,090	▲	▲	▲	▲	▲	▲	▲	▲
HDR <sup>2)</sup>	1,650	2.00	2,490	2,530	▲	▲	▲	▲	▲	▲	▲	▲
	1,650	2.25	2,570	2,610	▲	▲	▲	▲	▲	▲	▲	▲
	1,650	2.50	2,660	2,700	▲	▲	▲	▲	▲	▲	▲	▲

\* Indicated loads are based on ISO 10567, at maximum reach, and may be swung 360° on firm and even ground

<sup>1)</sup> HD bucket with teeth Z 50

<sup>2)</sup> HDR bucket with teeth Z 70

<sup>3)</sup> Bucket for direct mounting

<sup>4)</sup> Bucket for mounting to quick coupler

Other buckets available upon request

Max. material weight ▲ = ≤ 2.0 t/m<sup>3</sup>, ■ = ≤ 1.8 t/m<sup>3</sup>

# Equipment Standard/Option

## Undercarriage

Chain guide 3 pieces	•
Chain guide 4 pieces	+
Chain guide full length	+
Cover and base plate for undercarriage centre section	•
Reinforced cover and base plate for centre section (LC-V undercarriage)	+
Reinforced cover plate for centre section (LC-V undercarriage)	+
Screws protection for sideframe (LC-V undercarriage)	+
Special painting	+
Steps	•
Steps wide	+
Track pads triple grouser reinforced 600 mm	•
Track pads triple grouser reinforced 750/900 mm	+
Tracks, sealed and greased, reinforced	•
Travel drive gearbox protection	+
Travel motor housing protection	+
Undercarriage LC-V	+
Undercarriage S-HD	•

## Upper-carriage

Air pre-filter with cyclonical dust trap	+
Boxing ring	+
Counterweight heavy 9.4 t	+
Counterweight standard 8.4 t	•
Electric socket on uppercarriage (24 V)	+
Extended tool set including tool box	+
External starting aid (24 V)	+
Fuel anti-theft protection	+
Headlight on uppercarriage, front left, LED+, 1 piece, protection included	+ <sup>1)</sup>
Headlight on uppercarriage, front right, LED, 1 piece, protection included	• <sup>1)</sup>
Headlight on uppercarriage, front right, LED+, 1 piece, protection included	+ <sup>1)</sup>
Headlight on uppercarriage, lateral left, LED+, 1 piece	+ <sup>1)</sup>
Headlight on uppercarriage, lateral right, LED+, 1 piece	+ <sup>1)</sup>
Headlights on uppercarriage, rear, LED+, 2 pieces	+ <sup>1)</sup>
Lighting for tank area <sup>1)</sup>	+
Lighting for uppercarriage access <sup>1)</sup>	+
Pre-heating system for fuel	+
Radiator fine mesh protection grid	+
Reflective warning stickers	+
Reversible fan drive	+
Skyview 360°	+
Special painting	+
Tank refilling pump fuel	+
Tool set including storage case	•
Uppercarriage bottom and side protection	+
Uppercarriage bottom closure sheets	•

## Hydraulic System

Bypass filter for hydraulic oil	+
Liebherr hydraulic oil	•
Liebherr hydraulic oil, adapted for extreme climate conditions	+
Liebherr hydraulic oil, biodegradable	+

## Engine

Automatic engine shutdown after idling	+
Engine shut-down with overrun	+
Lighting for engine compartment <sup>1)</sup>	+

- Adhere to safety regulations at place of use.
- Report all changes to machine that affect safety to operating company.
- If it is no longer possible to work safely: Immediately stop operating machine.
- Exclusively perform retrofittings of machine after consultation with manufacturer.
- Use original Liebherr spare parts wherever possible.

## Requirement

The operator has following qualification and skills:

- Has completed the legally specified minimum age.
- Is physically and mentally capable of operating the machine safely.
  - Satisfactory eyesight
  - Satisfactory hearing ability
  - Quick reactions
  - Is able to estimate distance, height and gaps.
- Has the necessary authorisation for operation of machine.
- The operator has the necessary education (theoretical and practical) for the following:
  - Handling the machine type
  - Attaching
  - Spotting
  - Handling fire extinguishing equipment
- Knows all means of escape in an emergency.
- Is not under any physical or mental impairment that limits one of the prescribed requirements.
- Is not under the influence of alcohol.
- Is not under the influence of drugs.

## 2.3.5 Maintenance staff

### Responsibility

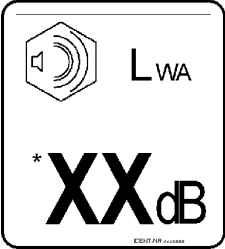
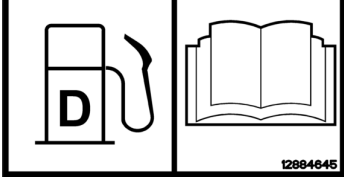




The maintenance staff are responsible for the following:

- Read operator's manual.
- Read supplied documentation.
  - Operator's manuals for components
  - Operator's manuals from third party manufacturers
  - Additional instructions
- Maintain machine for safe and reliable function.
- Execute all maintenance tasks specified for maintenance staff in the maintenance and inspection schedule.
- Wear personal protective equipment.
- Adhere to safety regulations at place of use.
- Report all changes to machine that affect safety to operating company.
- Exclusively perform retrofittings of machine after consultation with manufacturer.
- Use original Liebherr spare parts wherever possible.

### Requirement

The maintenance staff has following qualification and skills:

- Has completed the legally specified minimum age.
- Is physically and mentally capable of maintaining the machine.
  - Satisfactory eyesight
  - Satisfactory hearing ability
  - Quick reactions
  - Is able to estimate distance, height and gaps.

37	Sign	Description
		<p><b>Sound power level (L<sub>WA</sub>)</b></p> <p>Shows sound power level of the machine in dB. *XX: Machine-specific value.</p>
		<p><b>Diesel fuel</b></p> <p>Indicates that exclusively diesel fuels are permitted that comply with the minimum quality requirement. For more information see operator's manual. (For more information see: 5.3.1 Diesel fuels, page 269)</p>
		<p><b>Waxoyl</b></p> <p>Shows presence of corrosion protection.</p>
		<p><b>Roll over protective structure (ROPS)</b></p> <p>Indicates that modifications or repairs on the roll over protective structure (ROPS) are strictly prohibited. For more information see operator's manual.</p>
		<p><b>Diesel exhaust fluid tank</b></p> <p>Fill diesel exhaust fluid tank exclusively with diesel exhaust fluid in line with ISO 22241. For more information on filling diesel exhaust fluid tank with diesel exhaust fluid, see operator's manual.</p>
		<p><b>Coolant</b></p> <p>Shows that the cooling system is filled with Liebherr Antifreeze OS coolant. For more information see operator's manual.</p>

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### **Incorrect path of machine**

- Remove large rocks and obstacles.
- Fill up channels and holes.
- Keep machines to hand for creating and maintaining suitable terrain conditions and calculate sufficient time.

### **Damage**

#### **Increased travel mode**

- If machine is driven a lot: Stipulate use of special auxiliary systems for travel mode.
- Regulate speed to prevent swaying.

## **2.7.8 Operation of machine**

### **Danger to life**

#### **Incorrect place of use**

- Make sure that load capacity value of ground is sufficient.
- Do not exceed maximum inclination angle of machine while working.
- Do not exceed maximum inclination angle of machine when driving on ramps (side inclination).
- Make sure that ground offers sufficient grip.
- Adhere to safety gap from live overhead cables.

#### **Incorrect use**

- When working in following areas, adhere to the laws, regulations and rules applicable at the place of use.
  - Explosive area
  - Flammable area
  - Areas with underground lines (gas, electricity)
- Make sure that machine is equipped with components for exhaust gas reduction when in closed spaces (for example tunnel, hall) in non-explosive environment.
- Clean machine regularly to remove flammable residues (for example dust, wood scraps).

#### **Incorrect handling of electrical system**

- Make sure there are no persons with a pacemaker in the vicinity of the running diesel engine.
- Before working on electrical system, make sure that affected parts are voltage-free.
- Before working on electrical system, make sure that neighbouring parts are isolated.
- Have work on electrical systems performed exclusively by a qualified electrician.

## Selecting menu via menu bar

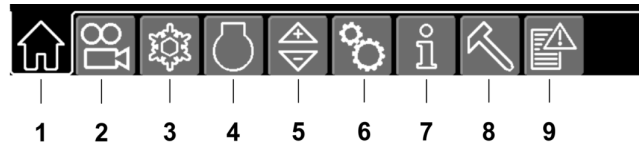


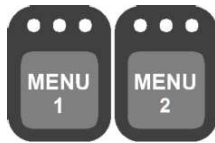
Fig. 49: Menu bar

- |   |  |   |                               |
|---|--|---|-------------------------------|
| 1 | Start page menu button   | 6 | Function settings menu button |
| 2 | Camera menu button <sup>5)</sup>   | 7 | Information menu button       |
| 3 | Automatic heating, automatic ventilation and automatic air conditioning system menu button | 8 | Tool Control menu button      |
| 4 | Operating status menu button   | 9 | Service codes menu button     |
| 5 | System settings menu button  |   |                               |

- ▶ Press menu button in menu bar.
  - ▷ Symbol of selected menu has a black background.

## Selecting menu via programmable keys

### Programming key



- ▶ Select menu: Press menu button in menu bar.
- ▶ Press *MENU 1* key or *MENU 2* key until middle and right LEDs light up.
- ▶ Release key/button.
  - ▷ Left LED lights up.
  - ▷ Menu is saved to key.

### Selecting menu via key

- ▶ Press *MENU 1* key or *MENU 2* key.
  - ▷ Menu appears on the display.

## 3.2.2 Status symbols

The symbols in the status bar indicate the operating status. The displayed symbols depend on model and equipment of machine.

### General symbols

Symbol	Meaning
	Confirmation required
	Confirmation error

<sup>5)</sup> not valid for Rail machines.

### A/C operating mode

The air conditioning is activated or deactivated.

When the air conditioning compressor is deactivated the machine consumes less fuel.

### Recirculated air mode

When working in enclosed spaces operator is exposed to less exhaust fumes.

Intake of fresh air is reduced.

Air in operator's cab is recirculated.



#### **DANGER**

Fogged up windows!  
Danger to life.

- ▶ Do not leave recirculated air mode switched on for long periods.
- ▶ Activate AUTO operating mode.

### Defrosting operating mode

Fan runs on maximum power.

Front air outlet (at windscreen) is open, other air outlets are closed.

Operator can control temperature.

### Setting air conditioning unit

- ▶ Set temperature and blower power: Press corresponding display button.
- ▶ Set air supply: Press corresponding display button.
  - ▷ Corresponding display button is displayed in green.

### Activating and deactivating operating mode

- ▶ Activate mode: Press corresponding display button or corresponding key on control unit A.
  - ▷ Corresponding display button is displayed in green.
  - ▷ LEDs in corresponding key of control unit A light up.
- ▶ Deactivate mode: Press corresponding display button or corresponding key on control unit A.
  - ▷ Corresponding display button is displayed in white.
  - ▷ LEDs in corresponding key of control unit A light up.

## 3.2.6 *Operating status menu*

Menu call: 

The display of this submenu varies depending on machine configuration:

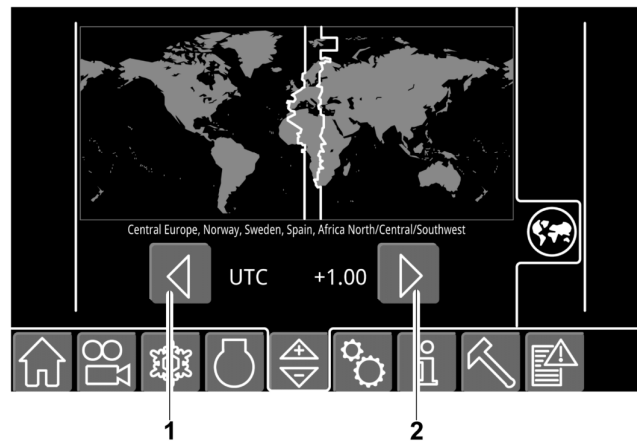


Fig. 160: Time zone submenu

1 Moving time zone to west button      2 Moving time zone to east button

### 3.2.20 Time format and date format submenu

Menu call:  >  > 

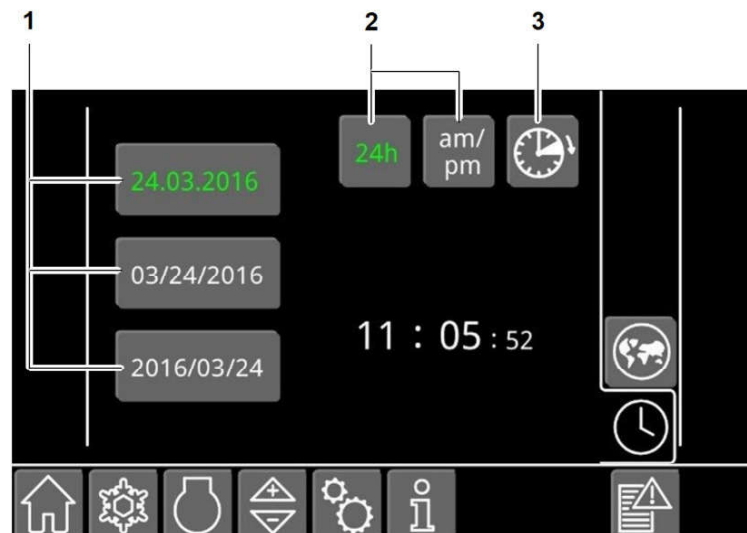


Fig. 161: Time format and date format submenu

1 Date format buttons      3 Summer time or winter time button  
2 Time format buttons

- ▶ Select time format and date format: Press corresponding buttons.
- ▷ Selected time format and date format are displayed in green.

### 3.2.21 Language selection submenu

Menu call:  >  > 



- ▶ Press *working tool A* button or *working tool B* button.
  - ▷ Settings of selected button apply to both control directions.
  - ▷ *Symmetrical mode* button 4 is displayed in green.

### Reversing control direction

Make sure the following precondition is met:

- Controls are not actuated.
- ▶ Press *reversing control direction* button 5.
  - ▷ *Reversing control direction* button 5 is displayed in yellow.
- ▶ Press confirmation button.
  - ▷ *Reversing control direction* button 5 is displayed in green.
  - ▷ Reversing control direction is active.

### Factory settings

- ▶ Activate factory settings: Press *factory settings* button 3.
  - ▷ *Symmetrical mode* button 4 is displayed in green.
  - ▷ Speed is set to maximum value.
  - ▷ Progressivity is set to medium value.

### Turning working tool

Menu call:  >  > 

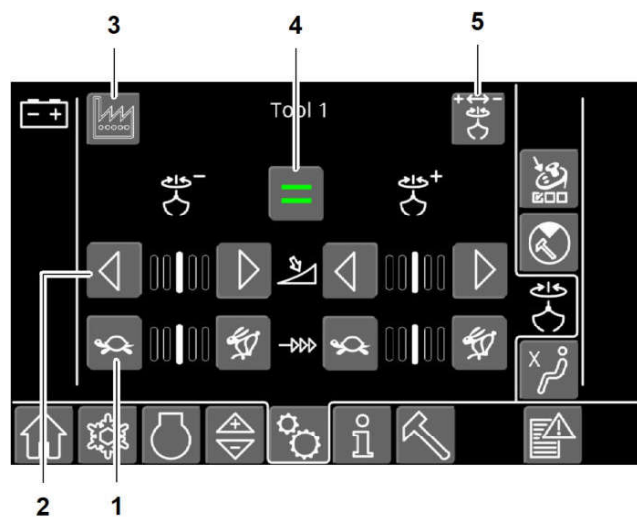


Fig. 187: Turning working tool

- |   |  |   |   |
|---|--|---|---|
| 1 | <i>Adjusting rotating speed of working tool</i> button | 4 | <i>Symmetrical mode</i> button                |
| 2 | <i>Adjusting progressivity of control</i> button       | 5 | <i>Reversing direction of rotation</i> button |
| 3 | <i>Factory settings</i> button                         |   |   |

### Asymmetrical mode

With the asymmetrical mode the speeds of the control directions can be adjusted independently of each other.

- |   |   |   |  |
|---|---|---|--|
| 2 | <i>Scroll</i> button                        | 5 | Maximum flow rate in small flow circuit of special working tool during operation |
| 3 | <i>Selected special working tool</i> button | 6 | Maximum pressure of special working tool during operation                        |








**NOTICE**

Unsuitable parameters!  
Damage to working tool.

- ▶ Select parameters adapted to working tool.
  - ▶ Adhere to maximum permitted values for pressure and flow rate.
- 
- ▶ Press *scroll* buttons **2** until desired *selected special working tool* button **3** is outlined in white.
  - ▶ Press required *selected special working tool* button **3**.
    - ▷ Name of special working tool is displayed in green.
    - ▷ Special working tool is selected.
    - ▷ Parameters of special working tool are activated.

### 3.2.45 Tool Control symbols

#### Symbols for working tools

Symbol	Designation
	Tiltrotator
	Dual circuit tiltrotator
	Bucket
	Tiltrotator, permanent supply
	Hammer
	Shear
	Sorting grapple

- ▶ Press unlocking button 3.
- ▷ Folding console 4 moves upwards.
- ▷ Safety barrier 2 retracts.

If folding console does not properly fold up after being unlocked:

- ▶ Contact Liebherr customer service.

### 3.3.6 Operator's seat

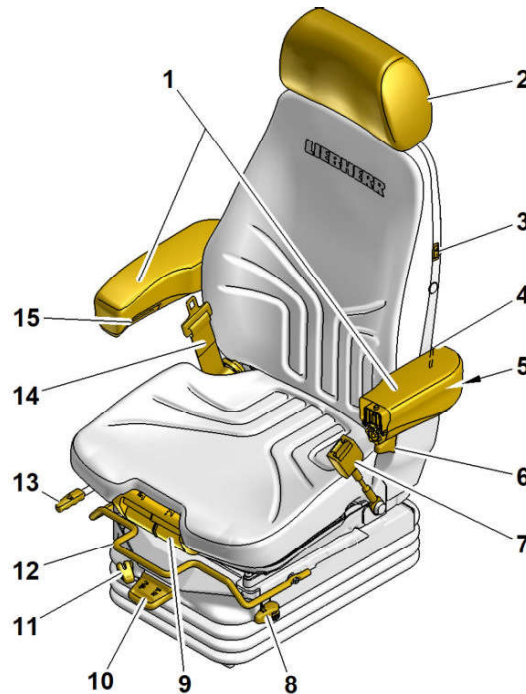


Fig. 241: Operator's seat

- |   |  |    |                                       |
|---|--|----|---------------------------------------|
| 1 | Armrest  | 9  | Adjusting seat cushion                |
| 2 | Head restraint                                     | 10 | Adjusting seat height <sup>11)</sup>  |
| 3 | Seat heating, seat air conditioning <sup>11)</sup> | 11 | Shock absorption                      |
| 4 | Lumbar support <sup>11)</sup>                      | 12 | Adjusting seat position with armrests |
| 5 | Adjusting armrest height                           | 13 | Adjusting seat position               |
| 6 | Adjusting backrest                                 | 14 | Safety belt                           |
| 7 | Belt buckle  | 15 | Adjusting armrest angle               |
| 8 | Horizontal suspension <sup>11)</sup>               |    |                                       |



#### DANGER

Unexpected machine movement!  
Danger to life.

- ▶ Exclusively adjust operator's seat when safety lever or folding console is in upper position.

<sup>11)</sup> Option

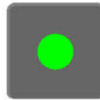


- ▶ Activate function: Press confirmation button within 5 seconds.
- ▷ Corresponding symbol on button is green.

If function is not activated:

- ▶ Preselect and confirm function again.

### Deactivating function via button on the display



- ▶ Preselect function: Press corresponding button on the display.
- ▷ *Confirmation required* status symbol appears on the display:



- ▷ Corresponding symbol on button is yellow.



- ▶ Deactivate function: Press confirmation button within 5 seconds.
- ▷ Corresponding symbol on button is white.

If function is not deactivated:

- ▶ Preselect and confirm function again.

### 3.3.9 Horn

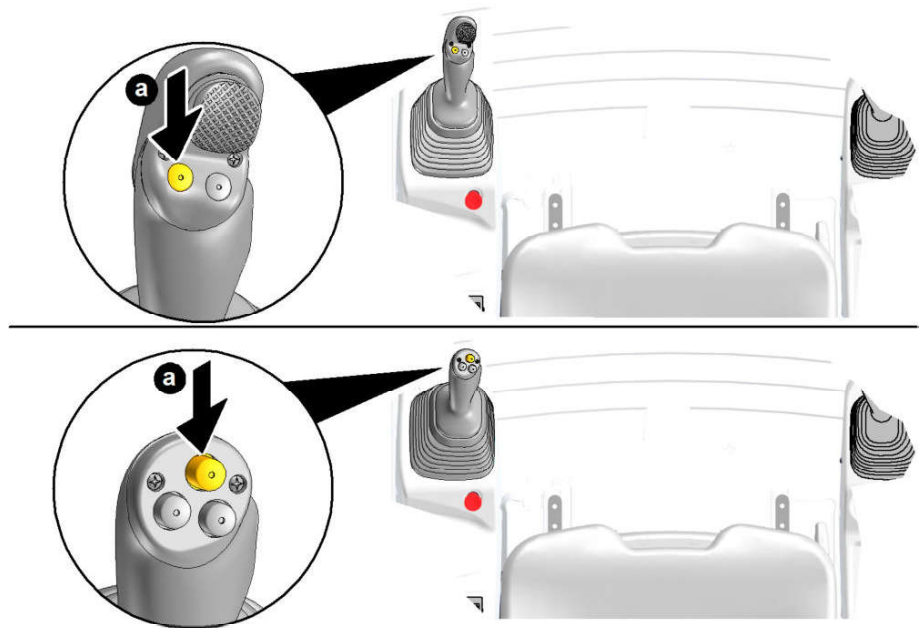


Fig. 272: Horn

#### Activating horn

- ▶ Press and hold button a.

#### Deactivating horn

- ▶ Release button a.

## Side area camera

### Checking blue area covered by side area camera

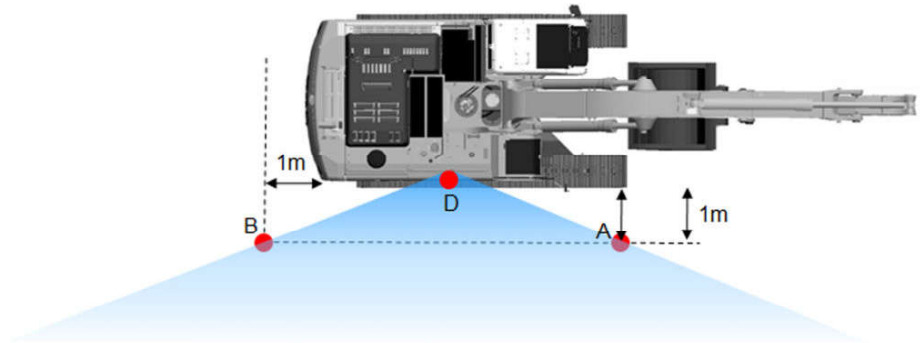


Fig. 287: Checking blue area covered by side area camera

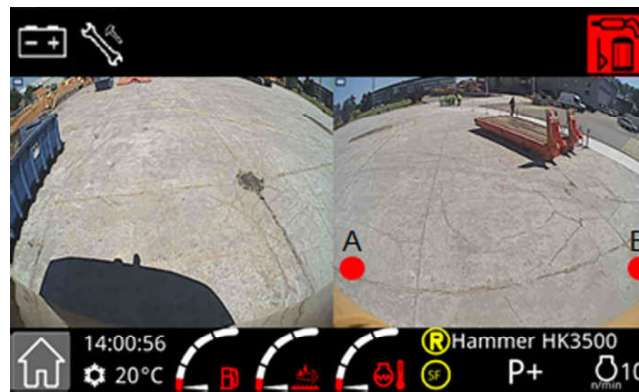


Fig. 288: Camera menu

- ▶ Align uppercarriage parallel to undercarriage.
- ▶ Place object **A** on the ground at 1 m distance from right side of machine and in front of right track.
- ▶ Place object **B** on the ground at 1 m distance from right side of machine and 1 m distance behind counterweight.
- ▶ On display of operator's cab check blue area covered by side area camera.
  - ▷ Objects **A** and **B** are visible in bottom corners of side area camera image.
  - ▷ Right side **D** of machine is visible in bottom area of side area camera image.
  - ▷ Camera image must cover area of at least 12 m on right side of machine.

If blue area displayed by side area camera is not correct:

- ▶ Adjust side area camera. (For more information see: [Adjusting side area camera, page 134](#))

## Starting refuelling with electric refuelling pump

### NOTICE

Incorrect refuelling with electric refuelling pump!  
Damage to electric refuelling pump and machine.

- ▶ Use clean fuel.
- ▶ Do not change length or diameter of suction hose.
- ▶ Comply with the maximum suction head of electric refuelling pump.
- ▶ Ensure correct progress of refuelling with electric refuelling pump.

Make sure the following preconditions are met:

- Diesel engine is shut off.
- Fuel used is approved. (For more information see: [5.3.1 Diesel fuels, page 269](#))
- Screen plate in foot valve 2 is clean and in good condition.
- ▶ Unscrew protection plug of foot valve 2.
- ▶ Insert foot valve 2 until bottom of tank container is reached.
- ▶ Press *start* button 3.

## Stopping refuelling with electric refuelling pump

When refuelling has ended, electric refuelling pump switches off automatically.

- ▶ Switch off electric refuelling pump manually: Press *stop* button 4.
- ▶ Unscrew foot valve 2 from tank container.
- ▶ Screw in plug of foot valve 2.
- ▶ Wind up suction hose 1 and stow behind door of fuel tank.

### 3.4.4 Refuelling diesel exhaust fluid

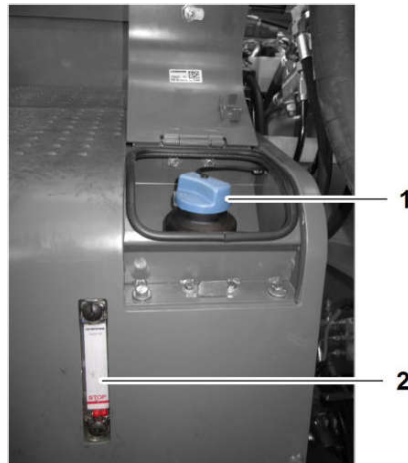


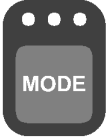




Fig. 312: Refuelling diesel exhaust fluid

1 Plug

2 Sight glass for maximum level of diesel exhaust fluid

## Operating mode

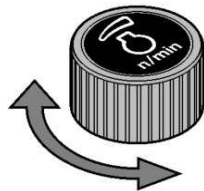
The four operating modes permit optimum use of the machine according to the work to be done.

Operating mode			Operation	Speed step	Hydraulic power
Key	Status of LEDs	Mode			
		S (SENSITIVE)	Precise work or lifting loads	7	Limited
		E (ECO)	Light to medium work	8	Slightly limited
		P (POWER)	Heavy work	9	Unlimited
		P+ (POWER PLUS)	Very heavy work	10	Unlimited

Tab. 33: Operating modes



- ▶ Activate operating mode E, P or S: Press *operating mode* key until relevant LED lights up. (see: [tab. 33, page 153](#))



- ▶ Activate operating mode P+: Set engine speed controller to speed step 10.

### 3.4.11 After starting

#### Precautions related to conditions of machine use

##### Altitude and outside temperature

Altitude and outside temperature affect the performance capacity and service life of the diesel engine.

The performance of the diesel engine is automatically adjusted according to the altitude and the outside temperature.

---

##### NOTICE

Cooling circuit overheating at high altitude or low outside temperature!  
Damage to diesel engine.

- ▶ Constantly monitor coolant temperature and hydraulic oil temperature.
-

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In a machine with a control variant:

- It is the operator who decides how the control variant is activated.
- Controls are specific to the options.

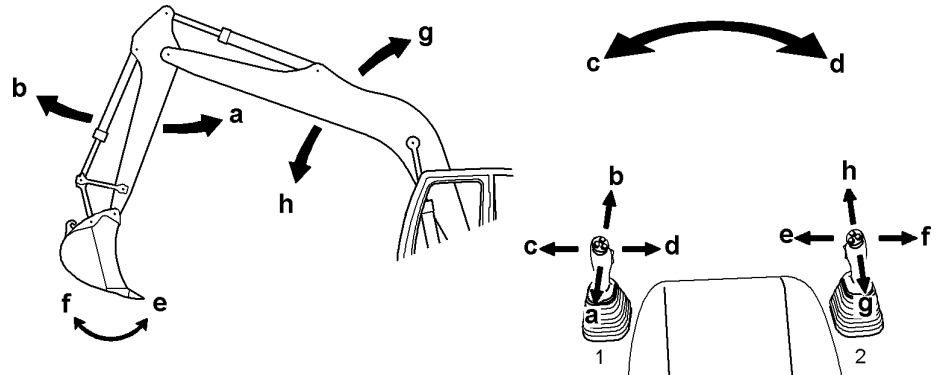


Fig. 353: Controls for the working attachment

1 Left joystick

2 Right joystick

## Controlling the boom

- ▶ Raise the boom: move the right joystick 2 in direction g.
- ▶ Lower the boom: move the right joystick 2 in direction h.

## Controlling the stick

- ▶ Retract the stick: move the left joystick 1 in direction a.
- ▶ Extend the stick: move the left joystick 1 in direction b.

## Controlling the bucket or grapple



### DANGER

Guiding the bucket or grapple by hand!  
Fatal or serious injuries.

- ▶ Do not allow anyone to guide the bucket or grapple by hand.
- ▶ Tilt the bucket in or close the grapple: move the right joystick 2 in direction e.
- ▶ Tilt the bucket out or open the grapple: move the right joystick 2 in direction f.

## Combining the controls

- ▶ Operate the joysticks diagonally.

## Controlling special working attachment with right mini-joystick

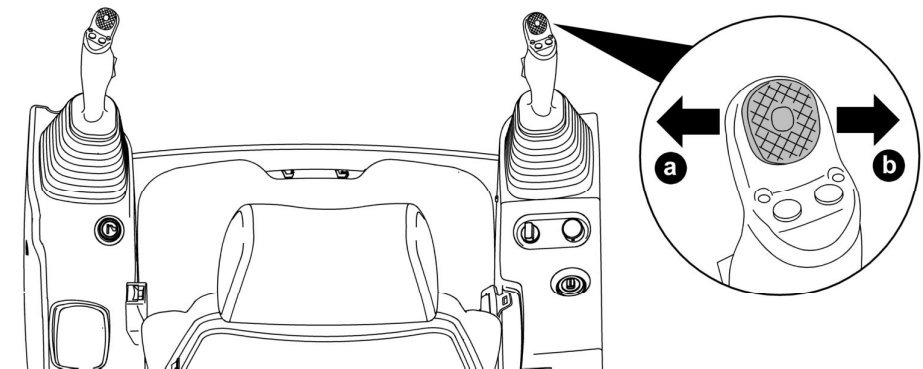
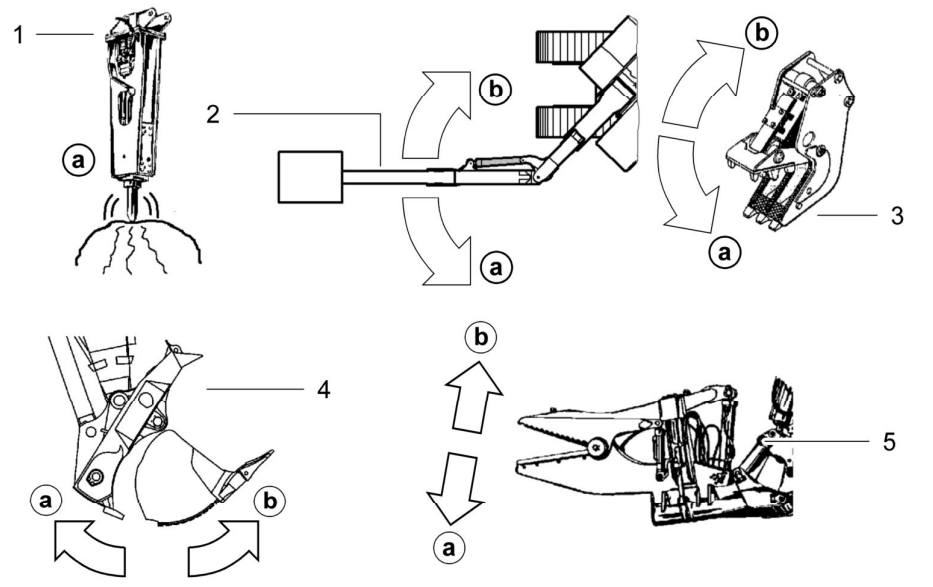


Fig. 379: Controlling special working attachment with right mini-joystick

- |   |                              |   |                    |
|---|------------------------------|---|--------------------|
| 1 | Hydraulic hammer             | 4 | Bottom dump shovel |
| 2 | Laterally adjustable boom    | 5 | Scrap shear        |
| 3 | Concrete shear or pulveriser |   |                    |

### Controlling cylinder of the special working attachment

- ▶ Retract cylinder of special working attachment: Move right mini-joystick in direction **b**.
- ▶ Extend cylinder of special working attachment: Move right mini-joystick in direction **a**.

### Controlling hydraulic hammer

- ▶ Move right mini-joystick in direction **a**.



- ▶ Press confirmation button.
  - ▷ LED 1 of corresponding key lights up.
  - ▷ Button is displayed in green.



Fig. 409: Switch of left joystick



- ▶ Press left joystick switch up or down and hold.
  - ▷ *Movement restriction for stick deactivated* status symbol appears on the display.

### Permanently deactivating movement restriction for stick (option)



- ▶ Press *deactivating movement restriction for stick* button on the display.
  - ▷ Corresponding button is displayed in yellow.



- ▶ Press confirmation button.
  - ▷ Corresponding button is displayed in white.
  - ▷ *Movement restriction for stick deactivated* status symbol appears on the display.

### Reactivating movement restriction for stick

#### After selective deactivation

- ▶ Release switch on left joystick.

Menu call:  > 

- ▶ Press *deactivating movement restriction for stick* key again.



### 3.6.4 Travelling under obstacles

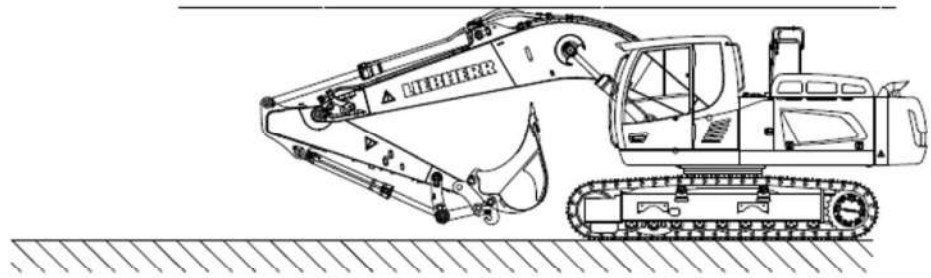


Fig. 439: Travelling under obstacles

During travel under obstacles, travel position of working attachment does not match the position described in "Travelling" chapter and working tool can block the view.

---

#### NOTICE

Impact of working tool on the ground! Impact of working attachment on the ground! Damage to working tool and working attachment.

- ▶ If possible travel on level and firm ground.
- ▶ Travel slowly.
- ▶ Adapt height of working attachment to ground conditions.
- ▶ If necessary consult third person as spotter.

- 
- ▶ Lower boom.
  - ▶ Retract stick.
  - ▶ Tilt bucket in.
  - ▶ Activate creeper gear.
  - ▶ Start travel.

### 3.6.5 Working in water

- ▶ Make sure that water level does not reach above axles of carrier rollers.

### 3.6.6 Working on slope

The maximum inclination angle for working on slopes depends on the machine configuration.




---

#### DANGER

Machine tipping over!  
Danger to life.

- ▶ Adhere to maximum inclination angle for working on slopes.
  - ▶ Determine maximum inclination angle for working on slopes: Contact Liebherr customer service.
-

- ▶ Make sure that exclusively the rigger attaches and releases loads.
- ▶ Make sure that rigger leaves the danger zone after attaching and releasing of load.
- ▶ Exclusively raise and lower loads vertically.
- ▶ Move loads close to the ground.

### 3.6.15 Lifting loads with quick coupler

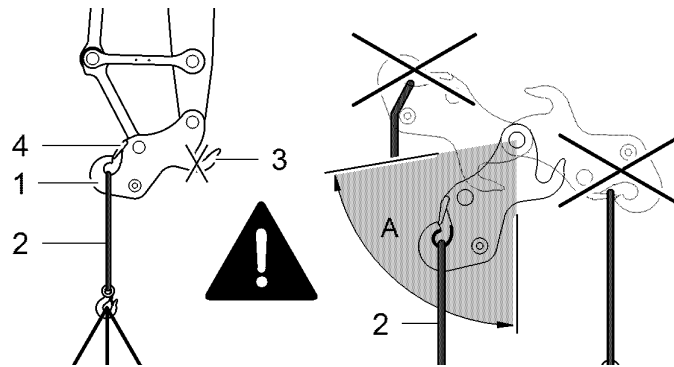


Fig. 448: Lifting loads with quick coupler

- |   |                               |   |                         |
|---|-------------------------------|---|-------------------------|
| 1 | Load hook                     | 4 | Safety flap             |
| 2 | Lifting accessory             | A | Permitted slewing range |
| 3 | Pick-up hook for working tool |   |                         |

The quick coupler has two load lift hooks 1 for load-lifting work.

The maximum load capacity value of each load lift hook 1 is specified on the quick coupler.

### Preparing load-lifting work

- ▶ Remove working tool from quick coupler and secure it.
- ▶ Fully retract locking pin.
- ▶ Align opening of the load lift hooks 1 upward.
- ▶ Check function of the safety flaps 4.

### Lifting loads



#### **DANGER**

Machine tipping over or falling loads!  
Danger to life.

- ▶ Make sure that no-one is in danger zone.
- ▶ Have load-lifting work carried out exclusively by trained personnel.
- ▶ Exclusively move quick coupler within the permitted slewing range A.

- ▶ Exclusively attach loads to load lift hooks 1.
- ▶ Do not put load on safety flaps 4.
- ▶ Observe maximum load lift of the load lift hooks 1.

## 3.8 Parking machine

**DANGER**

Machine tipping over!  
Danger to life.

- ▶ Make sure that ground has suitable grip and firmness.

**Note**

Battery discharges during longer downtime.

- ▶ Check charging state of battery.

**Note**

- ▶ Exclusively park machine on slope as an exception.

### 3.8.1 Parking machine on level ground

If ambient temperature is below 0 °C:

- ▶ Avoid freezing onto the ground: Park machine on boards.
- ▶ Turn operator's cab over idler-wheels.
- ▶ Align uppercarriage parallel to undercarriage.
- ▶ Lock slewing brake.
- ▶ Lower working attachment to the ground.
- ▶ Shut off diesel engine.
- ▶ Make sure that ignition key is set to I.
- ▶ Make sure that folding console is folded down.
- ▶ Depressurise hydraulic system: Carefully move joysticks and pedals in all directions.
- ▶ Move folding console up.
- ▶ Pull out ignition key.
- ▶ Lock all doors and flaps and remove key.

If machine is not used for more than 14 days:

- ▶ Switch off battery main switch.

- ▶ Secure stick with adjustable locking bars on the boom.
- ▶ Secure whole unit with cotter pins.

## Preparing machine

- ▶ Depressurise hydraulic hoses. (For more information see: [5.10.1 Depressurising hydraulic system, page 325](#))
- ▶ Set ignition key to 0.
- ▶ Pull out ignition key.
- ▶ Move folding console up.
- ▶ Close and lock all doors, covers and hoods on the machine.
- ▶ Protect exhaust pipe of exhaust treatment system from rain and splashing water: Cover exhaust pipe.

## Driving machine off low-loader

Make sure the following preconditions are met:

- Spotter is in eye contact with operator or speaking contact with operator is possible.
- The loading zone of the machine contains no persons.
- Loading ramp is ready.
- ▶ Remove lashing chains.
- ▶ Start diesel engine.
- ▶ Raise working attachment.

If machine is equipped with dozer blade or support blade:

- ▶ Lift dozer blade or support blade.



### WARNING

Steering directions reversed!  
Danger to life.

If sprocket wheels are at front of the machine:

- ▶ Drive carefully.

- ▶ Use driving lever for sensitive travel of machine.
- ▶ Drive off low-loader with increased caution.
- ▶ Drive over loading ramp in straight line.

## 3.9.4 Lifting machine



### DANGER

Incorrect lifting!  
Danger to life.

- ▶ Make sure that exclusively experienced persons lift machine.
- ▶ Make sure that exclusively experienced persons instruct operator of lifting machine.
- ▶ Make sure that exclusively lifting machine and lifting accessory with sufficient dimension and load-carrying capacity are used.



Malfunction / error	Cause	Remedy
Diesel engine switches off inadvertently.	Power supply interrupted	Contact Liebherr customer service.
	Leak or too low pressure in low pressure fuel system	Have leak test performed.
	Fault in electronic components	Check error memory of diesel engine control unit. Contact Liebherr customer service.
Low diesel engine power (reduced power)	Malfunction in fuel system (clogged, leaking)	Perform visual inspection and search for leaks. Replace fuel fine filter. Contact Liebherr customer service.
	Charging pressure too low	Tighten loose clamps. Replace seals and hoses. Clean air filter. Repair turbo charger.
	Intake air temperature too high (automatic power reduction by diesel engine control unit)	Clean intake air filter. Check blower power. Reduce ambient temperature. Contact Liebherr customer service.
	Coolant temperature too high (automatic power reduction by diesel engine control unit)	Check the cleanliness of radiator. Check fan and thermostat. Check coolant level. Contact Liebherr customer service.
	Fuel temperature too high (automatic power reduction by diesel engine control unit)	Contact Liebherr customer service.
	Area of deployment more than 1800 m above sea level	No remedy; power of diesel engine is automatically reduced.
	Injection nozzles blocked or not injecting.	Contact Liebherr customer service.
	Diesel engine compression too low	Contact Liebherr customer service.
	Fault in electronic components	Check error memory of diesel engine control unit. Contact Liebherr customer service.
	Clogged exhaust treatment system	Contact Liebherr customer service.
Inadequate diesel engine braking power	Fault in electronic components	Contact Liebherr customer service.

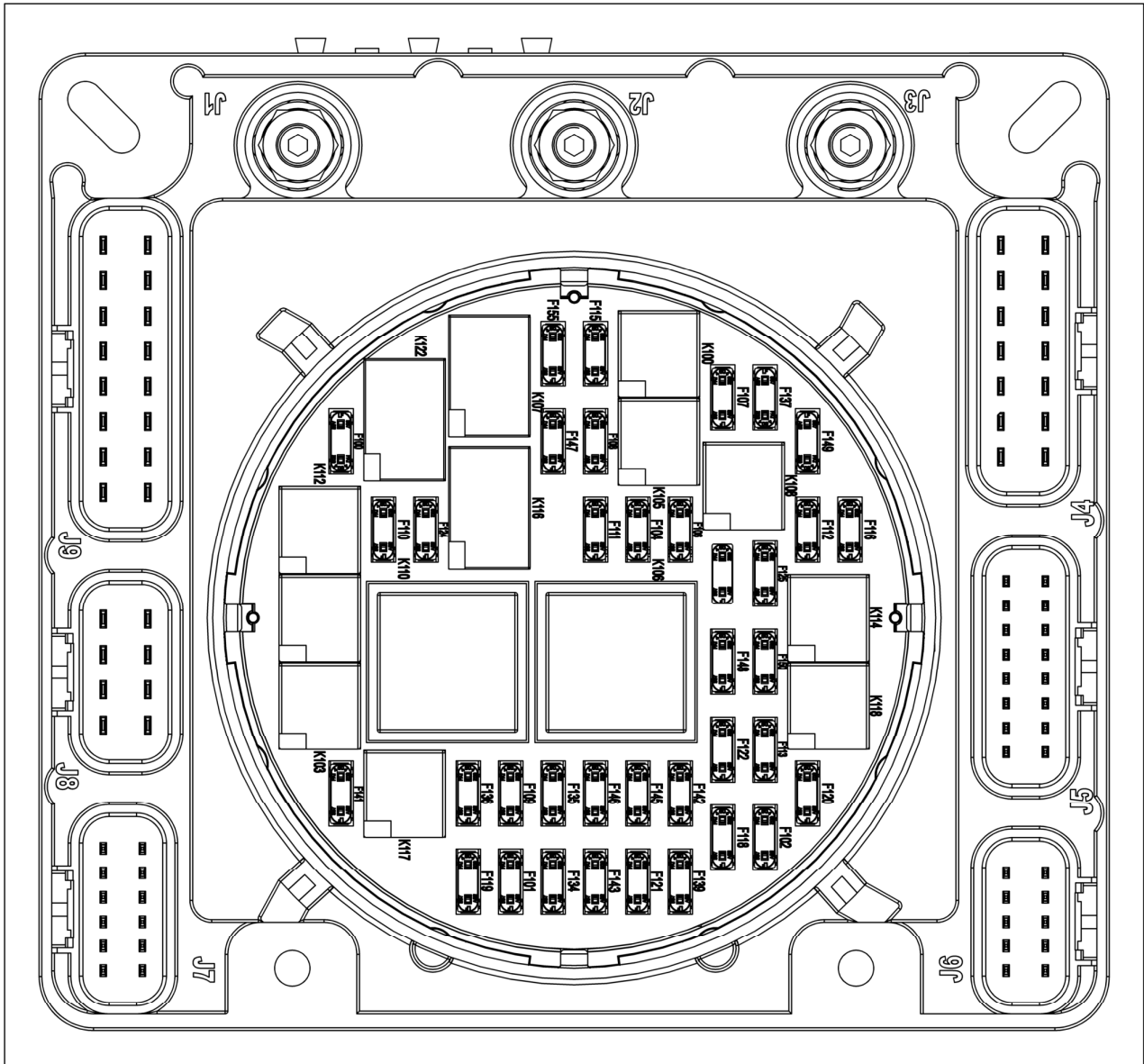
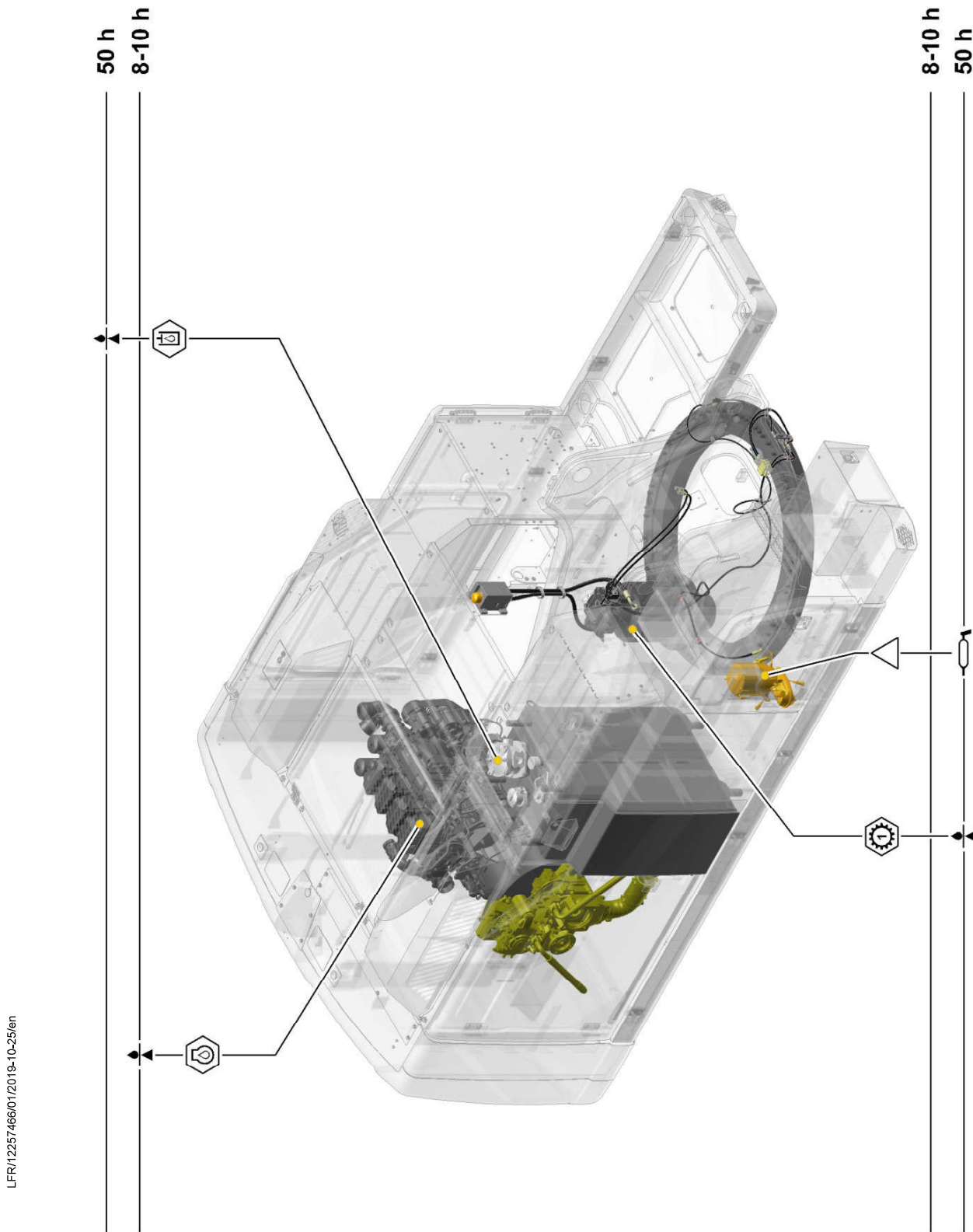


Fig. 530: Electric cabinet E75

	Current value [A]	Function
Fuses		
F100	5	Headlight Service Pack Headlight Coming home & Leaving home
F101	10	Tool change, not Liebherr
F102	10	Diagnostic interface
F104	5	Beacon on operator's cab and beacon on counterweight
F106	30	Front uppercarriage working headlight
F107	20	Power supply bank A179

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### 5.2.2 Lubrication chart



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Fig. 532: Lubrication chart for uppercarriage in case of central lubrication system (option)

## Anti-freeze and corrosion protection agent

### Liebherr recommendation

Type	Description
Concentrate	Liebherr-Antifreeze OS Concentrate
Premix <sup>A)</sup>	Liebherr-Antifreeze OS Mix

Tab. 69: Liebherr recommendation

Ambient temperature	Mixing ratio
down to -50 °C	40 % water 60 % anti-freeze and corrosion protection agent
down to -37 °C	50 % water 50 % anti-freeze and corrosion protection agent

Tab. 70: Mixing ratio

A) Premix = ready-mixed product (50% water and 50% anti-freeze and corrosion protection agent)

### Minimum quality requirements

Specification
LH-01-COL3A

Tab. 71: Minimum quality requirements

If coolants from other manufacturers are used, information on change intervals must be obtained from respective manufacturer or supplier.

## 5.3.6 Hydraulic oils

### Liebherr recommendation

Ambient temperature	Description
	<b>Liebherr mineral oil</b>
15 to 55 °C	Liebherr Hydraulic Basic 100
10 to 45 °C	Liebherr Hydraulic Basic 68
-20 to 40 °C	Liebherr Hydraulic HVI
	<b>Liebherr-PAO <sup>25)</sup> biodegradable</b>
-25 to 45 °C	Liebherr Hydraulic Plus
-40 to 30 °C	Liebherr Hydraulic Plus Arctic

Tab. 72: Liebherr recommendation

<sup>25)</sup> PAO = poly-alpha-olefin

## 5.5 Preparing for maintenance

### 5.5.1 Maintenance procedures

#### Definition of maintenance tasks



##### Note

Put machine in maintenance position before beginning maintenance tasks. (For more information see: [5.5.3 Putting machine in maintenance position, page 285](#))

Following maintenance tasks are defined:

- Lubricate complete machine.
- Check complete machine for cracks.
- Change fuels and operating fluids.
- Replace filter.
- Clean components.
- Check hydraulic system.
- Perform visual inspection for defects.

#### Definition of visual inspection

Symbol	Meaning
	<b>Visual inspection</b> Indicates places to be examined by visual inspection.

Tab. 88: Symbol of visual inspection

Visual inspection is a visual inspection process of the complete machine and individual components.

The legal basis for visual inspection is provided by DIN EN 13018 or country-specific standards, ordinances and regulations.

#### Visual inspection without aids

Criteria for the visual inspection without aids are:

- An uninterrupted optical path between the eyes of the inspector and the inspected surface.
- Examination of the complete machine and individual components with the naked eye.

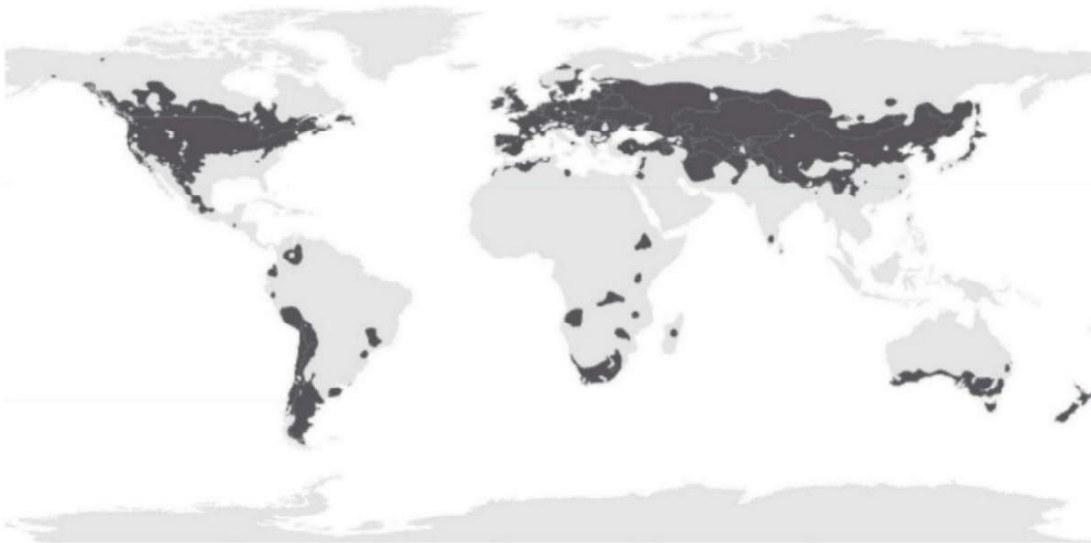
#### Visual inspection with aids

Criteria for the visual inspection with aids are:

- An interrupted optical path between the eyes of the inspector and the inspected surface.
- Examination of the complete machine and individual components with suitable aids such as mirrors, magnifiers and lighting.



*Fig. 554: Cold humid climate*



*Fig. 555: Warm temperate climate*

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## Manually lubricating bearings

---

### NOTICE

Insufficient lubrication!  
Damage to bearings.

- ▶ Make sure that grease emerges at all lubricating points.
  - ▶ Check grease fitting for damage.
  - ▶ Check lubricating bores for blockages.
  - ▶ Check viscosity of grease.
- 

Lubricate following lubricating points manually:

- Lubricating points on quick coupler
- Lubricating points on working tools
- Lubricating points on undercarriage
- Lubricating points on uppercarriage
- ▶ Prepare hand grease gun.
- ▶ Adhere to lubrication chart.
- ▶ Remove protective cap before lubrication.
- ▶ Inject grease into grease fitting until grease emerges from bearings.
- ▶ Put on protective cap after lubricating.

### 5.7.4 Checking components for cracks

---

### NOTICE

Incorrect check!  
Damage to machine.

- ▶ Perform visual inspections as per maintenance and inspection schedule.
  - ▶ Check components for cracks.
-

Make sure the following preconditions are met:

- Diesel engine is in maintenance position. (For more information see: [5.8.1 Diesel engine: Putting in maintenance position, page 311](#))
- Oil used is approved. (For more information see: [5.3.3 Engine oils, page 270](#))
- ▶ Remove plug of oil filling hole **2**.
- ▶ Fill oil via oil filler hole **2** until oil level is between **MIN** mark and **MAX** mark.
- ▶ Clean plug of oil filling hole **2**.
- ▶ Put on plug of oil filling hole **2**.

### 5.8.3 Fuel pre-filter: Draining water

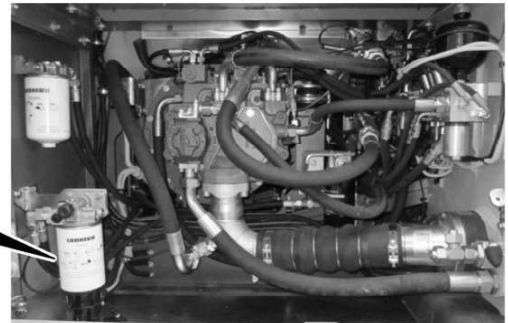
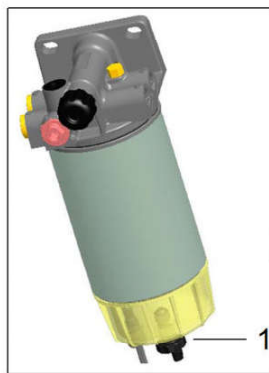


Fig. 567: Fuel pre-filter: Draining water

1 Water drain tap



#### **DANGER**

Explosion of highly flammable fuel!  
Danger to life.

- ▶ Avoid naked flames.
- ▶ Do not smoke.

Make sure the following preconditions are met:

- Diesel engine is shut off.
- ▶ Place receptacle under fuel pre-filter.
- ▶ Open water drain tap **1**.
- ▶ Drain water until pure fuel emerges.
- ▶ Close water drain tap **1**.



## 5.12.2 Tightening track

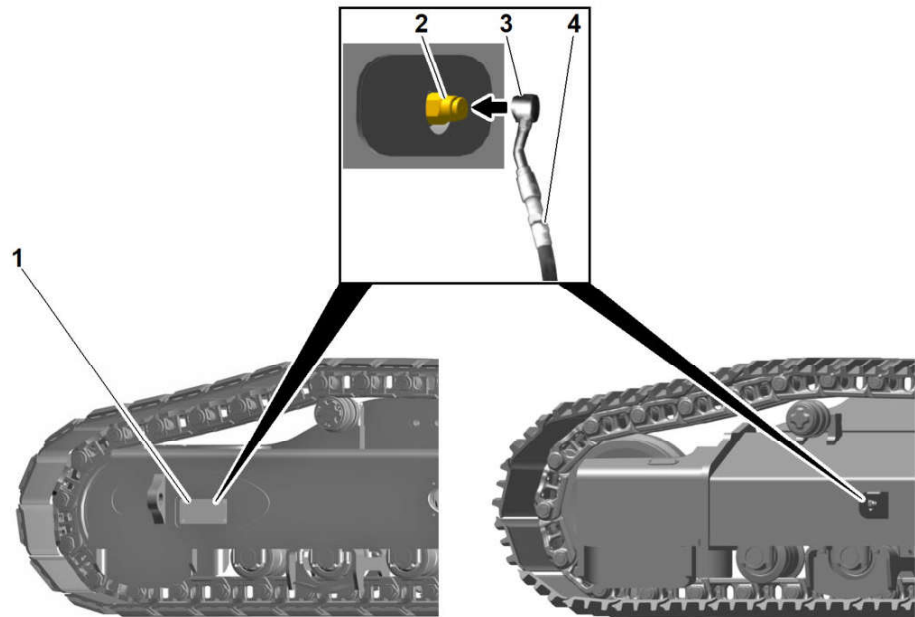


Fig. 589: Tightening track

- |   |                        |   |                        |
|---|------------------------|---|------------------------|
| 1 | Cover (type dependent) | 3 | Grease fitting adapter |
| 2 | Grease fitting         | 4 | Grease gun hose        |

Make sure the following preconditions are met:

- Machine is parked on level and firm ground.
- Machine is secured against rolling away.

- ▶ Clean track.
- ▶ Remove objects jammed in track.

If cover 1 is installed:

- ▶ Remove cover 1.
- ▶ Clean grease fitting 2.
- ▶ Connect supplied grease fitting adapter 3 to grease gun hose 4.
- ▶ Connect grease fitting adapter 3 to grease fitting 2.
- ▶ Inject grease until track tension corresponds to specifications.
- ▶ Attach cover 1.

### Troubleshooting

Track tension is not increasing?

Grease fitting or tensioning unit is damaged.

- ▶ Replace grease fitting and tensioning unit. For procedure see service manual under chapter 130.

If service manual cannot be accessed:

- ▶ Have repairs performed by Liebherr customer service.

- ▶ Insert pre-filter **2** in filter cassette **3**.
- ▶ Insert filter cassette **3** in filter assembly **1**.
- ▶ Insert filter assembly **1** in operator's cab.
- ▶ Close hatch **4**: Slam hatch **4**.

**or**

Close hatch **4**: Lock hatch **4** from outside of operator's cab with ignition key of machine.

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