en **Operator's manual**

Wheel loader

L 580-459 (USA / CAN)

From serial number 35715

Document ID

ORIGINAL OPERATOR'S MANUAL

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Contact

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Contents

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1.2 Technical data

1.2.1 Information on vibrations

Hand, arm and whole-body vibrations

The driver's seat installed in the machine by the manufacturer complies with ISO 7096:2000, EM3 for wheel loaders. If the seat is replaced, the new seat must also comply with this standard.

Hand/arm vibrations

When the machine is correctly operated, the weighted (frequency-evaluated) effective value for hand/arm vibrations as per ISO 5349-1:2001 is less than 2.5 m/s^2 .

Whole-body vibrations

When the machine is correctly operated, weighted (frequency-evaluated) effective values for certain example applications of the machine can be seen in the tables listed below. These values are based on the information in the technical report ISO/TR 25398:2006 “Earth-moving machinery - Guidelines for assessment of exposure to whole-body vibration of ride-on machines - Use of harmonized data measured by international institutes, organizations and manufacturers”. The measuring method corresponds to ISO 2631-1:1997. The listed effective values for typical machines are given with standard deviations. These deviations are classified according to light, normal and heavy-duty operating conditions. The operator must classify the operating conditions according to the terrain, site conditions, site organisation, material, machine equipment, mode of operation and expertise of the driver.

Because the stated values are individual effective values for certain common applications, it is only possible to approximately assess the driver's exposure to vibrations. Therefore, in order to precisely assess the driver's exposure to vibrations during an 8-hour working day, use the Liebherr brochure on whole-body vibrations and the special software. Both of these are available from Liebherr dealers or with the documentation CD (Liebherr Parts) supplied with each new machine.

(For more information see: 2.4.19 Protection against vibrations, page 65)

Machine type	Typical working cycles	Weighted effective value in m/s^2 under light, normal and heavy-duty operating conditions [A)]								
		x axis			y axis			z axis		
		Light	Normal	Heavy	Light	Normal	Heavy	Light	Normal	Heavy
Wheel loader	Load & Carry	0.44	0.60	0.76	0.44	0.58	0.72	0.38	0.52	0.66
	Transfer	0.31	0.54	0.78	0.40	0.65	0.90	0.32	0.49	0.66
	V mode	0.50	0.71	0.91	0.37	0.60	0.83	0.40	0.54	0.68
	Mining	0.57	0.91	1.24	0.47	0.69	0.91	0.34	0.81	1.28

Tab. 1: Whole-body vibrations

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Note
Installing or changing the working attachment or tyres.

▶ (For more information see: 2.4.18 Attachments and accessories, page 65)

1.2.20 Tyres with foam

This equipment is optional.

When tyres with foam are used, they must be attached to all four wheels.

If the tyres are filled with foam, the ballast needs to be modified. (For more information see: 1.2.17 Ballast, page 27)

Note
Installing or changing the working attachment or tyres.

▶ (For more information see: 2.4.18 Attachments and accessories, page 65)

1.2.21 Complete machine with bucket (Z kinematics)

The values stated refer to the machine:

- In its standard version
- With Michelin 26.5R25 XHA2 tyres,
- Including all lubricants
- With a full tank
- With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.

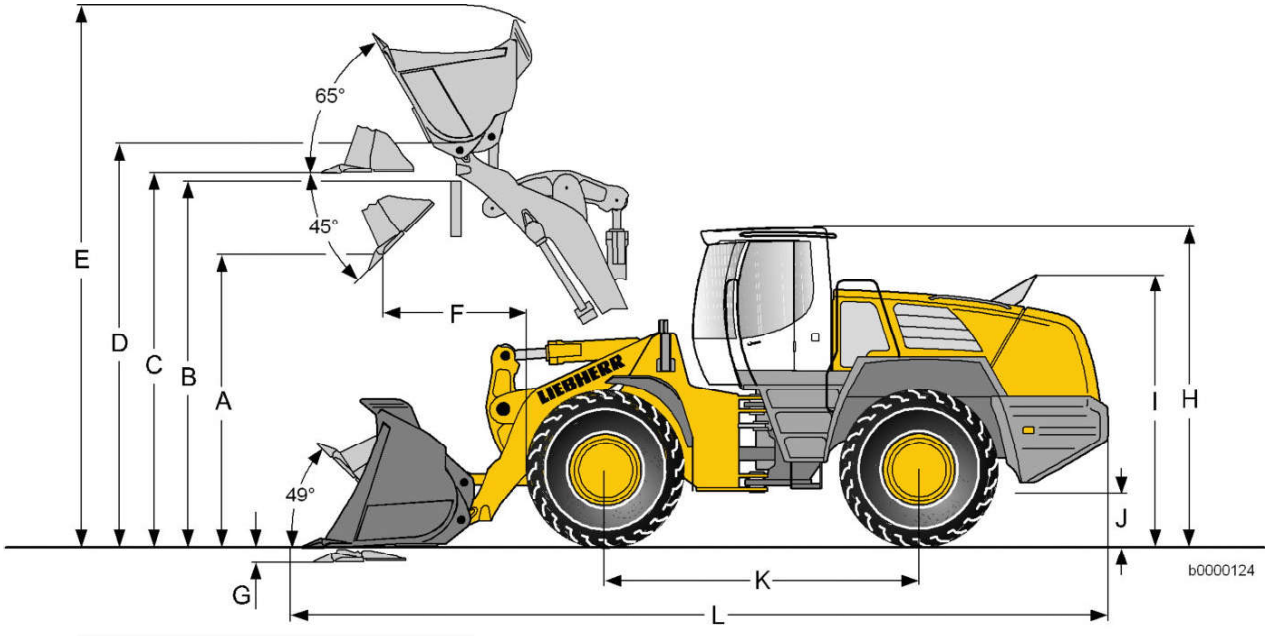

Fig. 20: Dimensions

	Description	Unit	Value	
	Hydraulic quick-change device		No	No

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2 Safety warnings, signs

Working on the machine poses safety risks to the operator, driver or maintenance personnel. You can prevent risks and accidents by regularly reading and observing the various safety instructions.

This is especially important for personnel who only occasionally work on the machine, for example, carrying out rigging or maintenance work.

The safety instructions listed below, if conscientiously followed, will ensure your own safety and that of others, and will prevent the machine from being damaged.

Whenever tasks which could cause danger to personnel or damage to the machine are described, the necessary safety precautions are explained in this manual.

2.1 How the warnings are marked

	This is the warning symbol. It warns you of potential injuries. To prevent injury or death, carry out all the measures identified by this warning symbol.

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The warning symbol always appears together with the signal words:
DANGER, WARNING, CAUTION

	**DANGER**	indicates a hazardous situation that will immediately lead to serious or fatal injury if it is not avoided.
	**WARNING**	indicates a hazardous situation that may lead to serious or fatal injury if it is not avoided.
	**CAUTION**	indicates a hazardous situation that may lead to minor or moderate injury if it is not avoided.
	ATTENTION	indicates a hazardous situation that may lead to damage if it is not avoided.

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2.1.1 Further markings

	**Note**	indicates useful tips and information.

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Lashing point sign

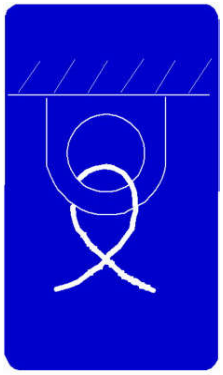

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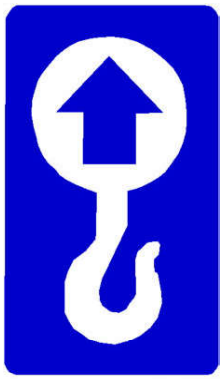
Fig. 52: Lashing point sign

Indicates the lashing points on the machine.

Slinging and lifting point sign



03sc17ab

Fig. 53: Slinging and lifting point sign

Indicates the slinging and lifting points on the machine.

Fire extinguisher sign

This equipment is optional.

bsich029

Fig. 54: Fire extinguisher sign

Indicates that there is a fire extinguisher in the cab.

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Further procedure:
- Make sure that during cleaning work on the machine housings, the temperature sensors for the fire alarm and extinguisher systems do not come into contact with hot cleaning agent. Otherwise the fire extinguishing system could be activated.
- After cleaning, completely remove the covers and tape.
- After cleaning, check all fuel, engine oil and hydraulic oil lines for leaks, loose connections, abrasion and damage.
- Repair any defects immediately.

16. Follow the safety instructions for the product in question when handling oil, grease and other chemical substances.
17. Dispose of spare parts and consumables in a safe, environmentally sound manner.
18. Take care when handling hot operating and auxiliary materials (danger of burns and scalding).
19. Only operate combustion engines and fuel-powered heaters in sufficiently ventilated rooms. Before starting the engine inside a building, make sure the room is well ventilated. Follow the local regulations in force at the site.
20. Only carry out welding, burning and grinding work when it is expressly allowed. There may be a risk of fires or explosions, for example.
21. Do not try to lift heavy parts. Only use suitable equipment with sufficient load capacity.

    Procedure:
    - When replacing individual parts and larger assemblies, carefully fasten and secure them to the lifting gear so that no danger can arise.
    - Only use suitable lifting gear in perfect order, and slinging equipment with sufficient load capacity.

    Keep out from under suspended loads.
22. Do not use ropes which are damaged or of insufficient load bearing capacity. Wear protective gloves when handling wire ropes.
23. Only allow experienced personnel to sling loads and direct crane drivers. The person giving directions must remain in sight of the operator or at least be in spoken contact with him.
24. When carrying out fitting work above head height, use the safety climbing aids and working platforms provided or equivalent. Do not use parts of the machine for climbing. Wear a safety harness when working at height. Keep all handles, steps, rails, gangways, platforms and ladders free from dirt, snow and ice.
25. When working on the attachment (for example replacing teeth), make sure it is properly supported. Avoid direct metal-to-metal contact.
26. Never lie under the machine when it is raised using the working attachment, unless the undercarriage is securely supported using wooden beams.
27. Always support the machine on blocks, so that it cannot become unbalanced by any shift in weight. Avoid metal-to-metal contact.
28. Only trained specialist staff may perform work on the chassis, brake and steering systems.
29. If you have to repair the machine on a slope, secure the wheels with wedges. Move the working attachment to the maintenance position and engage the articulation lock.
30. Only personnel with the requisite skills and experience may work on hydraulic equipment.
31. Wear protective gloves when looking for leaks. Under pressure, a thin jet of liquid can pierce the skin.
32. Never release hydraulic lines or bolts before setting down the working attachment and shutting down the engine.
    Before starting any work on the hydraulic circuit, you must also press the working hydraulics lockout button and actuate all pilot control units (joystick and pedals) in both directions in order to reduce the control pressure and

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- ▶ Place the safety bar **4** in the holder **3**.
- ▶ Push in the pin **2** and secure it with the spring clip **1**.

3.2.3 Cab access

Only get on and off the machine using the access aids provided.

Only enter and leave the cab through the left cab door.

The right window is hinged.

Familiarise yourself with the emergency exit through the right window or the rear window. (For more information see: 3.2.5 Emergency exit, page 73)

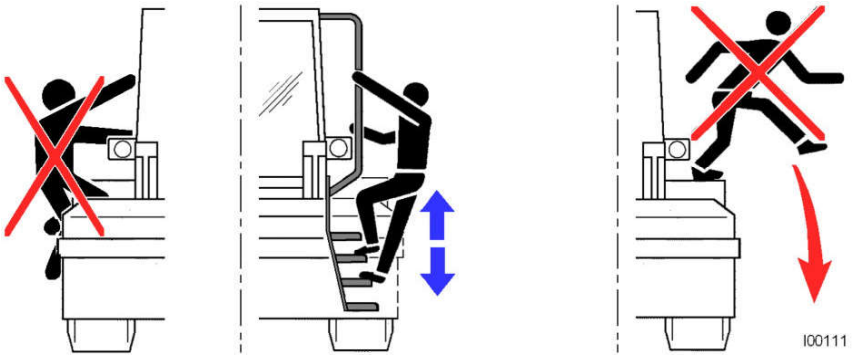

Fig. 66: Cab access

WARNING
You risk injury if you jump or fall off the machine.

- ▶ Use the steps, ladders and handles provided for getting on and off.
- ▶ Never jump down from the machine.

WARNING
You could be injured if the machine suddenly moves.
It is dangerous if the cab door is open and the engine is running.

- ▶ Do not hold onto the steering column, the control panel or the control levers when getting on or off.

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▶ Push or pull the lever **1** as far as it will go.
  ▷ When it reaches the top or bottom limit, the height is adjusted automatically.
  ▷ The minimum required suspension is ensured.

If the automatic height adjustment does not take place when the upper or lower limit position is reached:
▶ Briefly push or pull the lever **1**.

Adjusting the driver's seat shock absorber

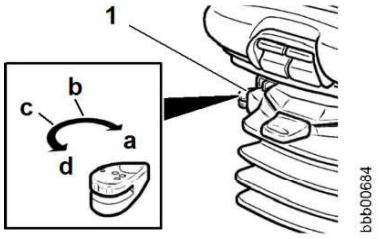

Fig. 85: Adjusting the driver's seat shock absorber

1	Lever for adjusting suspension	**b, c**	Medium setting
a	Soft setting	**d**	Hard setting

Adjust the shock absorber individually to the track or terrain.

Note

▶ The driver must be sitting in the normal position.

▶ Turn the lever **1** to the required position and let go.
  ▷ **a** = soft
  ▷ **b**, **c** = medium
  ▷ **d** = hard

Adjusting the arm rest

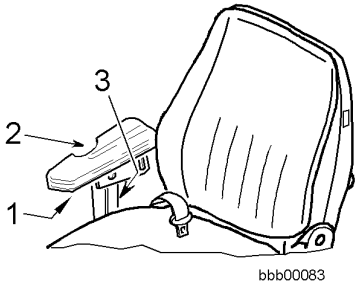

Fig. 86: Adjusting the arm rest

1	Locking screw for arm rest horizontal adjustment	**3**	Locking screw for arm rest height adjustment
2	Locking screw for arm rest inclination adjustment		

▶ Loosen the locking screw **1**, adjust the arm rest horizontally and lock it in place.

▶ Loosen the locking screw **2**, adjust the inclination and lock it in place.

▶ Loosen the locking screw **3**, adjust the height and lock it in place.

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▶ Fasten the arm rest **1** with the hex nut.

▶ Replace the cap **2**.

Adjusting the back rest inclination

Fig. 104: Adjusting the back rest inclination

1 Lever for back rest inclination adjustment

▶ Raise the lever **1**.

▶ Move the back rest to the angle required.

▶ Let go of the lever **1**.
▷ The lever **1** locks automatically. The back rest must no longer move.

Activating and deactivating the horizontal suspension on the driver's seat

Fig. 105: Activating and deactivating the horizontal suspension on the driver's seat

1 Horizontal suspension deactivated **2** Horizontal suspension activated

Under certain conditions, you can increase comfort by activating the horizontal suspension.

Advantage: the driver's seat can better absorb shocks in the direction of travel.

▶ Position **1** = OFF

▶ Position **2** = ON

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Cause:	Remedy:
The following symbol appears in the display unit 	- Use programmed keys - remove the other programmed keys from the bunch of keys
Starting keys cannot be programmed	- No master key or wrong master key used previously - The key to be programmed has no encoding option
Programmed starting keys cannot be deleted	- No master key or wrong master key used

Tab. 17: Troubleshooting

If the problem could not be solved as described above:

▶ Contact Liebherr customer service.

3.2.14 Driver identification

This equipment is optional.

The *Driver identification* option allows up to 5 driver profiles to be created. Special settings (relating to the operation of the machine) are stored in the driver profiles.

The following settings are saved in the driver profile:
- Travel range selected
- Tractive force reduction selected
- Air conditioning (temperature, blower, flaps, mode)
- Preselection of the working attachment functions (ride control, automatic lift kick-out, automatic bucket return-to-dig, float position, working hydraulics lockout)
- Joystick steering (release button “Joystick steering”, sensibility)
- 2-in-1 steering

Note
Risk of loss!
If the master key is lost, no starting keys can be programmed or deleted. The master controller must be replaced.

▶ Only use programmed starting keys to operate the machine.

▶ Keep the master key separate from the machine, in a safe place.

Saving the driver profile

Using the starting key, switch on the ignition and open the display screen using the switching buttons *Settings* and *Driver identification*.

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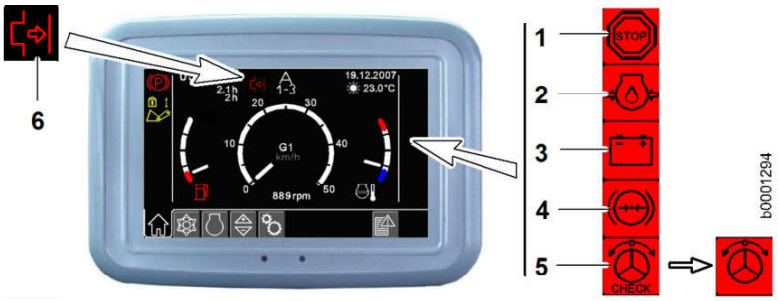

Fig. 138: Warning symbol indicator

1	STOP	**4**	Brake accumulator pressure
2	Engine oil pressure	**5**	Emergency steering pump check, emergency steering pump
3	Battery charge (charge control)	**6**	Quick-change device

STOP

b0000154

– Appears when a service code which requires the machine to stop occurs.
– The STOP symbol flashes.

Engine oil pressure


b0000155

– Appears when the engine oil pressure is too low.

Battery charge (charge control)


b0000156

– Appears when the battery is not charged.

Brake accumulator pressure


b0000157

– Appears when the brake accumulator pressure is too low.

Emergency steering pump check, emergency steering pump

b0000158

– The *emergency steering pump check* warning symbol lights up briefly when the engine is started and goes out once the check has been successfully completed.
– The *emergency steering pump* warning symbol lights up if the engine shuts down or if the steering pump fails when the machine is moving.

Quick-change device

Display when the quick-change device is not locked or not fully locked.

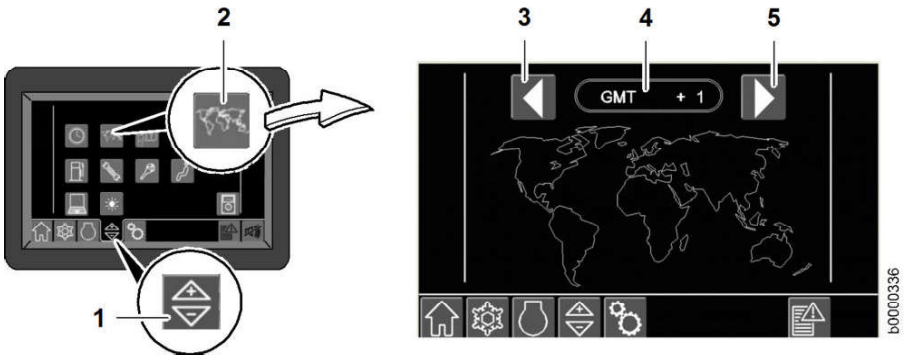

Fig. 187: Time zone setting

1 *Settings* switching button
2 Time zone setting
3 Change the time zone towards the west
4 *GMT time zone (Greenwich Mean Time)* indicator
5 Change the time zone towards the east

Changes are automatically applied and do not need to be saved separately.

Language and unit setting

Press the *Settings* and *Language and unit setting* switching buttons to open the display screen.

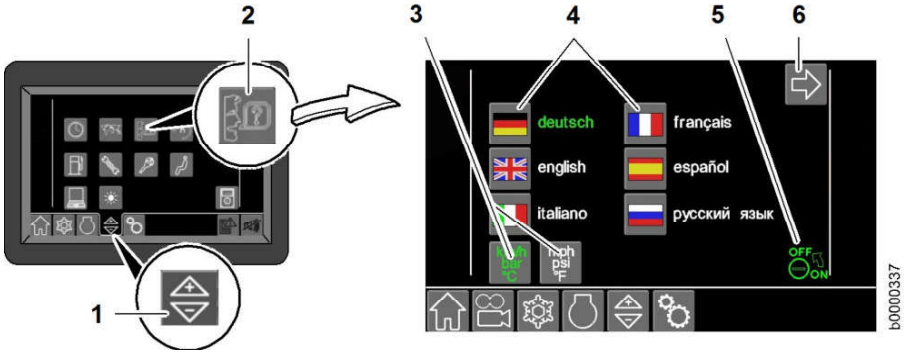

Fig. 188: Language and unit setting

1 *Settings* switching button
2 Language and unit setting
3 Unit selection
4 Language selection
5 *Ignition OFF/ON* symbol (flashes after language selection)
6 Further language selection

▶ Select the units with the buttons **3**.

▶ Select the language for the messages with the buttons **4**.

Note
To display the selected language:

▶ Switch ignition off and on again.

Hazard warning system


bbb00540

Hazard warning system button

Switches the hazard warning system on and off.

When you press the button for the first time:
– Function ON
– The direction indicator symbol field lights up
– All four direction indicator lights on the machine flash
– All three LEDs on the button light up

When you press the button a second time:
– Function OFF
– The direction indicator symbol field goes out
– All four direction indicator lights on the machine go out
– All three LEDs on the button go out

The button is also functional when the ignition key is in the 0 position or parking position.

Profile lights and low beam


bbb00541

Profile lights and low beam button

When you press the button for the first time:
– Profile lights function ON
– The profile lights light up
– The LED on the left lights up

When you press the button a second time:
– Low beam function ON
– Low beam lights up
– The LEDs on the left and right light up

When you press the button a third time:
– All functions OFF
– The LEDs on the button go out

The button is also functional when the ignition key is in the 0 position or parking position.

Flashing beacon

This equipment is optional.


bbb00546

Flashing beacon button

Switches the flashing beacon on and off.

When you press the button for the first time:
– Function ON - the flashing beacon lights up
– All three LEDs on the button light up.

When you press the button a second time:
– Function OFF - the flashing beacon goes out
– All three LEDs on the button go out.

The button is also functional when the ignition key is in the 0 position or parking position.

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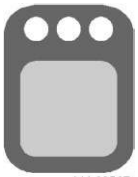
Spare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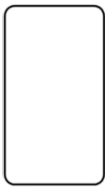
Spare button (unassigned)

For activating an optional function.

Spare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Dummy plug

Reserved for additional functions.

Working basket

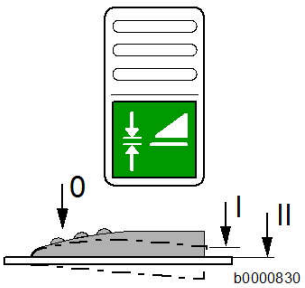
This equipment is optional.

The working basket is fitted to the lift arm. It can be lifted to the required position, whenever personnel are required to work above head height.

Attachment of a working basket must be officially approved before commissioning. Note the legislation and guidelines applicable at the installation location.

Note
Information on controlling and operating the working basket!

▶ See the manufacturer's operating manual supplied.



b0000830

Working basket switch

Field colour - green

Switches the "Working basket" function on or off.

Switch functions:
- Position **I**: raising and lowering the working basket
- Position **II**: adjusting the tilt of the working basket
- Position **0**: working with the bucket

WARNING
Risk of injury for persons in the working basket!
When using the working basket, persons may fall out.

▶ Use switch position I for lifting and lowering the working basket.

▶ Use switch position II to adjust the tilt of the working basket.

▶ Switch position 0 is not permitted while operating the working basket.

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▶ If available, switch on the air conditioning as well.
▷ When you press the buttons, the LEDs light up according to the temperature and blower settings.

▶ Close the cab doors and windows.

▶ Turn the outlet nozzles away from the windows.

To speed up the warming process:

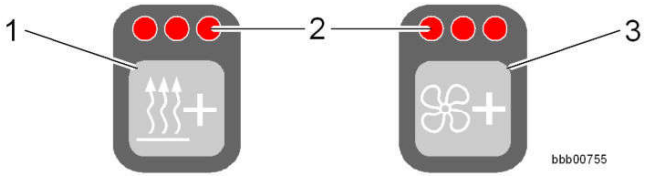

Fig. 256: Temperature and blower buttons

1 Temperature up button
2 LEDs
3 Blower speed up button

▶ Press the button **1** up to the highest temperature level.

▶ Press the button **3** up to the highest blower level.
▷ When you press the buttons, the LEDs light up according to the temperature and blower settings.

Adjusting the blower

The filters of the heating/air-conditioning unit must be regularly serviced in order to ensure good ventilation.

The air flow is impaired if a filter is dirty. (For more information see: 5.18.3 Cleaning the fresh air and recirculated air filter, page 376)

The air outlet nozzles in the cab must also be open.

NOTICE
The evaporator may be damaged if the recirculated air filter is not present.
If there is no recirculated air filter or fresh air filter, the closely meshed, deep evaporator fins will quickly become dirty.
It is then necessary to replace the evaporator as cleaning is no longer possible.

▶ Never operate the heater/air-conditioning unit without filters.

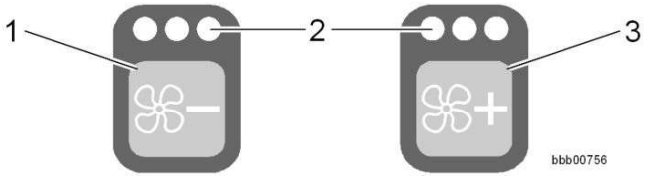

Fig. 257: Adjusting the blower

1 Blower speed down button
2 LEDs
3 Blower speed up button

To increase the blower speed:

▶ Press the button **3**.
▷ Fresh air or recirculated air is automatically blown into the cab.

▶ Use the buttons **1** and **3** to set the air flow.

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Operating the central lubrication system

Using the central lubrication system button, you can perform non-scheduled lubrication at any time when the ignition is switched on.

To start a non-scheduled lubrication:

▶ Press the button briefly (for less than 2 seconds).
  ▷ The pump performs a selected lubrication cycle.
  ▷ It then switches back to normal mode.

Cycle error

Causes of cycle errors:

– Engine is defective
– Lubrication point, lubricant supply line or distributor blocked.

If the set cycles set could not be performed in the time specified:

– All three LEDs on the central lubrication system button flash.

A service code is shown in the display in the event of a cycle error (For more information see: 4.1.1 Service code indication on the display, page 267) .

▶ Contact LIEBHERR CUSTOMER SERVICE to rectify the problem.

Grease level in reservoir too low

It the grease in the reservoir container is too low, all 3 LEDs on the central lubrication system button light up.

Filling the reservoir

NOTICE
There is a risk of damaging the system.

▶ Pay attention to cleanliness when filling.

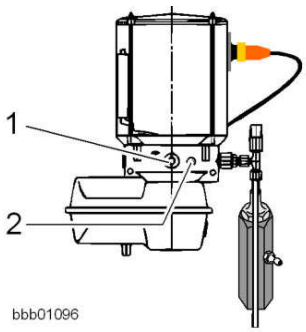

Fig. 274

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Boot phase of the main electronics (master)

“Boot phase” process.

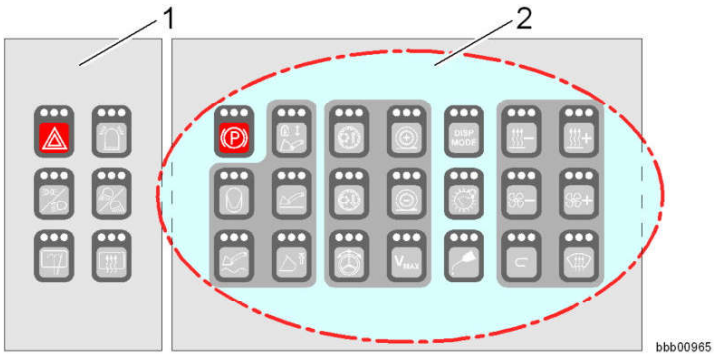

Fig. 290: Control units

1 Control unit for electrical system **2** CAN bus control unit

The control system (CAN bus) is started up during the boot phase.

During the “boot phase”, all the LEDs on all buttons of the CAN bus control unit **2** briefly light up.

Main electronics (master) standby

Standby for starting the engine is indicated as follows.

The LEDs on most of the buttons go out.

Fig. 291

The LEDs on the following buttons do not go out:
- Button **1** – parking brake
- Button **2** – working hydraulics lockout
- All buttons with a memory function (if they have been active since the last start-up).

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▷ When you press the gas pedal, the main electronics (MASTER) automatically switches to second and third gear.

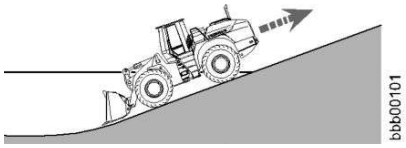

Fig. 313

c) Reversing up a steep slope

– When you select the travel direction, the machine drives off in second gear. If steep terrain prevents this, the main electronics (MASTER) automatically switches to first gear after 0.8 seconds.

If you cannot wait 0.8 seconds:

▶ You can switch to first gear immediately using the kick-down function.

If you want to use kick-down shifting:

▶ Set the travel direction switch **3** to reverse and at the same time press the kick-down button **2** on the LH control lever **1**.

Driving with the Vmax (Tempomat) function

When slow driving is necessary, the Vmax (Tempomat) function can be activated.

This function is only available when traveling forward in fixed gears F1 and F2.

If activated while the machine is moving:

– The machine keeps to the travel speed (Vmax) at the time the function is activated.
The speed set is for full throttle.

If activated while the machine is at a standstill:

– The machine travels at the minimum speed of the selected gear level.
Gear level G1: approx. 4 km/h
Gear level G2: approx. 10 km/h

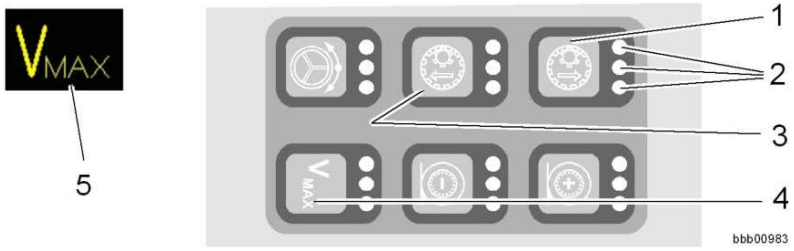

Fig. 314

To drive off at the desired speed (select fixed gear F1 or F2):

▶ Press button **1** or **3**.
▷ All three LEDs **2** light up briefly when the buttons are pressed.
▷ The segment display **5** shows the selected gear level.

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▷ Working hydraulics lockout is activated.

Turning off the battery main switch

The battery main switch is located at the rear left of the engine compartment.

If you are leaving the machine unattended:

NOTICE
Risk of damage to the electrical system.

▶ Never switch off the battery main switch if the engine is running.

(For more information see: 5.4.4 Turning off the battery main switch, page 329)

If you turn off the battery main switch:
▶ First turn off the engine and then turn off the battery main switch.

To secure the machine against unauthorised use:
▶ Pull out the main switch key.

Securing the machine

The following precautions should be taken when the machine is to be parked for a prolonged period on a slope.

DANGER
There is a risk of accidents if the machine rolls away.

▶ Secure the machine against rolling away.

▶ Take the wedges out of their holders.

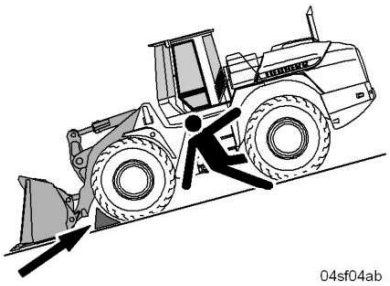

Fig. 337: Downhill slope

▶ Use the wedges to secure the machine against rolling away.

Parking position

The ignition key cannot be pulled out in the parking position **P**.

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If operated at more than 1500 m above sea level, approval must be requested from Liebherr:

▶ Contact Liebherr customer service.

Operation

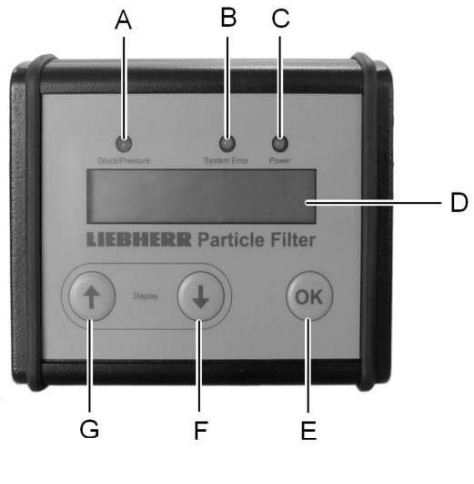

Fig. 358: “Diesel particulate filter” control unit in the driver's cab

A LED (red) *warning (pressure)*
B LED (yellow) *system error*
C LED (green) *power*
D LC display
E *OK (confirmation)* button
F *Decrease* button
G *Increase* button

Display in normal operation

The function test is carried out using the control unit in the driver's cab.

After switching on the ignition the text “LIEBHERR particulate filter” and “data logger ready” appears. After starting the engine the last menu used appears.

There are five menus to choose from. Depending on the selected menu the display shows operating data in various combinations (see: tab. 20, page 202) .

The presentation is changed by pressing button **F** and button **G**.

▶ Press button **G** or button **F** (about two seconds).
▷ The display changes to the next menu.

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3.3.11 Timber grabber

An optional attachment is available for transferring timber.

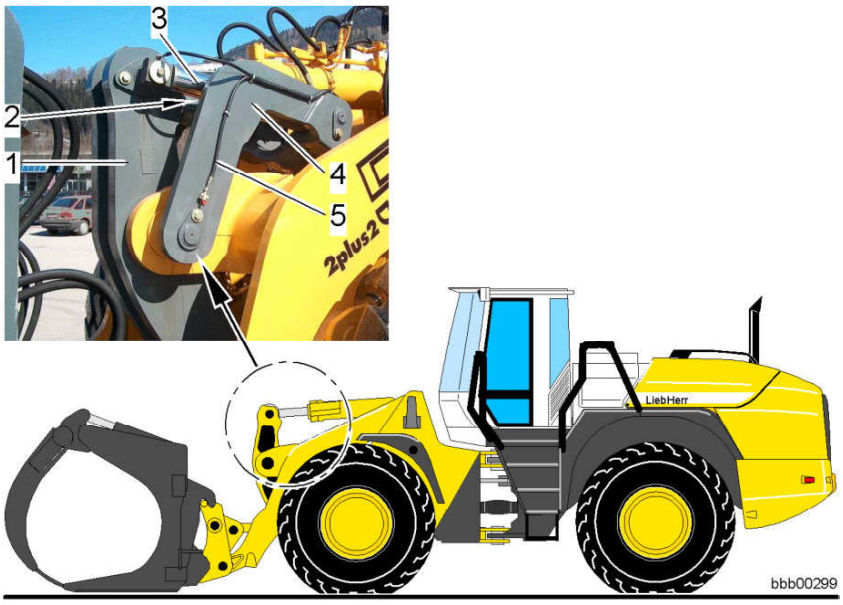

Fig. 368: Tilt cylinder support

1	Linkage	**4**	Support fork
2	Tilt cylinder	**5**	Lubricating line
3	Support cylinder		

The support fork and the two support cylinders provide the necessary torque in the unloading position when carrying heavy equipment and loads.

Permissible payload, (For more information see: 1.2.26 Attachment - timber grabber, page 38)

Installing/removing timber grabber on quick-change device

▶ (For more information see: 3.5 Fitting and removing the attachment, page 230)

Operating the timber grabber

Depending on the equipment, there are two options for controlling the additional function:

– using the control lever for additional working functions
(For more information see: 3.2.23 Control lever for additional working functions, page 148)
– using the Liebherr control lever (comfort control)
(For more information see: 3.2.22 LIEBHERR control lever, page 143)

CAUTION
There is a risk of accidents if the hydraulic circuit is incorrectly connected.

▶ Test the function of the attachment.

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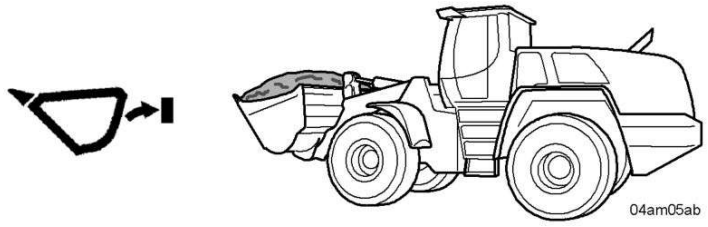

Fig. 384: Bucket position

▶ Tilt in the loaded bucket as far as it will go and raise the lift arms.

Transporting material

Keep the loaded bucket low during transport in order to improve the machine's stability and to ensure good viewing conditions.

The transport position means that the bucket pivot point is roughly 40 cm above the ground.

Make sure that the bucket is in the transport position.

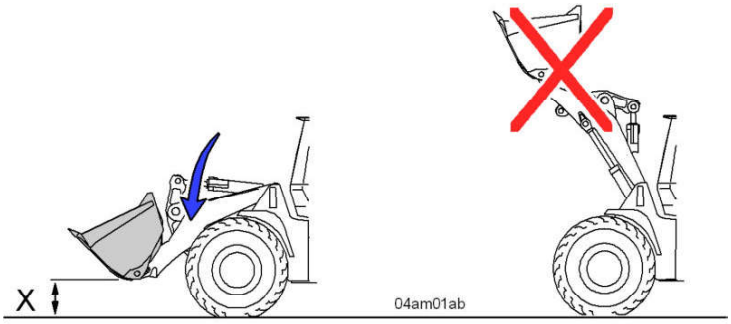

Fig. 385: Bucket position

▶ Move the bucket to the transport position.

WARNING
There is a risk of the machine tipping over.
The machine might tip over when the lift arms are raised due to the shift in the centre of gravity.

▶ Do not suddenly change direction or brake abruptly when the bucket is raised.

▶ Do not raise the lift arm until just before reaching the unloading point.

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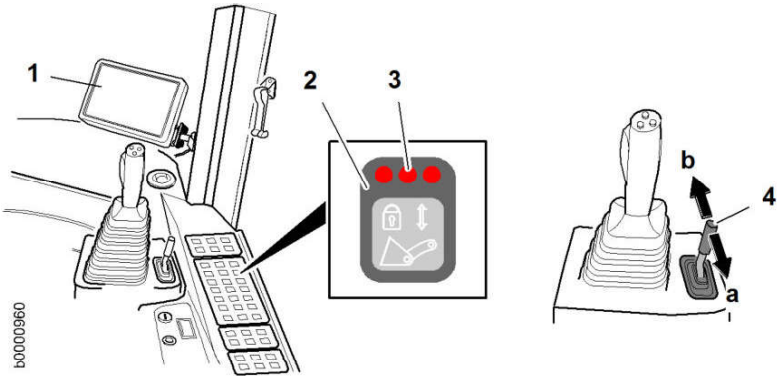

Fig. 406: Depressurising the hydraulics

1	Display unit	**4**	Control lever for additional working functions
2	*Working hydraulics lockout* button	**a**	Direction of movement
3	LED	**b**	Direction of movement

- ▶ Start the engine and let it run for around 10 seconds.
- ▶ Lower the lift arms to just above the ground.
- ▶ Turn off the engine.
- ▶ Switch on the ignition.
- ▶ Press the button **2** and hold it down.
  - ▷ All the LEDs **3** light up.
  - ▷ The *working hydraulics lockout* symbol field in the display unit **1** lights up.
  - ▷ The working hydraulics are locked.
- ▶ Move the control lever **4** several times in direction **a** and **b**.
  - ▷ This reduces the hydraulic pressure of the working attachment.

Disconnecting the hydraulic lines

If the working attachment has an independent hydraulic circuit, the hydraulic supply lines must be disconnected.

WARNING
There is a risk of accidents from pressurised hydraulic lines.

- ▶ Depressurise the hydraulic circuits before connecting or disconnecting hydraulic lines and couplings.

Make sure that:
- The lift arms are lowered to just above the ground.
- Cylinders, valves etc. on the working attachment are in the home position or closed.
- The installed working attachment is tilted in.
- The hydraulics have been depressurised.

Note
Hydraulic oil is harmful to the environment.

- ▶ Make sure that no hydraulic oil leaks onto the ground. Dispose of any contaminated soil in accordance with the local regulations.

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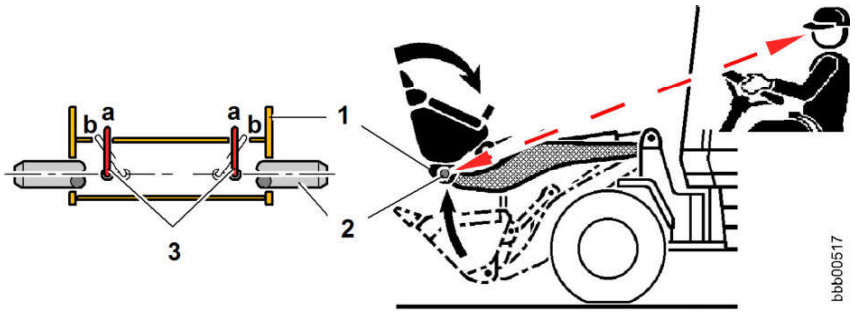

Fig. 418: Visual inspection

1	Quick-change device	**a**	Locked position
2	Locking pin	**b**	Unlocked position
3	Locking indicator		

▶ Move the lift arms until you can see the quick-change device from the cab.

▶ Make a visual inspection on both sides.
  ▷ The locking indicator **3** is in position **a**.
  ▷ The locking pins **2** must have moved into the outer bore hole of the quick-change device **1**.

Mechanical check

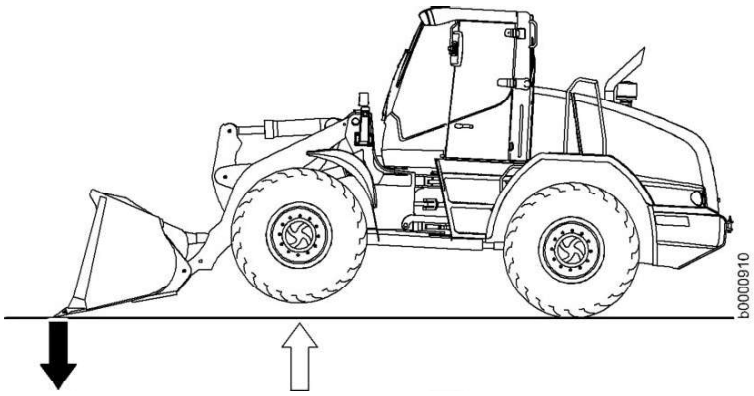

Fig. 419: Mechanical check

▶ Push the front edge of the bucket against the ground so that the front axle of the machine is slightly raised.
  ▷ The bucket must remain firmly attached to the quick-change device.

Connecting the hydraulic lines

If the working attachment has an independent hydraulic circuit, the hydraulic supply lines must be connected.

WARNING
There is a risk of accidents from pressurised hydraulic lines.

▶ Depressurise the hydraulic circuits before connecting or disconnecting hydraulic lines and couplings.

▶ Depressurise the hydraulics (For more information see: Depressurising the hydraulics, page 237) .

3.6 Transport

3.6.1 Transporting the machine

Lifting the machine by crane

NOTICE
The machine may leak fluids if it is tilted!

▶ Always make sure the machine is level when lifting it.

Observe the accident prevention regulations when lifting the machine by crane!

(For more information see: 2.4.15 Safety instructions for transporting the machine by crane, page 63)

Take the following precautions before lifting the machine by crane.

Note
To ensure safe machine transport!
Always clean the machine before transporting it by road, rail or sea!

▶ Remove any loose parts, coarse dirt, mud, ice, snow etc.

Further precautions:
– Lower the working attachment and tilt back the loading equipment to its limit.
– Engage the articulation lock.
– Move all control levers to neutral.
– Engage the parking brake.
– Lock the working hydraulics.
– Shut down the engine.
– Close and lock all doors, hatches and hoods on the machine.

For detailed descriptions: (For more information see: 3 Handling and operation, page 67)

Find out about:
– The weight and collision dimensions of the machine: (For more information see: 1.2 Technical data, page 21)
– The required load bearing capacity and lengths of the lifting tackle.

Loading for lorry, rail or sea transport

To be carried out when the machine needs to be loaded by crane.

Necessary equipment:

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Fig. 446: Transmission

▶ Reattach the plug **1** to the powershift section **2** of the transmission **3**.
  ▷ This connects the solenoid valve on the gearbox to the electronics.
  ▷ The machine's travel functions are operational again.

Towing with the engine not running

If the machine has suffered a serious breakdown such as engine failure, the braking and steering functions will be impaired.

Note
The brake accumulator is not filled if the engine is not running.

▶ The service brake becomes ineffective after it is applied several times.

The following precautions must be taken before towing the machine:
❑ Release the parking brake mechanically
❑ Have a suitable tow bar of sufficient strength ready

Releasing the parking brake mechanically:

Fig. 447

WARNING
There is a risk of accidents if the machine rolls away.

▶ Use the wedges to secure the machine against rolling away.

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Servicecode	Effect	Cause	Remedy
M3000	STOP symbol field H24 flashes, no emergency steering function available	Emergency steering pump check pressure switch: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3001	STOP symbol field H8 flashes, no emergency steering function available	Emergency steering pump pressure switch: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3002	Brake system accumulator pressure symbol field H19 lights up, condition of the service brake cannot be detected	Brake system accumulator pressure switch: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3003	No float position available	Float position pressure switch: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3004	None	Inching angle sensor: channel 1 overcurrent >20 mA	Contact LIEBHERR CUSTOMER SERVICE
M3005	None	Inching angle sensor: channel 1 undercurrent <4 mA	Contact LIEBHERR CUSTOMER SERVICE
M3006	Travel direction cannot be selected	Travel direction switch: forward signal channel 1 shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3007	Travel direction cannot be selected	Travel direction switch: reverse signal channel 1 shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3008	No lift kick-out available	Lift kick-out inductive switch: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M3009	No bucket return-to-dig available	Bucket return-to-dig inductive switch: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M300B	Fuel filling level not detected - minimum filling level displayed	Fuel level sensor: voltage below 1 V	Check fuse F44 - contact LIEBHERR CUSTOMER SERVICE
M300C	Fuel filling level not detected - minimum filling level displayed	Fuel level sensor: voltage above 4 V	Contact LIEBHERR CUSTOMER SERVICE
M300D	Engine cannot be started	Ignition switch: start signal T 50a shorted to earth	Contact LIEBHERR CUSTOMER SERVICE
M300E	None	Gas pedal angle sensor: channel 1 overcurrent >20 mA	Contact LIEBHERR CUSTOMER SERVICE
M300F	None	Gas pedal angle sensor: channel 1 undercurrent <4 mA	Check fuse F44 - contact LIEBHERR CUSTOMER SERVICE
M3010	Hydraulic oil overheating symbol field H23 lights up, fan runs at high speed, driving only possible in fixed gear 1 or 2	Hydraulic oil temperature sensor: shorted to earth	Contact LIEBHERR CUSTOMER SERVICE

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Servicecode	Effect	Cause	Remedy
M502C	No inching function available	Inching angle sensor less than 100% for more than 2 mins (dirt on inch pedal)	Clean the inch pedal so that it moves properly
M502D	No inching function available	Inch function deactivated due to parameters	Contact LIEBHERR CUSTOMER SERVICE
M502E	None	Variable displacement motor 2 overspeed - (in 3rd gear) - motor 2 exceeds 1500 rpm even though coupling 2 is open in 3rd gear	Contact LIEBHERR CUSTOMER SERVICE
M502F	None	Variable displacement motor 1 overspeed - (in 2nd gear) - motor 2 exceeds 1500 rpm even though coupling 1 or 3 is open in 2nd gear	Contact LIEBHERR CUSTOMER SERVICE
M5030	Engine shifts to neutral and the driver cannot select a travel direction after the speed is lowered	Variable displacement motor protection active: speed sensor overspeed	Contact LIEBHERR CUSTOMER SERVICE
M5031	Engine shifts to neutral and the driver cannot select a travel direction after the speed is lowered	Variable displacement motor 2 speed sensor: overspeed	Contact LIEBHERR CUSTOMER SERVICE
M5032	Engine shifts to neutral and the driver cannot select a travel direction after the speed is lowered	Variable displacement motor 1 speed sensor: overspeed	Contact LIEBHERR CUSTOMER SERVICE
M5034	Engine damage	Engine oil pressure too low: fault in pressure sensor or wiring	Contact LIEBHERR CUSTOMER SERVICE
M5035	Travel direction selection cannot be clearly detected	Travel direction switch: invalid switching condition	Check fuse F36 - contact LIEBHERR CUSTOMER SERVICE
M5036	The motor retains the old value	Variable displacement motor 1 calibration maximum current too low	Contact LIEBHERR CUSTOMER SERVICE
M5037	The motor retains the old value	Variable displacement motor 1 calibration maximum current too high	Contact LIEBHERR CUSTOMER SERVICE
M5038	The motor retains the old value	Variable displacement motor 1 calibration minimum current too high	Contact LIEBHERR CUSTOMER SERVICE
M5039	The motor retains the old value	Variable displacement motor 1 calibration minimum current too low	Contact LIEBHERR CUSTOMER SERVICE

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Warning signal	Cause	Remedy
Engine oil pressure symbol field lights up	Error in the engine lubricating oil supply	- Contact LIEBHERR CUSTOMER SERVICE
The STOP symbol field lights up After 10 seconds continual warning buzzer	Fault in the electrical system	
Service code M5028	Gear oil temperature above 120 °C	- Clean the gear oil cooler
Gear oil overheating symbol field lights up	Oil level too high	- Correct the oil level
Driving is only possible at reduced speed (approx. 20 km/h)	Fault in the electrical system	- Contact LIEBHERR CUSTOMER SERVICE
Service code M2016	Brake accumulator pressure too low	- Start the engine: the brake accumulators are filled while the engine runs
Accumulator pressure symbol field lights up No travel direction can be selected After 2 minutes continual warning buzzer	Error in the electrical/hydraulic system	- Contact LIEBHERR CUSTOMER SERVICE
Service code M6016	Torn V-belt	- Fit a new V-belt
Battery charge indicator symbol field lights up The parking brake cannot be released	Defective alternator	- Contact LIEBHERR CUSTOMER SERVICE
Service code segment display shows the service code, single 1-second beep		- (For more information see: 4.1.1 Service code indication on the display, page 267) - Contact LIEBHERR CUSTOMER SERVICE

Tab. 23

4.2.2 Troubleshooting the LIEBHERR automatic central lubrication system

This equipment is optional.

This section describes possible mechanical faults in the system, what they are caused by and how to remedy them.

For electronic faults: (For more information see: 4.1.1 Service code indication on the display, page 267)

Malfunction	Cause	Remedy
Pump working	Air pocket in pump piston	Bleed pump
but not delivering	Filling level below minimum	Fill reservoir
	Pump element defective	Replace pump element

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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 **with 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
						✦		Bleed the fuel system (CAUTION: do not loosen injection lines)		
☐		●	❍	❍	❍	✦		Drain off condensate and sediment from the fuel tank		
		●	❍	❍	❍	✦		Clean the air filter service cap and dust extraction valve		
				❍	❍			Test the air filter vacuum switch		
				❍	❍	✦		Change the main air filter element when indicated by the vacuum switch (or every year at the latest)		
					❍	✦		Change the air filter secondary element (after replacing the main element 3 times or every year at the latest)		
			❍	❍	❍			Check the air suction hoses for leaks and tight fitting		
			❍	❍	❍			Check the exhaust lines for leaks and tight fitting		
☐		●	❍	❍	❍			Check the oil level in the splitter box		
			☐	❍	❍			Change the splitter box oil		
Diesel particulate filter (optional)										
		●	❍	❍	❍	✦		Diesel particulate filter - draining the condensate separator		
				❍	❍			Diesel particulate filter - changing the sintered metal filter		
					❍	✧		Cleaning the diesel particulate filter (or in the event of poor performance)		
Cooling system										
			❍	❍	❍	❄		Check the coolant antifreeze and corrosion inhibitor concentration		
						✦		Clean the cooling system		
						❍3000h		Replace the coolant (at least every 2 years)		
Working hydraulics										
☐	●	●	❍	❍	❍			Checking the oil level in the hydraulic tank		
			❍	❍	❍			Draining off condensate and sediment from the hydraulic tank		
						✧		Hydraulic tank - changing the oil in the hydraulic system in accordance with oil quality and oil analysis (For more information see: 5.3.6 Hydraulic oil, page 314)		
☐		■	❍	❍	❍	250h		Checking and cleaning the magnetic rod on the hydraulic tank		
				❍	❍			Change the hydraulic tank return suction filter insert		
					❍			Changing the hydraulic tank bleeder filter		
				❍	❍			Lubricate the pilot control device solenoids, universal joints and tappets		

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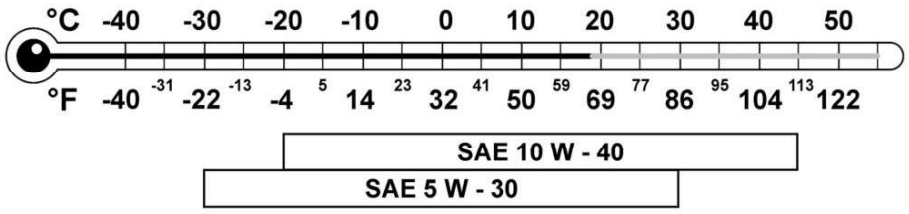

Fig. 467: Selection of the SAE class according to temperature

The following diesel engine oil is recommended for ambient temperatures from -20 °C to 45 °C:

Liebherr Motoroil 10W-40, specification ACEA E4

Liebherr Motoroil 10W-40 low ash, specification ACEA E4, E6, E7

The following diesel engine oil is recommended for ambient temperatures from -30 °C to 30 °C:

Liebherr Motoroil 5W-30, specification ACEA E4, E7

Lubricating oil change intervals

Changing intervals: (For more information see: 5.1 Maintenance and inspection schedule, page 299)

Change the oil according to the climate zone, sulphur content in the fuel and oil quality as shown in the following table.

Even if the specified number of service hours (h) is not reached in the course of a year, the engine oil and filter should be replaced at least once a year.

Various **complicating factors** (harsh operating conditions) can affect the maintenance interval.

Possible complicating factors are:
– Frequent cold-starts
– Sulphur content in the fuel
– Operating temperature

If complicating factors do play a role, the oil must be changed and the filter replaced in accordance with the specifications in the following table.

Complicating factor		**Oil quality**	
		CH-4, CI-4	E4, E7 [B)]
Operating conditions	**Sulphur content in the fuel**	**Interval** [A)]	
Normal climate down to -10 °C	up to 0.5%	250 h	500 h
	over 0.5% to 1%	125 h	250 h
below -10 °C	up to 0.5%	125 h	250 h

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Minimum quality requirements

Lubrication greases must fulfil the following minimum quality requirements.

Application	Specification	Designation
Standard	Soap-based (lithium complex)	KP 2 K (DIN 51502)
		NLGI grade: 2 (DIN 51818)
		VKA weld load: ≥ 6000 N (DIN 51350 / 4 – ASTM D 2596)
Cryogenic temperature	Soap-based (lithium complex)	KP 1 K (DIN 51502)
		NLGI grade: 1 (DIN 51818 / ASTM D 2596)
		VKA weld load: ≥ 5500 N (DIN 51350 / 4 – ASTM D 2596)

Tab. 45

Liebherr lubrication grease

Liebherr recommends the following lubrication greases to achieve optimum lubrication results and for additional corrosion protection.

Application	Recommended lubricant	Specification	Designation
Standard	Liebherr Universalfett 9900	Soap-based (lithium complex)	KPF 2 N - 25 (DIN 51502)
			NLGI grade: 2 (DIN 51818)
			VKA weld load: ≥ 6000 N (DIN 51350 / 4)
			with vapour phase anti-corrosion agent
Cryogenic temperature	Liebherr Universalfett Arctic	Soap-based (lithium complex)	KPFHC 1 N - 60 (DIN 51502)
			NLGI grade: 1 (DIN 51818)
			VKA weld load: ≥ 5500 N (DIN 51350 / 4)

Tab. 46

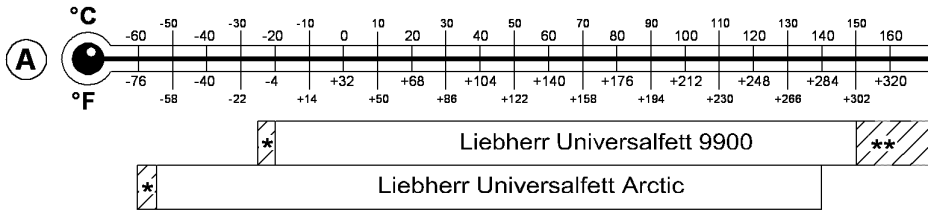

Fig. 476: Operating temperature of Liebherr lubrication greases

A Temperature of the lubrication grease

* Not when used in central lubrication systems

** Brief temperature peaks up to a maximum of 200 °C may occur.

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5.5.6 Replacing VCI capsules

This equipment is optional.

If you replace VCI capsules:

▶ See separate instruction manuals “Using salt and artificial fertiliser” or “Corrosion protection system for fittings and electrical contacts”.

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▶ Operate the hand pump **2**.

When fuel flows out of the bleeder screw without bubbles:
▶ Tighten the bleeder screw **1**.

▶ Continue to operate the hand pump until you feel strong resistance.

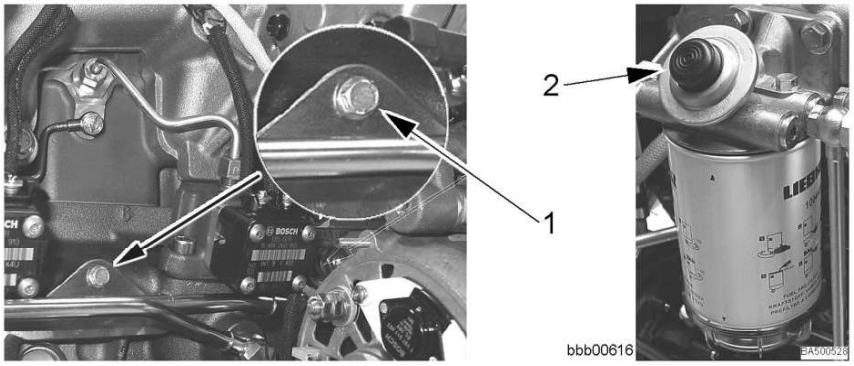

Fig. 502: Bleeder screw on the crankcase

▶ Unscrew the bleeder screw **1** on the crankcase (if present) by 2 to 3 revolutions.

▶ Operate the hand pump **2**.

When fuel flows out of the bleeder screw without bubbles:
▶ Tighten the bleeder screw **1**.

▶ Continue to operate the hand pump until you feel strong resistance.

Bleeding the fuel filter with the engine bleeding function

It is necessary when the fuel tank has run completely empty.

When the fuel tank is empty there is air in the fuel system.

You can remove some of the air from the fuel system by bleeding the fuel filter.

You can bleed the air between the injection pump and the injection nozzle by activating engine bleeding mode.

or

Procedure

DANGER
There is a risk of fire and explosions.

▶ Do not smoke.

▶ Avoid naked flames.

▶ Only work with the engine switched off and cooled down.

▶ Bleed the fuel filter (For more information see: Bleeding the fuel filter, page 340)

▶ Activate the engine bleeding function on the control unit or the display unit.

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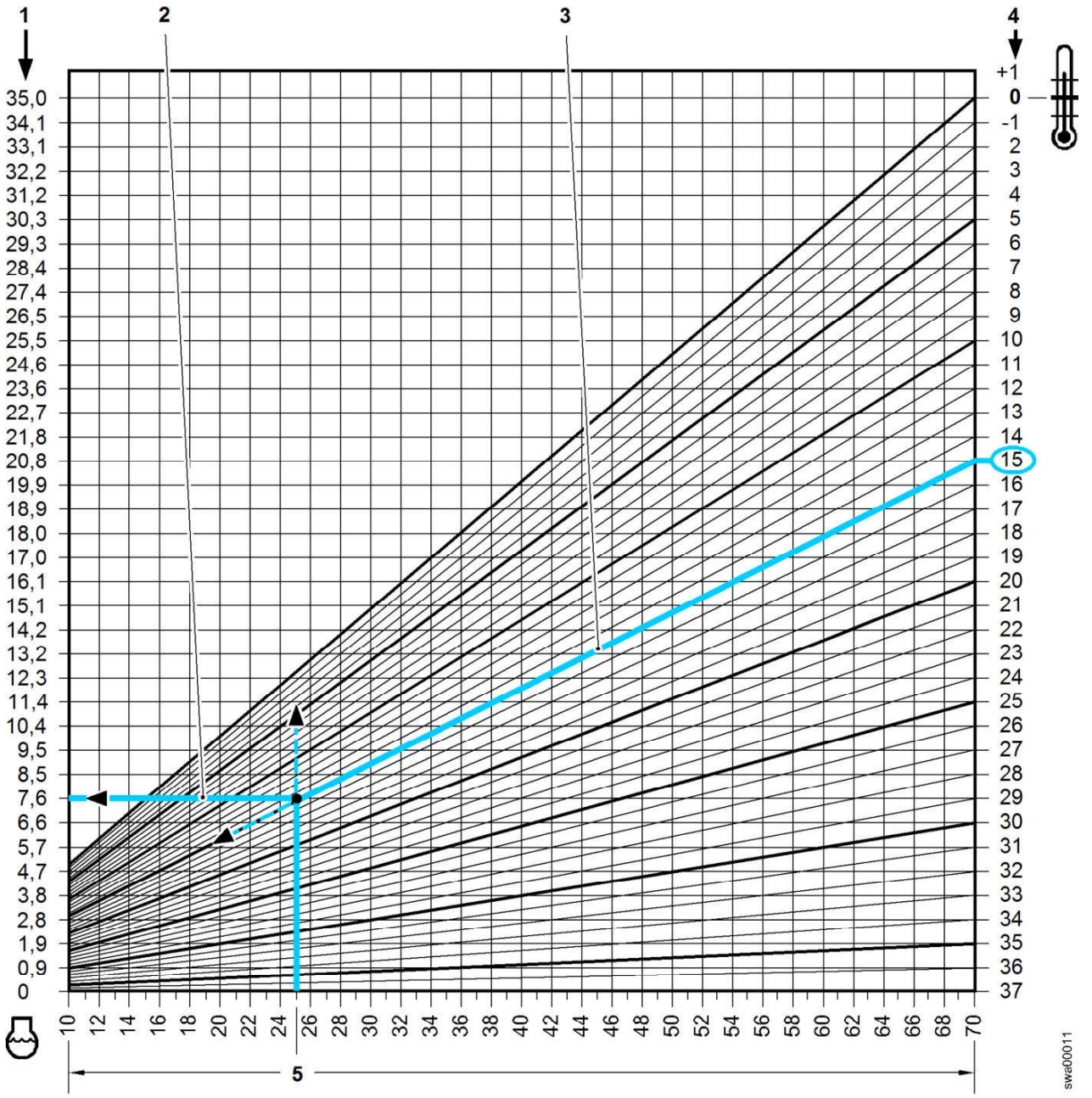

Fig. 514: Selection for antifreeze concentration

1 Amount of pure antifreeze to be added in litres

2 Identified line - top-up quantity

3 Guide line(s) - example -15 °C

4 Measured coolant freezing point in °C

5 Total capacity of cooling system in litres (example 25 litres)

Example procedure

Assumption:
25 litres total filling quantity of the cooling system
-15 °C coolant temperature, measured in the cooling system

▶ In the diagram, go to the line showing the overall cooling system capacity **5** at 25 litres and follow it upwards.

5.11 Steering system

5.11.1 Testing the steering

Make sure that:
- ❑ The working attachment is in the transport position
- ❑ The articulation lock is open
- ❑ There is enough space to test the steering

Procedure

CAUTION
Beware of accidents

- ▶ Do not allow anyone into the danger area while the test is being conducted.
- ▶ Perform the test on level ground with no obstacles.

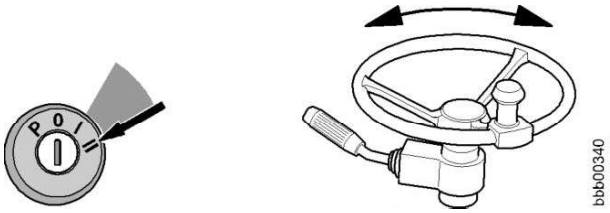

Fig. 527

- ▶ Start the engine.
- ▶ Without moving the machine, turn the steering in both directions and check that it is functioning properly.

5.11.2 Lubricating the bearing points on the steering cylinders

Make sure that:
- ❑ The machine is in maintenance position 1.
- ❑ The articulation lock is engaged if possible.

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5.16 Machine frame and ballast weight

5.16.1 Lubricating the articulated bearing and the rear oscillating bearing

Make sure that:
- ❑ The machine is in maintenance position 1.
- ❑ The articulation lock is engaged.

Lubricating the articulation bearing

Procedure

Articulation bearing lubrication points

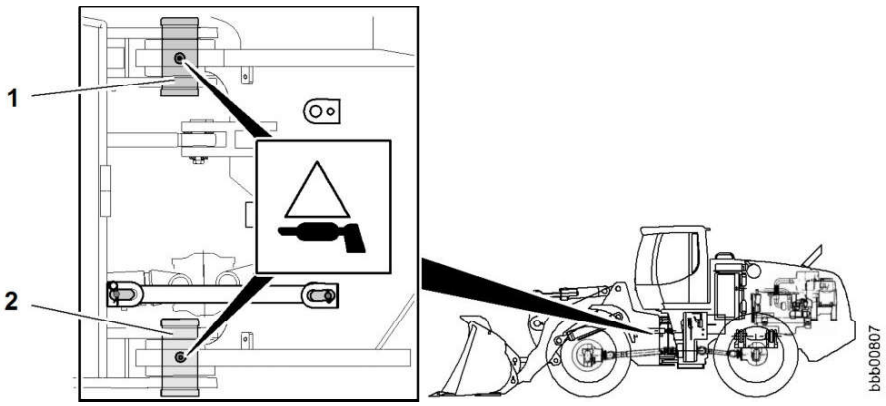

Fig. 538: Articulation bearing lubrication points

1 Top articulation bearing **2** Bottom articulation bearing

▶ Lubricate the articulation bearing lubrication points.

Lubricating the rear oscillating bearing

Procedure

Lubricating points on the rear oscillating bearing

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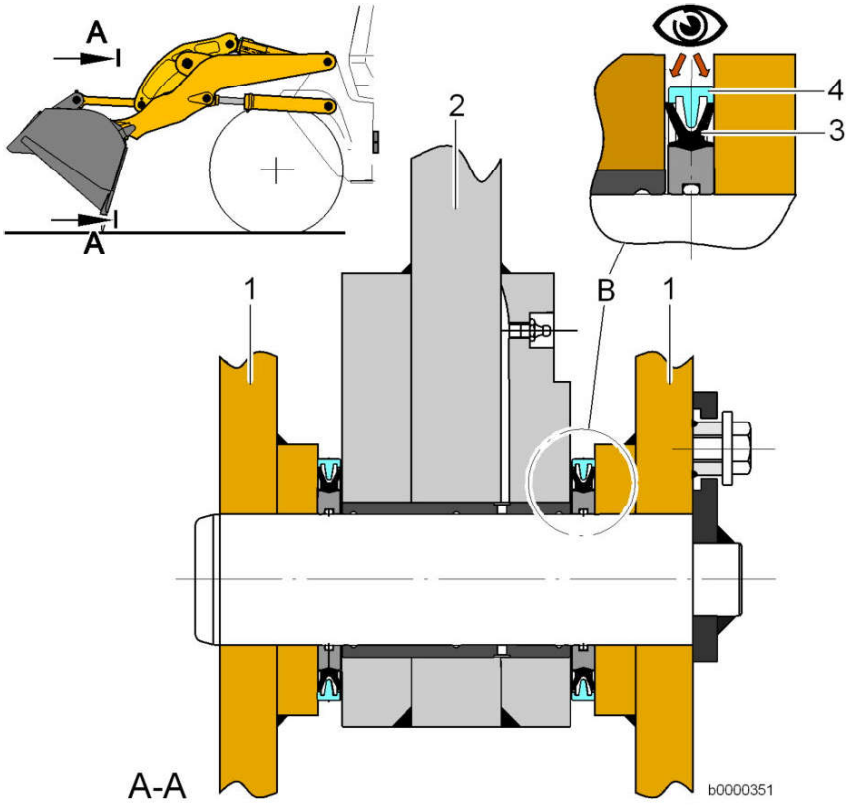

Fig. 557: Checking the bucket bearing seal

1 Bucket bearing plate
2 Bucket arm
3 Sealing lips
4 Dirt guard
B Bucket bearing seal

▶ Clean the bucket bearing seal **B** using a steam jet.

▶ Visually check whether the sealing lips **3** touch the sides of the bucket arm **2** and bucket bearing plate **1**.

Replace the bucket bearing seal if:
– The bucket bearing seal **B** is damaged
– The sealing lips **3** do not touch the bucket bearing plate **1**
– The sealing lips **3** do not touch the bucket arm **2**

Note
Replace the bucket bearing seal.

▶ Contact LIEBHERR CUSTOMER SERVICE.

Checking the bearing bushings for wear

Dirt or insufficient lubrication causes wear on the bearing bushings. Wear is recognisable through increased play between the pin and bearing bushing or through loud noises. Replace the bearing bushings in good time to prevent damage to the bucket arms.

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