en **Operator's manual**

Hydraulic excavator

Document ID

ORIGINAL OPERATOR'S MANUAL

Order number: 12218814
Issued: 2020-02-21
Version: 01
Author: LFR / Technical Documentation Department

Product ID

Manufacturer: Liebherr-France SAS
Type: R 980 SME
Type no.: 1543, 1786
From Serial no.: 44138

Contact

Liebherr-France SAS
2 avenue Joseph Rey, B.P. 90287
F – 68005 Colmar Cedex

LFR/12218814/01/2020-02-21/en

1.1.2 Uppercarriage

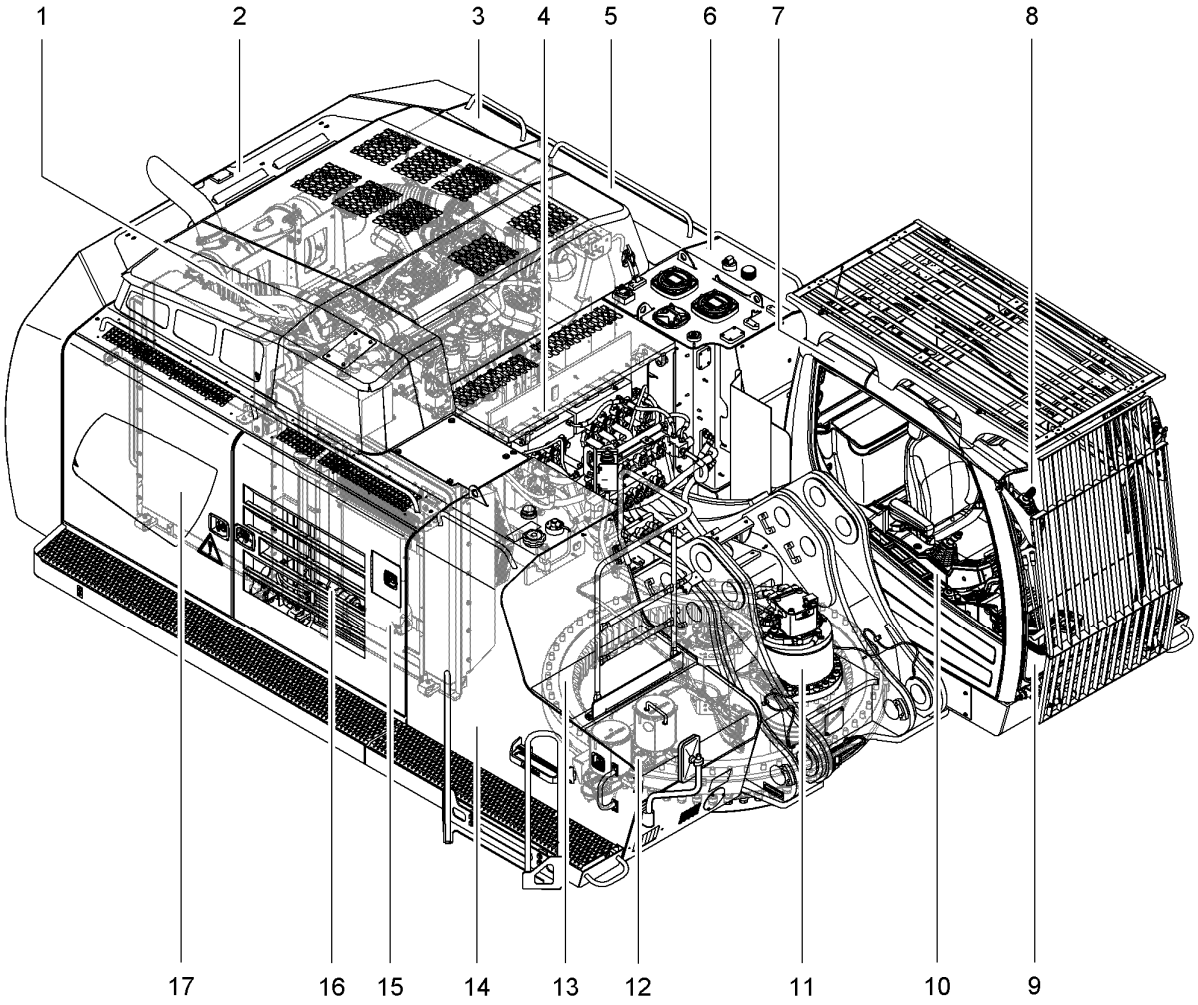


Fig. 4: Uppercarriage

1 Diesel engine
2 Counterweight
3 Air filter
4 Control valve block
5 Hydraulic pump
6 Hydraulic tank
7 Operator's cab
8 Left console
9 Operator's platform
10 Right console
11 Slewing gearbox
12 Central lubrication system
13 Slewing ring
14 Fuel tank
15 Diesel exhaust fluid tank
16 Combination cooler (hydraulic oil and fuel)
17 Combination cooler (charge air, oil for pump distributor gear and diesel engine coolant)

LFR/12218814/01/2020-02-21/en

Silent and comfortable cab

- Elevated cab for improved visibility of loading area (optional)
- To date, the largest and quietest cab in its category
- Mounted on visco-elastic elements to absorb vibrations
- Impact-resistant front window and roof window
- Pneumatic suspension seat, heated, multidirectional (air-conditioned optional)
- Large colour touch screen with high resolution display

Accessible and protected uppercarriage

- Left and right walkways as standard and large walkways with optional guardrails
- Platform with access to engine and hydraulic compartments for ergonomic and safe servicing
- Refined design for extended visibility
- New engine which conforms to Phase IV / Tier 4 final standards
- Heavy counterweight for enhanced stability and better performance

Standard Equipment

Undercarriage

- Chain guide 2 pieces
- Lashing eyelets
- Sprocket double-toothed with dirt ejector
- Supporting rollers with double bearings
- Track pads, chamfered
- Track rollers, lifetime-lubricated
- Tracks, sealed and greased
- Travel gear support, reinforced

Uppercarriage

- Engine hood with two-part gas spring opening
- Fuel tank cap lockable with padlock
- Handrails
- Headlights on uppercarriage, front, halogen, 2 pieces, protections included
- Heavy counterweight
- Internal platform with access to engine and hydraulic compartments
- Manual main switch
- Sound insulation
- Storage box, lockable
- Swing brake lock, maintenance-free
- Tool set 29 pieces
- Walkway, both-sided

Hydraulic System

- Dedicated swing circuit
- Filter with integrated fine filter area
- Liebherr hydraulic oil
- Positive Control system
- Pressure storage for controlled lowering of equipment with engine turned off
- Pressure test ports for hydraulic
- Shut-off valve between hydraulic tank and pumps
- Work mode selector

Engine

- Common-Rail injection system
- Conform with stage IV/Tier 4f emission standard
- Engine idling, automatic, sensor-controlled
- Fixed geometry turbo charger
- Fuel filter and water separator
- Intercooler
- Liebherr SCR technology
- Stepless adjustable engine speed

Operator's Cab

- 7" colour multifunction display with touchscreen
- Air conditioning, automatic
- Camera for side area monitoring
- Cigarette lighter and ashtray
- Coat hook
- Cup holder
- Fuel consumption indicator on touchscreen
- Headlights on cab, front, halogen, 2 pieces
- Hydraulic suspension
- Impact-resistant roof window
- Impact-resistant 2 pieces windscreen
- Interior light
- LiDAT Plus (Liebherr data transfer system)*
- Mechanical hour meters, readable from outside the cab
- Oil level monitoring on touchscreen
- Operator seat Comfort with horizontal and vertical damping
- Preparation for radio installation
- Rain hood over front window opening
- Rearview mirrors
- Rear view monitoring camera
- Rear window emergency exit
- Retractable seat belt 51 mm
- Roll-down sun blind
- Rotation/boom lift priority adjustable on display
- Rubber floor mat
- Sliding windows in cab door
- Storage bin
- Storage space
- Tinted windows
- Urea tank level monitoring on touchscreen
- Wiper/washer

Attachment

- Boom cylinders oil regeneration
- Bottom protection for stick
- Headlights on boom, halogen, 2 pieces, protections included
- Liebherr central lubrication system, fully-automatic (except connecting link for bucket kinematics)
- Load valve for stick cylinder (on distributor)
- Safety check valves for hoist and stick cylinders
- Stick cylinder oil regeneration

Non-exhaustive list, please contact us for further information.

* optionally extendable after one year

				mm
A	Uppercarriage width			3,565
A1	Uppercarriage width with catwalks			4,730
B	Uppercarriage height			3,965
C	Cab height			3,935 / 4,130*
D	Counterweight ground clearance			1,860
E	Rear-end length			4,640
G	Wheelbase			4,810
H	Undercarriage length			6,095
I	Undercarriage ground clearance			810
J	Track height			1,715
K	Track gauge			3,600
L	Track pad width	500	600	750
M	Width over tracks	4,465	4,465	4,465
N	Width over steps	4,845	4,845	4,845

* with FOPS top guard

		Stick length m	**Mono boom SME 7.20 m** direct mounting **mm**
T	Boom height	2.90 SME	5,250
		3.30 SME	5,400
U	Length on ground	2.90 SME	8,600
		3.30 SME	8,400
V	Overall length	2.90 SME	13,800
		3.30 SME	13,450
	Bucket		6.30 m^3

Transport Dimensions

removable elements disassembled

	Stick m	**Mono boom SME 7.20 m mm**
Transport width		4,845
Transport length	2.90 SME	13,800
	3.30 SME	13,450
Transport height	2.90 SME	5,250
	3.30 SME	5,400
Bucket		6.30 m^3

Notes

2.3.7 Refrigeration technician

Responsibility

The refrigeration technician is 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 and repair machine for safe and reliable function.
- Execute all maintenance tasks and repair tasks specified for the refrigeration technician in the maintenance and inspection schedule.
- Isolate battery main switch of power supply system and secure it against switching on again.
- Clearly define and label working position.
- Wear personal protective equipment.
- Use tools suitable for the work deployment.
- 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 refrigeration technician 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.
- The refrigeration technician has completed training that complies with the country-specific laws, standards and guidelines.
- The refrigeration technician has following skills:
  - Is able to assess work correctly.
  - Is able to recognise dangers.
  - Is able to take safety measures.
- Has knowledge and experience of the relevant field of activity.
- Knows the relevant national standards.
- Has the necessary authorisation for maintenance and repair of machine.
- Knows the machine and the hazards.
- Knows all procedures and precautions for maintenance.
- Has knowledge of handling special tools for maintenance and repair.
- 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.

2.3.8 Slinger

Responsibility

The slinger is responsible for the following:
- Wear personal protective equipment.
- Choose correct and undamaged slinging gear.

LFR/12218814/01/2020-02-21/en

2.5.2 Operator's cab

Danger to life

Unapproved working method

– Put on safety belt before starting work.
– Make sure that changes in the operator's cab (for example installation of accessories) do not restrict the operator's workspace.

Injuries

Objects in the operator's cab

– Remove objects that are not necessary for the work from the operator's cab.
– Stow and fasten objects that are necessary for the work before starting.
– Make sure that objects carried do not protrude into the operator’s workspace.

2.5.3 Height-adjustable operator's cab

Danger to life

Persons in the danger zone

– Make sure there are no persons in the danger zone under the operator's cab.
– Keep your distance from moving parts when the operator's cab is moving down.

Machine tipping

– On slopes, travel with lowered operator's cab.

Injuries

Falling from operator's cab

– Close cab door before raising and adjusting operator's cab.
– If operator's cab is raised: Make sure that cab door is closed.

Damage to operator's cab and machine

Collision with obstacles

– Make sure there are no obstacles in the range of movement of operator's cab.
– Exclusively adjust operator's cab when machine is at a standstill.
– Move operator's cab to upper park position before starting travel.
– Move slowly to end positions (upper or lower park position) using automatic mode.

LFR/12218814/01/2020-02-21/en

Incorrect charging of battery

– Do not smoke.
– Avoid naked flames.
– Wear safety glasses.
– Put on protective gloves.

Incorrect handling of flammable liquids

– Exclusively transport flammable liquids on the machine in the designated tanks.
– Make sure that no oil squirts out of leaks.
– Regularly check lines, hoses and screwed connections for leaks and damage.
– Immediately seal leaks.
– Immediately replace damaged parts.

Incorrect refuelling

– Before refuelling, shut off diesel engine.
– Before refuelling, switch off auxiliary heater (option).
– Do not smoke.
– Avoid naked flames.
– Do not touch fuels with your skin.
– Do not inhale fuel vapours.

Damage to machine

– Before placing machine under heavy load, make sure that machine is at operating temperature.

Environmental pollution

– When working in following areas, adhere to the laws, regulations and rules applicable at the place of use.
  • Areas at risk of water (for example bodies of water)
  • Sound-sensitive areas
  • Emission-sensitive areas

2.7.9 Load-lifting work

Danger to life

Machine tipping

– Make sure that machine is equipped for load-lifting work.
– Make sure that machine has safety equipment for load-lifting work.

Falling load

– Make sure that machine is equipped with line break safety valve on every hoist cylinder and stick cylinder.
– Make sure that the operator's cab contains a load chart.
– Exclusively use suitable slinging gear for load-lifting work.
– Exclusively tie down or loosen loads or stabilise them during transport with the help of another person.

LFR/12218814/01/2020-02-21/en

8 *Recirculated air* key
9 *Mute radio* key
10 *Defrosting* key
11 *Hydraulic adjustment of undercarriage width* key [3)]
19 *AUTO* key
20 *Beacon* key [3)]
21 Inactive key

3.1.3 Control unit B

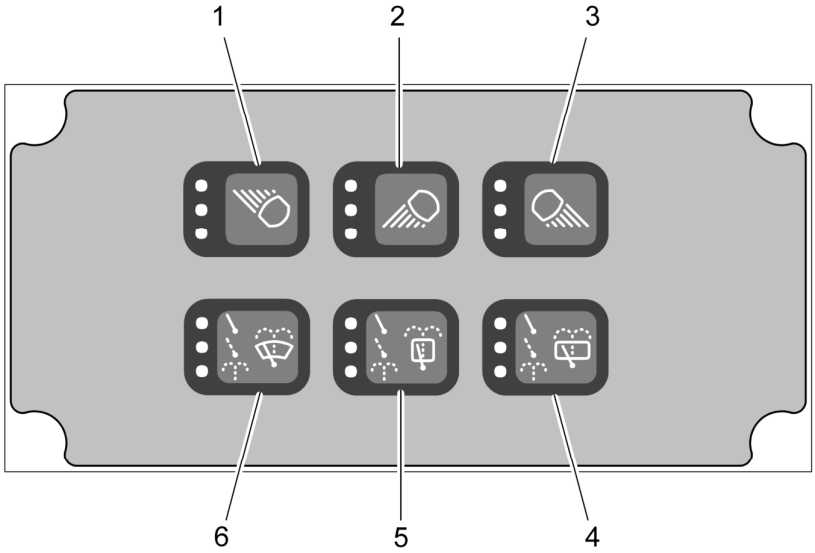


Fig. 51: Control unit B

1 *Working attachment headlights* key
2 *Roof light, front and uppercarriage headlights* key [4)]
3 *Roof light, rear* key [4)]
4 Inactive key
5 *Roof glass panel windscreen wiper* key [4)]
6 *Front windscreen wiper and rear windscreen wiper* key [4)]

[3)] Option
[4)] Option

3.2.4 *Camera* menu

Menu call: 

The *camera* menu enables the image of the rear area camera and the side area camera to be enlarged.

The *camera* menu appears automatically when the safety lever or the folding console is lowered, or after an adjustable time of between 3 seconds to 15 seconds. (For more information see: 3.2.16 *Camera return time* submenu, page 86)

The *camera* menu contains different display areas:
– Information of *start page* menu appears in the bottom area.
– Status symbols and warning symbols appear in the top area.

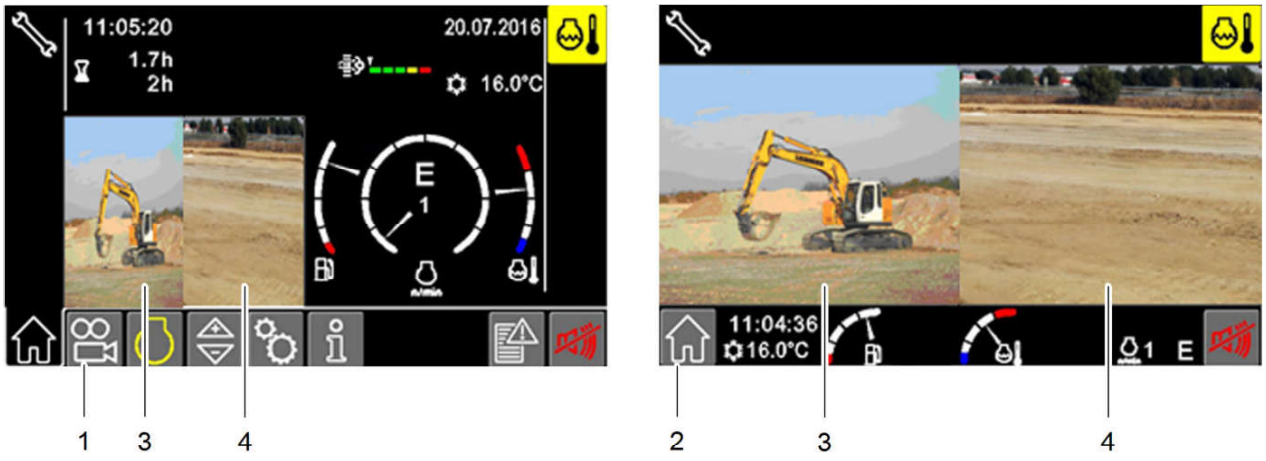


Fig. 135: Camera menu

1 *Camera* menu button
2 *Start page* menu button
3 Image of rear area camera
4 Image of side area camera

DANGER
Restricted field of view for camera!
Danger to life.

▶ Pay close attention to the working area and driveway of the machine.

In case of malfunction of a camera:
▶ Exclusively manoeuvre with support of an additional person.

▶ Select *camera* menu: Press *camera* menu button **1**.

▶ Exit *camera* menu: Press *start page* menu button **2**.

3.2.5 Air conditioning

Menu call: 

The cab temperature can be adjusted between 16 °C and 28 °C:
– Maximum cooling power is 16 °C.
– Maximum heating power is 28 °C.

LFR/122188814/01/2020-02-21/en

Kenwood radio (option)

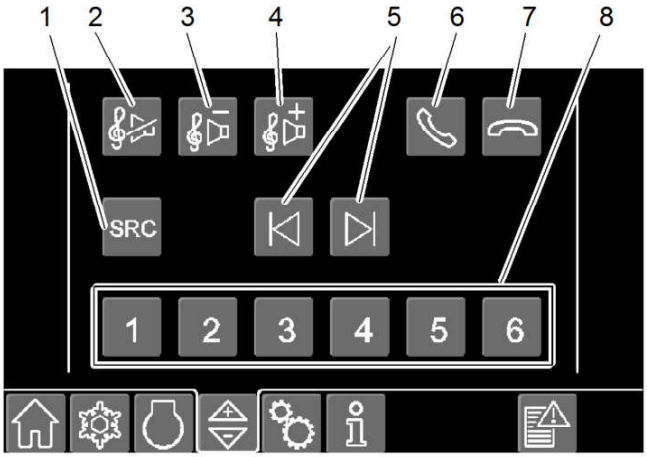


Fig. 164: Radio remote control submenu

1 *Selecting audio source* button
2 *Mute* button
3 *Reducing volume* button
4 *Increasing volume* button
5 *Changing radio station or track* buttons
6 *Answering phone call* button
7 *Ending phone call* button
8 *Selecting stored radio station* buttons

3.2.14 *Display brightness and display volume* submenu

Menu call: > or > >

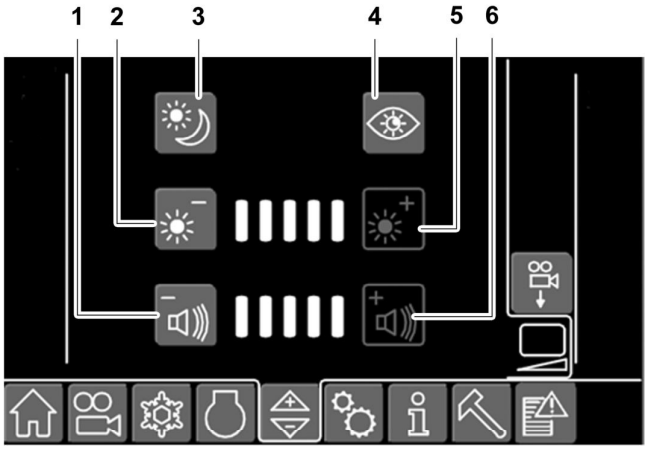


Fig. 165: Display brightness and display volume submenu

1 *Reducing display volume* button [9)]
2 *Reducing display brightness* button
3 *Day/night mode* button [9)]
4 *Night Shift mode button*[9)]
5 *Increasing display brightness* button
6 *Increase display volume* button[9)]

[9)] Available depending on machine type

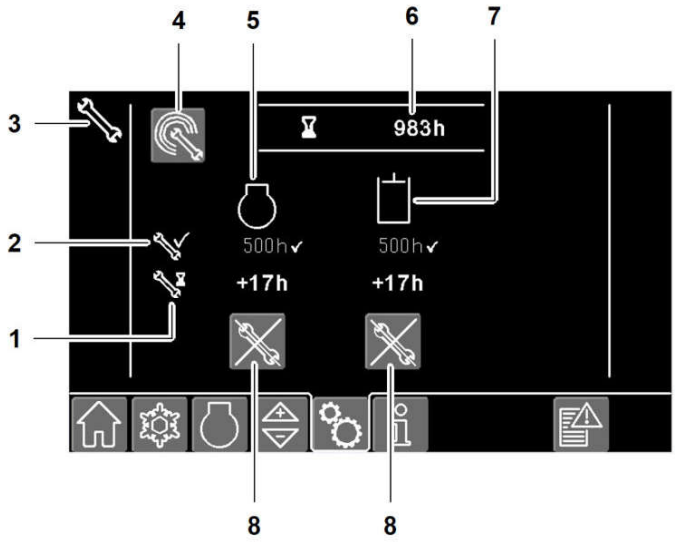


Fig. 196: Maintenance submenu

1	Remaining time to next maintenance	**5**	Maintenance of diesel engine
2	Operating hour meter at last maintenance	**6**	Total operating hours
3	*Maintenance due* status symbol	**7**	Hydraulic system maintenance
4	*Teleservice* button	**8**	*Confirmation of maintenance due message* button

Maintenance

If next maintenance is due in less than 100 hours or deadline has been exceeded by 100 hours, the following elements are displayed:
– *Maintenance due* status symbol **3**
– *Confirmation of maintenance due message* button **8**

▶ Hide *maintenance due* message: Press *confirmation of maintenance due message* button **8**.
▷ *Maintenance due* status symbol **3** disappears.

▶ Have maintenance performed at specified time: Contact Liebherr customer service.

Teleservice

Via Teleservice Liebherr customer service reads and modifies parameters of machine control online if necessary.

Activating write access

DANGER
Machine movements!
Danger to life.

▶ Make sure there are no persons in hazard zone.

LFR/12218814/01/2020-02-21/en

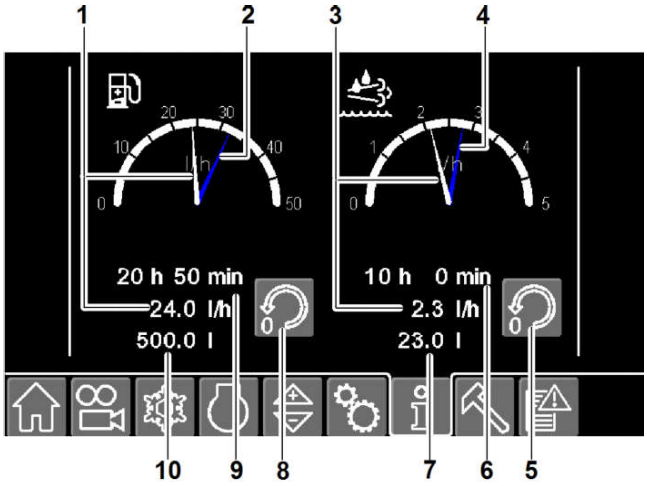


Fig. 227: Fuel consumption submenu

1 Average fuel consumption
2 Current fuel consumption
3 Average diesel exhaust fluid consumption
4 Current diesel exhaust fluid consumption
5 *Resetting counter* button
6 Measurement period
7 Consumed diesel exhaust fluid
8 *Resetting counter* button
9 Measurement period
10 Consumed fuel

3.2.40 *CodingKey* submenu

Menu call: > CODE

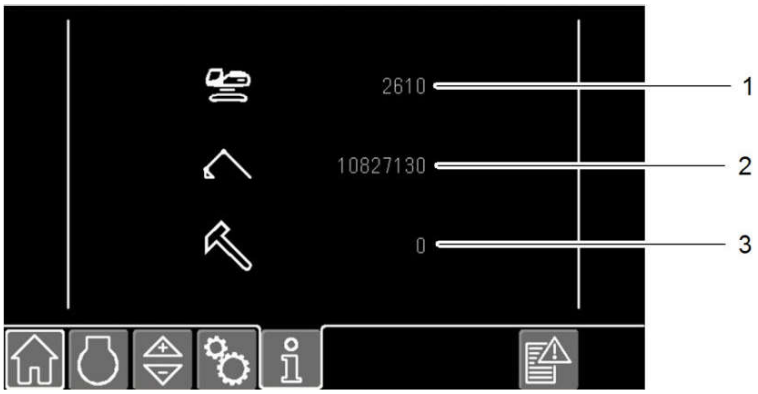


Fig. 228: CodingKey submenu

1 CodingKey of machine
2 CodingKey of working attachment
3 Number of installed working tool

3.2.41 *Tool Control* menu

Menu call:

In *Tool Control* menu a special working attachment can be selected and the corresponding parameters can be activated.

Adjusting seat position

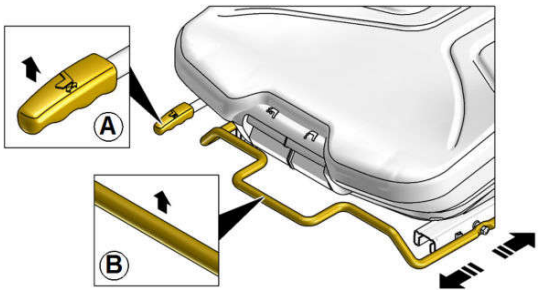


Fig. 256: Adjusting seat position

A Adjusting seat position without armrests

B Adjusting seat position with armrests

Adjusting armrests

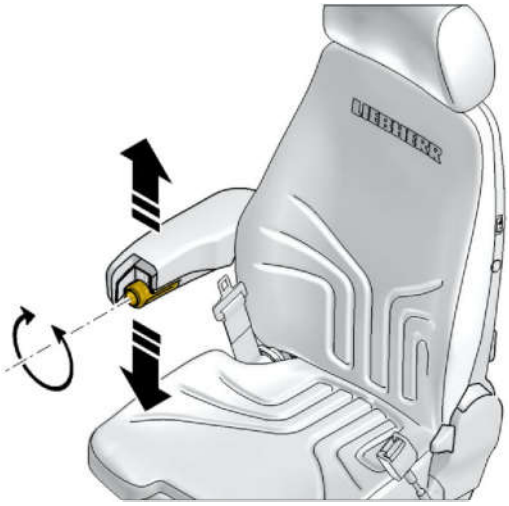


Fig. 257: Adjusting armrest angle

LFR/12218814/01/2020-02-21/en

Rolling out sun blind on the windscreen

▶ Pull sun blind on windscreen down to desired position using tab **1**.

Rolling up sun blind on the windscreen

▶ Push roll up button **2** upwards.

Sun blind on the roof glass panel

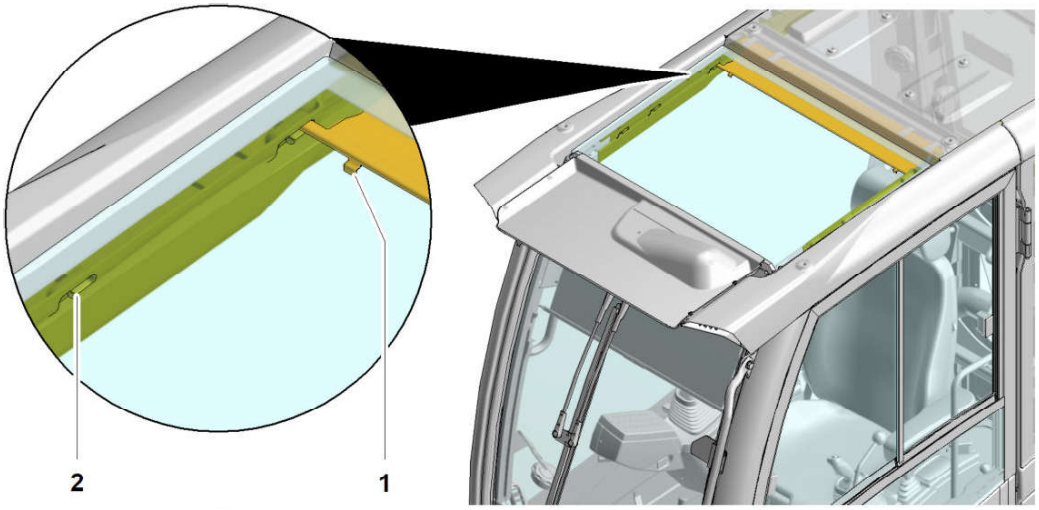


Fig. 276: Sun blind on the roof glass panel

1 Tab **2** Groove

Rolling out sun blind on the roof glass panel

▶ Pull sun blind forward on the roof glass panel using tabs **1**.

▶ Clip sun blind into grooves **2** on the roof glass panel.

Rolling back sun blind on the roof glass panel

▶ Lift sun blind out of grooves **2** carefully and let it roll back carefully.

LFR/12218814/01/2020-02-21/en

3.3.15 Windscreen wipers

Key		Status of LEDs	Operating mode
Windscreen and rear window	Roof glass panel		
		○ ○ ○	Switched off
		○ ☀ ○	Intermittent operation
		☀ ○ ○	Continuous operation
		☀ ○ ☀	Windscreen washer system switched on

Tab. 30: Operating modes

Selecting operating mode

▶ Press appropriate key until required operating mode is selected. (see: tab. 30, page 135)

Switching on windscreen washer system

▶ Press and hold appropriate key. (see: tab. 30, page 135)

3.3.16 Auxiliary heater (option)

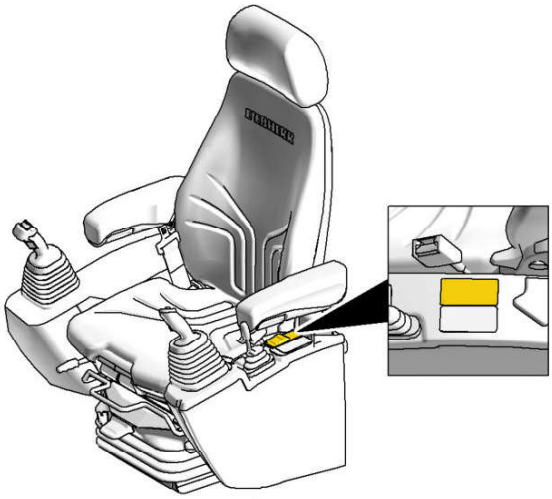


Fig. 305: Position of control module

LFR/12218814/01/2020-02-21/en

▶ Press *START STOP* key for about half a second.
▷ During starting of diesel engine, LEDs in *START STOP* key flash.
▷ LEDs in *START STOP* key light up as soon as diesel engine has started.

Troubleshooting
Diesel engine does not start?
Starting the diesel engine ends automatically after 30 seconds. Starting can be extended beyond 30 seconds by pressing and holding *START STOP* key while starting. If two attempts to start fail, there is probably a malfunction of the diesel engine.

▶ Wait for at least 1 minute before the next attempt to start the diesel engine.

▶ Press *START STOP* key and keep it pressed continuously while starting.

▶ If there are two unsuccessful attempts to start the diesel engine, establish the cause of the fault and eliminate it.

Starting at low temperatures

At low outside temperatures, preglowing of the diesel engine is activated.

Engine preglowing activated status symbol appears on the display during preglowing of diesel engine.

When preglowing of the diesel engine is in progress:
▶ Do not start diesel engine.

When preglowing of diesel engine has finished:
▶ Start diesel engine.

Starting at temperatures below -18 °C

▶ Equip machine with one or more starting aids optionally available from Liebherr.

3.4.9 Bringing machine to operating temperature

Make sure the following preconditions are met:
❑ Hydraulic oil is approved for ambient temperature range. (For more information see: 5.3.6 Hydraulic oils, page 264)

▶ Move safety lever up.

▶ Start diesel engine and run at idle speed for 15 seconds.

▶ Move safety lever down.

▶ Set engine speed no higher than half the maximum engine speed.

▶ Maintain engine speed and actuate working hydraulics until operating temperatures for coolant and hydraulic oil are reached.
▷ Machine is ready for operation.

LFR/12218814/01/2020-02-21/en

3.4.16 Travel alarm (option)

The travel alarm is an acoustic warning signal. It sounds outside the machine.

Activating travel alarm

The travel alarm is activated automatically at the start of travel.

▶ Check whether travel alarm functions: Slightly depress one travelling pedal before driving.

Adjusting period for deactivating travel alarm

▶ Set period for deactivating travel alarm to between 5 seconds and 20 seconds: Contact Liebherr customer service.

Deactivating travel alarm

Depending on machine confirmation travel alarm can be deactivated.

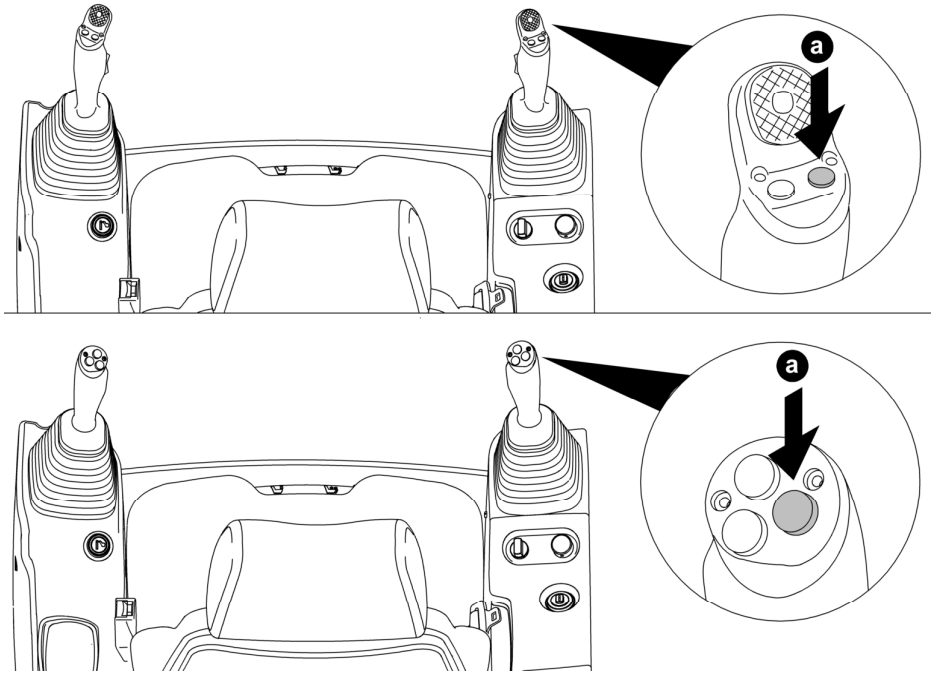


Fig. 339: Deactivating travel alarm

▶ Wait 10 seconds after activation of the travel alarm.

▶ Press the right button of the right joystick.

3.4.17 Controlling working attachment

An information sign, affixed on the side window of the operator's cab, explains the operating principle of the controls.

The controls described below meet the **ISO standard for controllers** and are part of the standard equipment of the machine.

LFR/12218814/01/2020-02-21/en

Key	Status of LEDs	Meaning
	○ ○ ○	OFF mode: Hoist cylinder protection is deactivated.
	☀ ○ ○	Continuous mode: Hoist cylinder protection is permanently active.

Tab. 37: Protection modes for working tool without automatic protection

▶ Select protection mode: Press and hold *hoist cylinder protection* key until required protection mode is selected.

Selecting automatic protection mode

This protection applies to machines with *Tool Control* and with selected working tool that does not require automatic protection.

The adjacent symbol indicates on the *Tool Control* display menu that the selected working tool is parametrised with automatic protection.

Key	Status of LEDs	Meaning
	○ ○ ☀	Automatic mode: Hoist cylinder protection is activated automatically as soon as working tool with automatic protection is selected on the display in *Tool Control* menu.

Tab. 38: Protection modes for working tool with automatic protection

Combining protection modes

A permanent protection mode can be combined with the automatic protection mode. In this case continuous mode is used.

Key	Status of LEDs	Meaning
	☀ ○ ☀	Automatic mode combined with continuous mode: Hoist cylinder protection is permanently active.

Tab. 39: Combined protection modes

Make sure the following preconditions are met:

❑ Automatic mode is selected. (For more information see: Selecting automatic protection mode, page 165)

▶ Combine automatic mode with continuous mode: Press and hold *hoist cylinder protection* key until combination of these two operating modes is reached.

LFR/12218814/01/2020-02-21/en

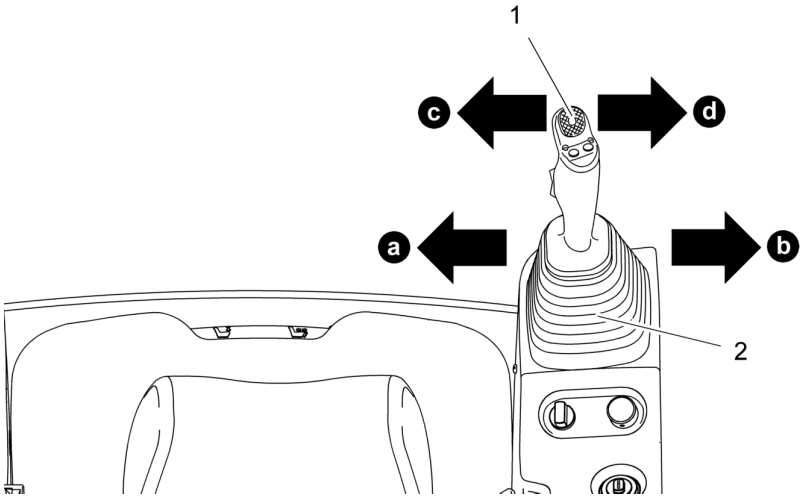
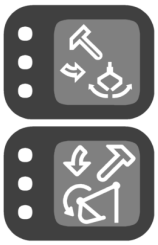


Fig. 387:

1 Right mini-joystick **2** Right joystick

Key	Status of LEDs	Changeover	Operation	Control element
	○ ○ ○	Deactivated	Bucket or grapple	Right joystick **2**
			Special working attachment	Right mini-joystick **1**
	☼ ☼ ☼	Activated	Bucket or grapple	Right mini-joystick **1**
			Special working attachment	Right joystick **2**

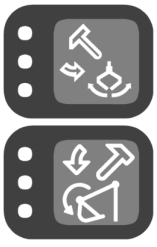
Tab. 41: Changing over control of right mini-joystick

DANGER
Use of incorrect control!
Danger to life.

▶ Before working with machine, check function of controls.

Make sure the following preconditions are met:
❑ Right mini-joystick **1** is not activated.
❑ Right joystick **2** is not activated.

Activating control changeover to right mini-joystick



▶ Press *control changeover to right mini-joystick* key.
▷ *Confirmation required* status symbol appears on the display.
▷ LEDs in *control changeover to right mini-joystick* key flash.

LFR/12218814/01/2020-02-21/en

Working with activated overload warning system

Note
Earth-moving operations create increased pressure on the machine.
When the overload warning system is activated, it can trigger repeatedly.

▶ Deactivate overload warning system for earth-moving operations.

If overload warning system triggers:
▶ Reduce reach.
or

Lower load to the ground without increasing reach.

Deactivating overload warning system

▶ Press *overload warning system* key.
▷ *Confirmation required* status symbol appears on the display.
▷ LEDs in *overload warning system* key flash.

▶ Press confirmation button within 5 seconds.
▷ *Confirmation required* status symbol is hidden.
▷ LEDs in *overload warning system* key go out.

LFR/12218814/01/2020-02-21/en

- ▶ Make sure that handle is not vertical when working.
- ▶ Make sure that hydraulic cylinder does not retract or extend to the stop when working.
- ▶ Operate hydraulic hammer.

If material to be broken does not break after 15 seconds maximum:

- ▶ Change purchase.

3.6.9 Working with scaling tooth

The scaling tooth is used in direct extraction as an alternative to blasting in applications where the bucket is inadequate for breaking or loosening the digging material.

Note

- ▶ Also adhere to operator's manual from manufacturer of scaling tooth.

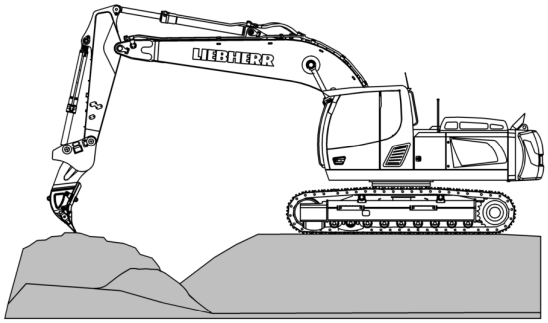


Fig. 446: Working with scaling tooth

WARNING
Machine tipping over!
Danger to life.

- ▶ Exclusively work in permitted working area.

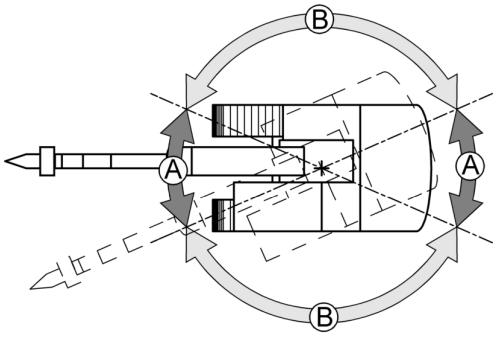


Fig. 447: Work areas

A Permitted working area

B Not approved working area

LFR/12218814/01/2020-02-21/en

- ▶ Push O-rings **9** inwards.
- ▶ Lock pin **4**: Attach locking plate **5**.
- ▶ Position working attachment so that hole of link **2** is aligned with bearings (link side) **B** of bucket **1**.
- ▶ Insert pin **4** in bearing (link side) **B**: Use same procedure as for inserting pin **4** in bearing (stick side) **A**.
- ▶ Lubricate pins **4** via grease fitting until clear grease emerges from bearings.

If stopcocks **8** are available:
- ▶ Set stopcocks **8** to **0**.

Removing bucket

- ▶ Remove locking plate **5**.
- ▶ Pull pins **4** and sealing rings **3** from bearings. Raise working attachment slightly if necessary.

3.7.3 Installing and removing bucket with special seal

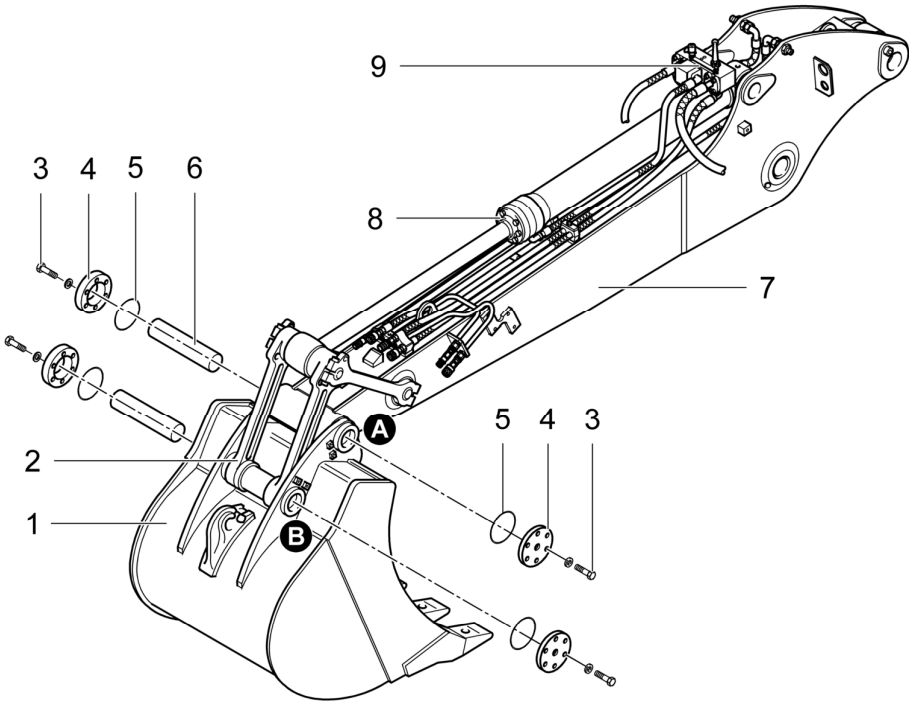


Fig. 454: Installing and removing bucket with special seal

A	Bearing (stick side)	**5**	O-ring
B	Bearing (link side)	**6**	Pin
1	Bucket	**7**	Stick
2	Link	**8**	Throttle check valve
3	Screw and nut system	**9**	Stopcock
4	Cover		

Make sure the following preconditions are met:
- ❑ Bottom part of bucket **1** is resting fully on ground.

LFR/12218814/01/2020-02-21/en

3.10 Transport

3.10.1 Driving machine onto low-loader (machine transporter)

Positioning machine on low-loader

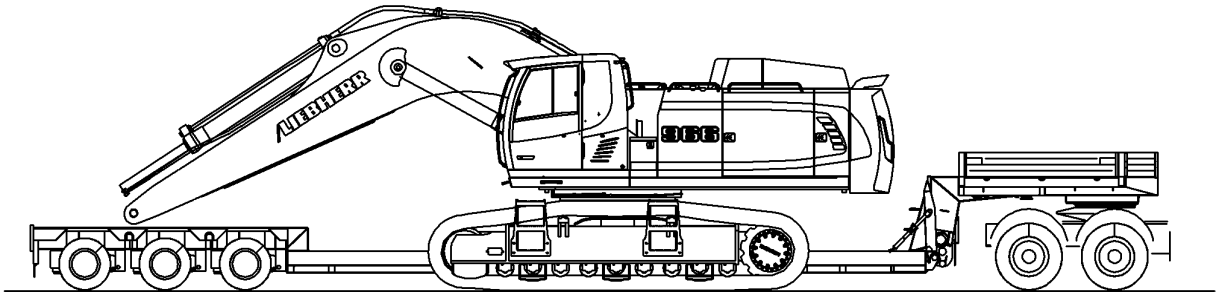


Fig. 459: Positioning machine on low-loader

Make sure the following preconditions are met:
- ❑ Travel gear is clean, free from snow and free from ice.
- ❑ Loading surface of low-loader is clean, free from snow and free from ice.
- ❑ Spotter is in eye contact with operator or speaking contact with operator is possible.
- ❑ The loading zone of the machine contains no persons.

▶ Align undercarriage of machine with low-loader.

▶ Slightly lift working attachment.

▶ Align uppercarriage so that working attachment is in rear area of low-loader.

If machine is equipped with undercarriage with adjustable width:

▶ Retract side frames.

▶ Unhitch low-loader from towing machine and position machine on low-loader platform.

▶ Place on tear-resistant, non-slip straps with a friction coefficient μ over 0.6 in accordance with standard EN 12195-1 between low-loader platform and centre part of machine undercarriage.

▶ Hitch low-loader to tractor truck and slowly raise low-loader platform to required transport height.

Positioning standard attachment

▶ Lower attachment to low-loader platform.

▶ Retract stick to maximum: Deactivate stick cylinder protection. (For more information see: 3.4.22 Stick cylinder protection, page 166)

Preparing machine

▶ Depressurise hydraulic hoses. (For more information see: 5.10.1 Depressurising hydraulic system, page 319)

▶ Set ignition key to **0**.

▶ Pull out ignition key.

LFR/12218814/01/2020-02-21/en

Towing small loads with machine

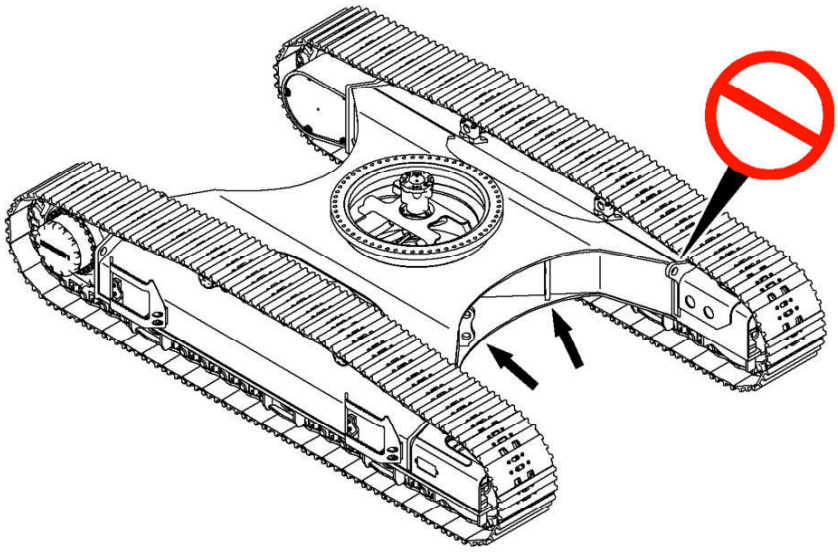


Fig. 478: Tie-down eyelets for towing small loads

DANGER
Incorrect towing!
Death, injuries, damage.

- ▶ Use faultless and correctly dimensioned towing device.
- ▶ Make sure there is nobody near the towing device.
- ▶ Make sure that applicable traffic rules and safety regulations are observed.

NOTICE
Incorrect towing!
Damage.

- ▶ Exclusively use tie-down eyelets on middle part of undercarriage.
- ▶ Do not use eyelets on side frame.
- ▶ Exclusively tow small loads such as compressors, generators or welding machines.
- ▶ Prevent towing device from getting tangled.
- ▶ Prevent contact between chains and towing device: Travel in a straight line.

- ▶ Mount towing device on tie-down eyelets of middle part of undercarriage.
- ▶ Pretension towing device: Move off slowly.
- ▶ Drive smoothly to the destination.

LFR/12218814/01/2020-02-21/en

Malfunction / error	Cause	Remedy
Diesel engine becomes too hot (according to coolant temperature display).	Too little coolant	Fill with coolant.
	Radiator contaminated from inside or calcified; radiator contaminated on outside	Clean or de-lime radiator.
	Thermostat defective	Check thermostat and replace if necessary. Contact Liebherr customer service.
	Coolant temperature sensor defective	Check sensor and replace if necessary. Contact Liebherr customer service.
	Fan speed too low (exclusively hydrostatic fan drive)	Check fan drive and replace if necessary. Contact Liebherr customer service.
Battery charge problem symbol lights up while diesel engine is running.	Inadequate belt tension	Check belt tension. Replace belt tensioner if necessary.
	Belt cracked	Replace belt.
	Cable connections loose or separated	Secure or replace cables.
	Generator, rectifier or controller defective	Contact Liebherr customer service.
Black smoke coming from diesel engine.	Exhaust treatment system defective	Contact Liebherr customer service.
Exhaust gas is blue.	Oil level in diesel engine too high	Correct oil level.
	Penetration and combustion of engine oil in combustion chamber	Contact Liebherr customer service.
	Leak at turbocharger compressor	Contact Liebherr customer service.
	Crankcase breather filter defective	Check crankcase breather filter and replace if necessary.
Exhaust gases are white.	Start of injection too late	Contact Liebherr customer service.
	Heating flange defective (at cold temperatures)	Have heater flange checked and replaced if necessary.
Diesel engine is pinging.	Combustion cycle is malfunctioning	Contact Liebherr customer service.
Diesel engine rattles.	Excessive valve clearance	Adjust valve play.
	Injection nozzles damaged or contaminated by carbon deposits	Contact Liebherr customer service.
	Bearing damage	Contact Liebherr customer service.
	Piston rings worn or broken; pistons seized	Contact Liebherr customer service.
Unusual noises	Leaks at suction hoses and exhaust hoses generate whistling noises	Eliminate leaks and replace seals if necessary.
	Turbine wheel or compressor wheel rubs against housing; foreign particles in compressor or turbine; bearings of rotating parts seized	Contact Liebherr customer service.

LFR/12218814/01/2020-02-21/en

	Current value [A]	Function
F8	80	Power supply KL30
F10	8	Diagnostic connection for auxiliary heater
F11	8	Accelerator pedals
F12	8	Joysticks
F13	8	Module A57 (24 V logic)
F15	16	Pump for diesel exhaust fluid
F16	8	Module A58 (24 V logic)
F17	8	Module A51 (24 V logic)
F18	8	Double pedals
F19	8	Power supply for relays K1A, K1B, K2A and K2B
F20	20	Power supply of diesel exhaust fluid pump
F21	16	Module A57/bank 1
F22	16	Module A57/bank 2
F23	16	Module A57/bank 3
F24	8	Module A57/bank 3
F25	16	Module A57/bank 4
F26	16	Module A58/bank 1
F29	16	Module A58/bank 2
F30	16	Module A58/bank 3
F36	16	Module A58/bank 4
F38	8	Module A51
F39	16	Module A51/bank 1
F40	8	Module A51
F41	16	Module A51/bank 2
F42	16	Module A51/bank 3
F43	16	Module A51/bank 4
F47	8	Reserve
F49	16	Auxiliary heater
Relay		
K1A	10/20	Magnet system
K1B	10/20	Magnet system
K2A	8	Auxiliary heater/water pump
K2B	8	Auxiliary heater
K3	8/15	Pump for diesel exhaust fluid

Tab. 53: Fuses and relays in electric cabinet E62

LFR/12218814/01/2020-02-21/en

Customer:.....Machine type:.....Serial no.:.....Operating hours:.....Date:.....

Maintenance / inspection after service hours								Tasks to be performed		
On handover	All 8-10 h	All 50 h	All 500 h	All 1000 h	All 2000 h	Other intervals	Additional labelling	**By maintenance staff** ■ Once-only activity ● Repeat interval ✦ If necessary ❄ Annually before the winter **By authorised specialist staff** ☐ Once-only activity ❍ Repeat interval ✧ If necessary **Additional labelling** Assistance required Have this task carried out exclusively by a certified electrician	Confirm tasks	See page
			☐		❍			**If travelling proportion of machine is less than 12 %:** Travel gearbox: Change oil (at least every 2 years).		
			☐	❍	❍			**If travelling proportion of machine is greater than 12 % or in dust intensive applications:** Travel gearbox: Change oil (at least every 2 years).		
				❍	❍			Travel motor and travel gearbox: Check mounting.		
				❍	❍			Check function of brakes.		
Travel gear										
☐	●	●	❍	❍	❍			Checking track tension, tightening if required.		326
		●	❍	❍	❍			Track pads and sprocket wheels: Check mounting.		
		●	❍	❍	❍			Check tracks, sprocket wheels, idler-wheels, carrier rollers and track rollers for wear.		330
Working attachment										
	●	●	❍	❍	❍			Lubricate working tool.		331
		●	●	❍	❍			Check pin bearings for wear.		331
		●	❍	❍	❍			Bucket teeth: Checking for wear.		
						✦		Changing bucket teeth with Z system.		332
						✧		Check overload warning system (option) in line with the regulations in force in the country of machine operation.		
Operator's cab, heating and air conditioning										
		●	❍	❍	❍	✦		Filling with windscreen washer fluid.		334
						❄		Heating: Check function.		334
				❍	❍	❄		Auxiliary heater (option): Check function.		336
		●	❍	❍	❍			Switching on air conditioning unit.		337
		●	❍	❍	❍			Clean pre-filter.		337
				❍	❍			Replacing the filter cassette.		
			❍	❍	❍			Checking and cleaning condenser.		
Lubrication system										
☐		●	❍	❍	❍	✦		Lubrication system (option): Top up grease.		339
		●	❍	❍	❍			Check lubrication of bearings (grease collar).		339
						✧		Checking function of entire system, pumps and control (at least once a year).		

Minimum quality requirements

Specification
EMT LH-00-Minimum-HYE

Tab. 78: Minimum quality requirements

If hydraulic oils or filters from other manufacturers are used, information on change and replacement intervals must be obtained from respective manufacturer or supplier.

Oil analysis

		Dust intensive application	Normal operation
Normal application (oil analysis optional)	**Liebherr mineral oil**	Every 250 h, at least once a year	Every 1000 h, at least once a year
	Liebherr Hydraulic Basic 68		
	Liebherr Hydraulic Basic 100		
	Liebherr Hydraulic HVI		
Eco-friendly application (oil analysis mandatory)	**Liebherr-PAO biodegradable**	Upon handover, then every 250 h, at least once a year	Upon handover, then every 1000 h, at least once a year
	Liebherr Hydraulic Plus		
	Liebherr Hydraulic Plus Arctic		

Tab. 79: Oil analysis

Filter replacement

	Dust intensive application	Normal operation
Liebherr return filter	Every 250 h, also during every hydraulic oil change	Once after 500 h, then every 1000 h, also during every hydraulic oil change
Liebherr breather filter	Every 500 h, also during every hydraulic oil change	Every 2000 h, also during every hydraulic oil change
Liebherr bypass filter (option)[25)]	If necessary, every 2000 h	

[25)] A bypass filter is mandatory for eco-friendly application.

If working under machine:
- ▶ Attach "Do not start engine!" warning sign to ignition key so it is clearly visible.
- ▶ Pull out ignition key.
- ▶ Switch off battery main switch.

If working above head height:
- ▶ Exclusively use approved safe ladders and working platforms.
- ▶ Exclusively use machine components intended for this purpose as climbing aids.

Attach personal protective equipment against falling:
- – When working with one hand on the machine at a height above 2 m without a possibility of standing with your feet sufficiently far apart to ensure firm standing
- – When working with two hands on the machine at a height above 2 m without fall protection constructions
- ▶ Wear safety harnesses when working at height.
- ▶ Keep all handles, steps, railings, pedestals, platforms and ladders free from dirt, snow and ice.

If machine is equipped with height adjustable cab:
- ▶ Put operator's cab in bottom position.

If operator's cab has to be positioned in top position during maintenance work or repair work:
- ▶ Make sure that operator's cab is supported in proper and secure manner.

When working under a raised machine:
- ▶ Make sure that machine is supported in a proper and secure manner.

If machine is equipped with undercarriage with adjustable width:
- ▶ Retract side frames.
- ▶ Avoid metal on metal contact.
- ▶ Make sure that changes to weight distribution do not endanger the secure standing of the machine.

When work is performed in closed rooms with diesel engine running:
- ▶ Divert exhaust fumes outside of the room.
- ▶ Make sure the room is well ventilated.

5.5.3 Putting machine in maintenance position

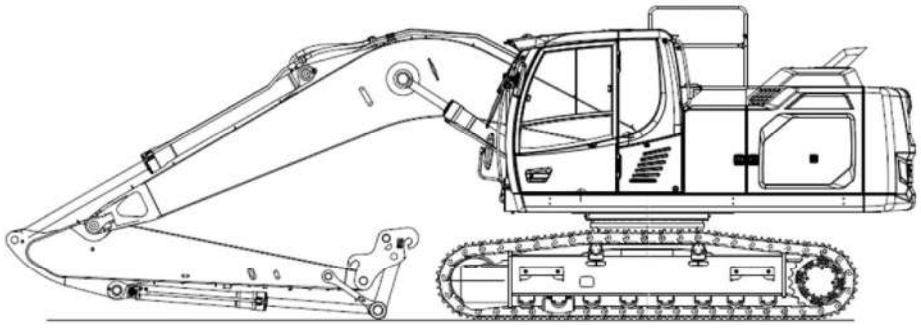


Fig. 562: Putting machine with backhoe bucket attachment and gooseneck boom in maintenance position

LFR/12218814/01/2020-02-21/en

CAUTION
Damage to unprotected areas.

▶ Renew protection regularly as per manufacturer's instructions.

	Icy climate			Polar climate			Cold humid climate			Warm temperate climate			Subtropical climate			Tropical climate		
Stage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Interval in months	-	4	2	-	4	2	9	6	3	18	12	6	6	4	2	-	4	2

Tab. 95: Maintenance interval for maintenance of conservation without visible damage to protective film

The internal stages for the climate zones listed in table (see: tab. 95, page 285) are as follows:

– **Stage 1:**
  - Minor fluctuation of conditions in the climate zone
  - Constant temperatures, constant low humidity
  - Low occurrence of strong winds
– **Stage 2:**
  - Minor fluctuation of conditions in the climate zone
  - Moderate temperature fluctuations, moderate fluctuations in humidity etc.
– **Stage 3:**
  - Strong fluctuation of conditions in the climate zone
  - Strong temperature differences, strong fluctuations in humidity, constant high humidity
  - Extreme wind movements, high wind load (salt, sand, ice, chemical substances etc.)
  - Offshore conditions, maritime weather conditions (machines on pontoons, working in coastal areas)
  - Strong UV radiation

Conserving exterior, interior and specific components of machine

NOTICE
Badly prepared surfaces!
Poor adhesion of coating

▶ Clean and degrease surface to be treated.

NOTICE
Thin sheets!
Damage through mechanical treatments

▶ Avoid polishing!

Repair area	Zinc-plated, chrome-plated parts, internal components from aluminium or alloy, engine and pump group, hydraulic control block, rotary connection, slewing gearbox	Hollow parts (body and fittings), gaps, holes and open threads

LFR/12218814/01/2020-02-21/en

Position	Assembly	Visual inspection for defects
1	Steel frame of working attachment	Check bearing points, supports, holders, fastening elements, connections for damage, warping and cracks.
2	Steel frame of uppercarriage	
3	Steel frame of climbing aids and hand rails	
4	Steel frame of undercarriage	
5	Steel frame of operator's cab	
6	Steel frame of quick coupler and working tool	

Tab. 108: Visual inspection for defects

Visual inspection during maintenance work or inspection tour

▶ Perform visual inspection. (For more information see: Definition of visual inspection, page 273)

If defects occur in machine:

▶ Record any identified defects.

▶ Inform operating company of defects affecting safety.

▶ Repair identified defects. See service manual for procedure.

If service manual cannot be accessed:

▶ Have repairs performed by Liebherr customer service.

LFR/12218814/01/2020-02-21/en

5.8.4 Fuel tank: Draining water and sediments

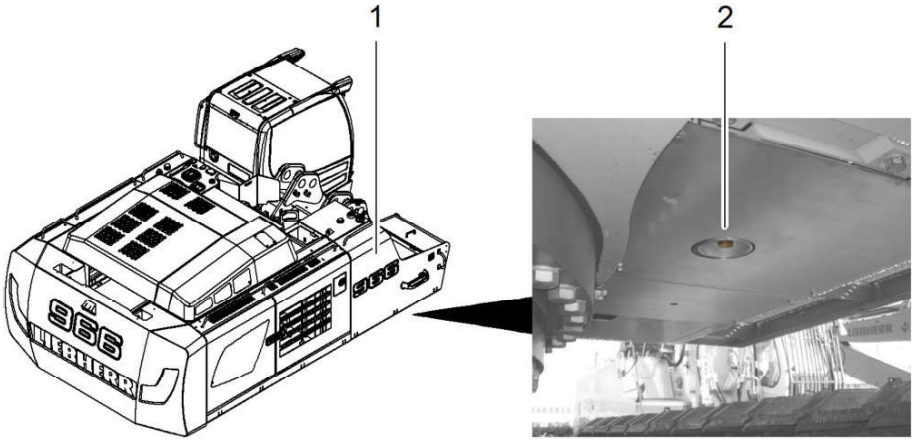


Fig. 584: Fuel tank: Draining water and sediments

1 Fuel tank **2** Drain valve

DANGER
Fire! Explosion!
Death, injuries, damage.

- ▶ Only work with the diesel engine shut off.
- ▶ Do not smoke.
- ▶ Avoid naked flames.

- ▶ Place suitable receptacle under the drain screw **2** below the fuel tank **1**.
- ▶ Unscrew plug from drain valve **2**.
- ▶ Attach the drain hose supplied with the machine to the drain valve **2**.
- ▶ Drain water and sediments until fuel escapes.
- ▶ Remove drain hose.
- ▶ Screw plug onto drain valve **2**.

5.8.5 Fuel fine filter: Replacing filter cartridge

The fuel fine filters are in the engine compartment under the guard plate.

LFR/12218814/01/2020-02-21/en

CAUTION
Corrosive coolant!
Allergic reactions.

- ▶ Wear protective gloves and safety glasses.
- ▶ Avoid skin contact with coolant.
- ▶ Rinse thoroughly with water in case of direct skin contact with coolant.

Make sure the following preconditions are met:
- ❑ Coolant used is approved. (For more information see: 5.3.5 Coolant, page 263)
- ▶ Depressurise coolant container **1**: Unscrew filler cap **3** by half a turn.
- ▶ Slowly and completely unscrew filler cap **3**.
- ▶ Fill coolant to end of filler pipe at maximum 8 l/min into coolant container **1**.
- ▶ Check condition of sealing ring. Replace if necessary.
- ▶ Screw in filler cap **3**.
- ▶ Regulate heating temperature of operator's cab to full.
- ▶ Let diesel engine run at idle speed for 5 minutes.
- ▶ Check coolant level. (For more information see: Checking coolant level, page 314)

5.9.2 Coolant: Checking concentration

Checking concentration of anti-freeze and corrosion protection agent in coolant

Checking temperature of anti-freeze and corrosion protection agent

- ▶ Take coolant sample.
- ▶ Use suitable method to test whether temperature of anti-freeze and corrosion protection agent is -37 °C.

If temperature of anti-freeze and corrosion protection agent is higher than -37 °C:
- ▶ Correct concentration of anti-freeze and corrosion protection agent. (For more information see: Correcting concentration of anti-freeze and corrosion protection agent, page 316)

LFR/12218814/01/2020-02-21/en

5.11 Electrical system

5.11.1 General information

Preparatory work

Before any intervention in electrical system:

- ▶ Wear safety glasses and protective gloves.
- ▶ Switch off battery main switch.
- ▶ Disconnect batteries: Disconnect negative pole **(-)** first and reconnect it last.

General maintenance work

- ▶ Regularly check flawless condition of the electrical system.
- ▶ Remedy malfunctions immediately.

Malfunctions could be, for example:
- Loose connections
- Damaged cables
- Inadequately attached clamps

If fuse or bulb is damaged:
- ▶ Remedy cause.
- ▶ Replace damaged fuse or bulb immediately.

LFR/12218814/01/2020-02-21/en

3 *Increasing temperature* button
4 *Head area air supply* button
5 *Torso area air supply* button
8 *Reducing blower power* button
9 *AUTO* button
10 *A/C* button
13 *A/C* key
14 *Defrosting* key

- ▶ Start diesel engine.
- ▶ Run machine warm.
- ▶ Open air outlets in operator's cab.

- ▶ Switch on automatic mode: Press *AUTO* button **9**.

- ▶ Switch on defrosting and defogging: Press *defrosting* button **12** or *defrosting* key **14**.

- ▶ Switch on recirculated air: Press *recirculated air* button **11**.
- ▶ Check for sufficient air outlet output.
- ▶ Clean air outlet if necessary.

LFR/12218814/01/2020-02-21/en