en **Operator's manual**

Wheel loader

L 566-460

From serial number 35715

Document ID

ORIGINAL OPERATOR'S MANUAL

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Contents

LBH/11696293/04/09-2014/en

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

LBH/116962293/04/09-2014/en

1.2.19 Snow chains or guard chains


bpik0044

This equipment is optional.

When snow chains or guard chains are used, they must be attached to all four wheels.

Note
Failure to do this can damage the drive system.

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

If chains are attached to the tyres, 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)

1.2.20 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)


bpik0039

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.

LBH/11696293/04/09-2014/en

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.

Tab. 13

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.

Tab. 14

2.1.1 Further markings

	**Note**	indicates useful tips and information.

Tab. 15

LBH/11696293/04/09-2014/en

– (For more information see: 1.2.5 Travel drive, page 23)

Fire extinguisher sign

This equipment is optional.

Fig. 54: Fire extinguisher sign

Indicates that there is a fire extinguisher in the cab.

Working hydraulics sign

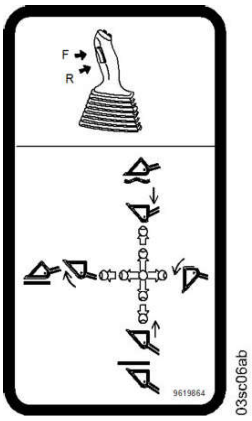

Fig. 55: Working hydraulics sign

It indicates the actuating directions of the control lever.

Bearing load table sign

This equipment is optional.

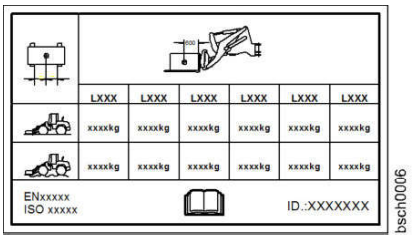

Fig. 56: Bearing load table sign

Indicates the maximum permissible load in forklift operation.

13. Before starting maintenance or repairs, clean any oil, fuel or service fluids from the machine, especially connections and bolted joints. Do not use abrasive cleaning agents. Use fibre-free cloths.
14. Before welding, burning and sanding, clean any dust from the machine and the area around it, and ensure adequate ventilation.
    Otherwise there is a risk of **"Explosion"** !
15. Before cleaning the machine with water, steam jet (high-pressure cleaner) or other cleaning agents, cover or tape up all openings where water, steam and cleaning agent may not penetrate for safety reasons.
    Electric motors, control cabinets and battery compartments are at particular risk.

    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, as otherwise you may cause fires or explosions.
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.

LBH/11696293/04/09-2014/en

3.2 Handling

3.2.1 Battery main switch

You must turn on the battery main switch before you can start the machine.

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

Turning on the battery main switch

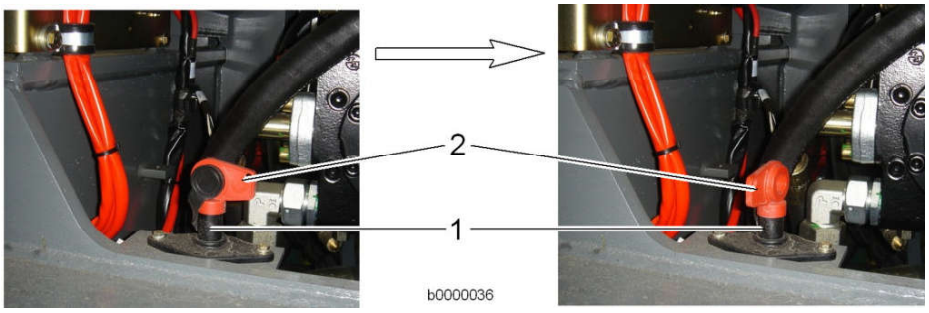

Fig. 65: Turning on the battery main switch

1 Battery main switch **2** Key

▶ Switch on the battery main switch **1** using the key **2**.

3.2.2 Articulation lock

The articulation lock creates a rigid connection between the front and rear sections. Steering is no longer possible.

WARNING
Persons can become trapped in the articulation area.

▶ Only engage or release the articulation lock when the engine is switched off.

▶ Adjust the driver's seat horizontally.

▶ Let go of the lever **1**.

3.2.7 Driver's seat with pneumatic suspension

This equipment is optional.

The ergonomically designed driver's seat offers a high degree of comfort.

The adjustable seat surface, back rest, suspension and arm rest mean that the driver can adjust the seat for maximum individual comfort.

Shock absorption:
- The seat installed in the machine complies with ISO 7096.
- When the machine is used correctly, the vibrations transmitted by the driver's seat are less than or equal to the vibrations simulated in test conditions for the corresponding machine class in accordance with ISO 7096 class EM3.
- The vibration acceleration values (a_{zw}) are measured in accordance with ISO 2631, Part 1, and thus meet the standards for protection against overall body vibrations in EN 474-1.

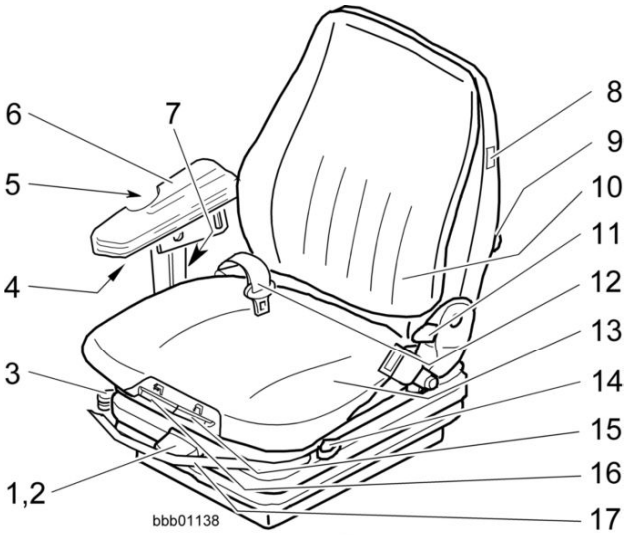

Fig. 84: Main components and adjustable elements of the driver' seat

1	Lever for adjusting body weight	**10**	Back rest
2	Lever for adjusting seat height	**11**	Lever for back rest inclination adjustment
3	Lever for adjusting suspension	**12**	Seat belt
4	Locking screw for arm rest horizontal adjustment	**13**	Seat surface
5	Locking screw for arm rest inclination adjustment	**14**	Lever for horizontal seat suspension
6	Arm rest	**15**	Lever for seat surface inclination adjustment
7	Locking screw for arm rest height adjustment	**16**	Lever for seat surface horizontal adjustment
8	Seat heating switch (optional)	**17**	Lever for driver's seat horizontal adjustment
9	Lumbar support knob		

LBH/11696293/04/09-2014/en

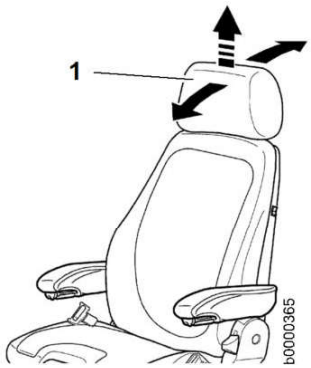

Fig. 102: Adjusting the head rest

1 Head rest

▶ Adjust the inclination and height of the head rest **1** by pulling or pushing it.

▶ To remove the head rest **1**, pull it sharply past the end limit.

Activating and deactivating the seat heating and seat climate control

The active seat climate control allows the driver to stay cool and dry.

Fig. 103: Activating and deactivating the seat heating and seat climate control

1 Seat heating ON
0 Seat heating and seat air conditioning OFF
2 Seat air conditioning ON

To activate the seat heating:

▶ Move the switch to seat heating ON **1**.
▷ The seat heating is activated.

To activate the seat climate control:

▶ Move the switch to seat air conditioning ON **2**.
▷ The seat climate control is switched on.

To deactivate the seat heating and seat climate control:

▶ Move the switch to seat heating and seat air conditioning OFF **0**.
▷ The seat heating and seat climate control is deactivated.

Adjusting the lumbar support

The lumbar support improves seat comfort and can be individually adapted by adjusting the bulge in the top and bottom of the back upholstery.

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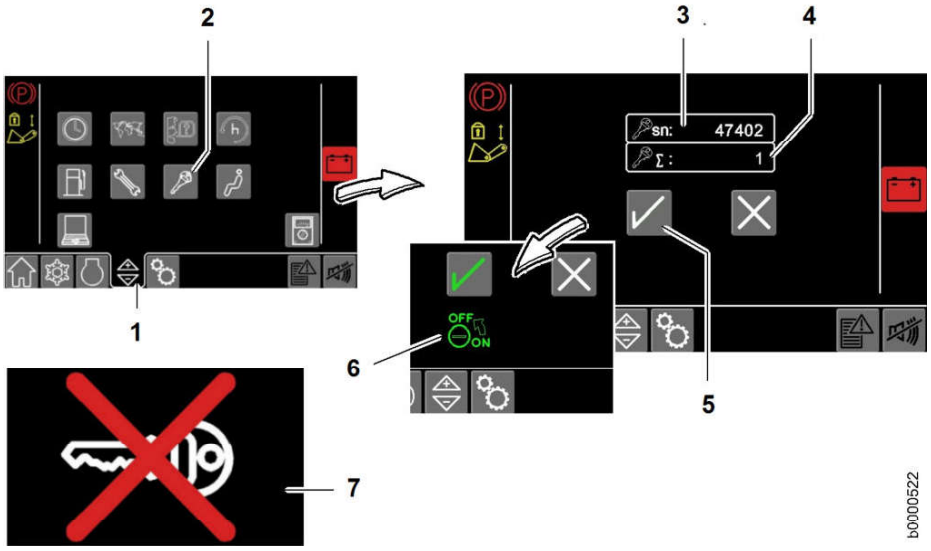


Fig. 119: Programming new starting keys

1 *Settings* switching button
2 *Electronic driver interlock* button
3 *Master key serial number* display
4 *Number of already programmed keys (incl. master key)* display
5 *Program starting key* button
6 *Switch off ignition* display
7 *Non-programmed key* display

▶ Press button **5**.
▷ Button **5** is green.
▷ The display **6** flashes green.

▶ Switch off the ignition.

▶ Remove the master key.

▶ Switch on the ignition with the new starting key that is yet to be programmed.
▷ When the display **7** disappears the starting key is programmed.

To programme further starting keys the entire process must be repeated:

▶ Switch on the ignition using the starting key.

▶ Press the *Settings* and *Electronic drive interlock* switching buttons to open the display screen.

▶ Press button **5**.
▷ Button **5** is green.
▷ The display **6** flashes green.

▶ Switch off the ignition.

▶ Remove the master key.

▶ Switch on the ignition with the new starting key that is yet to be programmed.
▷ When the display **7** disappears the starting key is programmed.

Deleting programmed starting keys

Only the master key is authorised to delete the starting keys. The delete process deletes **all** starting keys which have been programmed!

Using the master key, switch on the ignition and open the display screen using the switching buttons *Settings* and *Electronic drive interlock*.

LBH/11696293/04/09-2014/en

Switching the interior lighting on and off

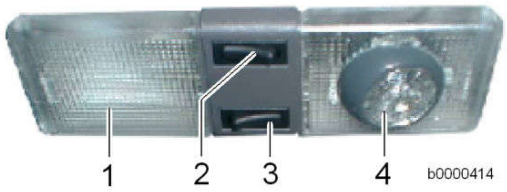


Fig. 132: Interior lighting

1 Interior lighting
2 Interior lighting switch
3 Reading lamp switch
4 Swivel reading lamp

▶ Press the switch **2.**
▷ The interior lighting is switched on or off:

▶ Press the switch **3.**
▷ The reading lamp is switched on or off.

3.2.18 Display unit

The display unit is a touch screen display.

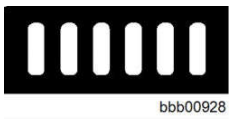
The grey switching buttons are for changing the screens and selecting functions.

The display is divided into the following sections:
– Status symbol indicator
– Warning symbol indicator
– Buttons for switching to the display and operation screens
– Display and operation screens

Fig. 133: Touch screen display

1 *Status symbol* indicator
2 *Warning symbol* indicator
3 *Display and operation screen* switching buttons
4 Display and operation screens

***Selected blower speed* indicator**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– The blower speed is shown on a bar indicator.

Reduce the blower speed


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Switches off the heating and air conditioning system.

Reduces the blower speed.

– 6 blower speeds
– Bar indicator on display
– The status is indicated with LEDs on the button on the control unit

Overview of units

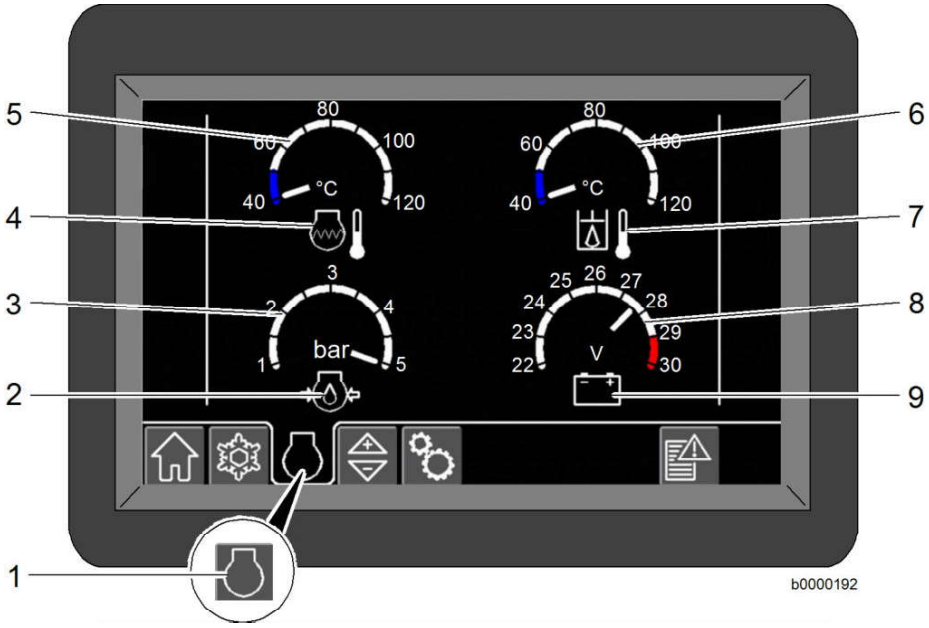

Fig. 182: Overview of units

1 *Overview of units* switching button
2 *Engine oil pressure* symbol
3 *Engine oil pressure* indicator
4 *Coolant temperature* symbol
5 *Coolant temperature* indicator
6 *Hydraulic oil temperature* indicator
7 *Hydraulic oil temperature* symbol
8 *Battery voltage* indicator
9 *Battery* symbol

***Overview of units* switching button**


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For switching to the overview of units display

LBH/11696293/04/09-2014/en

▶ Press the button **1**

Note
Acknowledge the messages (service codes).
When you acknowledge a message, the bar turns from red to yellow

▶ Acknowledge the messages by pressing the text.

▶ If required, contact Liebherr customer service.

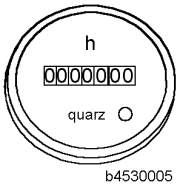
3.2.19 Mechanical hour meter

This equipment is optional.

Fig. 203: Hour meter

The mechanical hour meter **1** is in the instrument panel to the right of the driver's seat.

Machine service hours indicator



Mechanical hour meter

Shows how many hours the machine has been in operation.

The service hours are used as the basis for the maintenance intervals.

LBH/11696293/04/09-2014/en

Note
The memory function of the float position switch is optional.
The setting remains stored after the ignition is switched off.

▶ This means the function is active when the ignition is switched on again.

Rear window heater and mirror heater (optional)

Rear window heater and mirror heater (optional) button

Switches the rear window heater and mirror heater (optional) on and off.

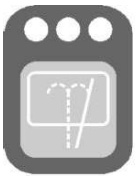
This function is only available when the ignition is on.

When you press the button for the first time:
– Function ON
– All three LEDs on the button light up

When you press the button a second time:
– Function OFF
– All three LEDs on the button go out

The function remains active after it is switched on:
– Until the rear window heater and mirror heater (optional) is switched off
– Or for a maximum 20 minutes (to protect the battery)

Rear windscreen wiper and washer system



Rear windscreen wiper and washer system button

Switches the windscreen wiper and washer system for the rear window on or off.

Press the button once:
– Intermittent wipe
– The LED on the left lights up

Press the button a second time:
– Constant wiping on
– The LEDs on the left and right light up

Press the button a third time:
– Function deactivated
– All the LEDs go out

Hold the button down:
– Rear windscreen washer pump ON
– Rear wiper ON
(Continues wiping for several seconds)

LBH/11696293/04/09-2014/en

Controlling the optional attachment

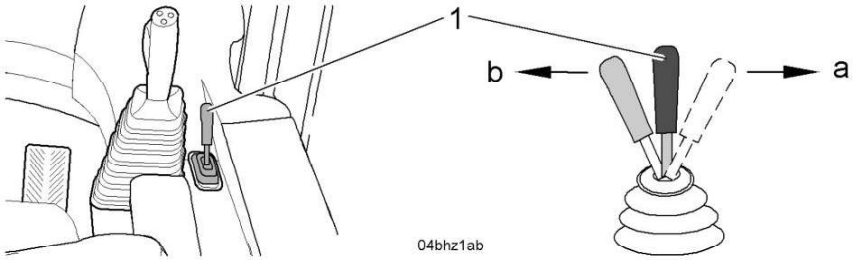


Fig. 254: Directions of movement of the additional control lever

a - Back **b** - Forward

▶ You can control the optional attachment using the additional control lever **1**. Movements of the additional control lever and associated functions:
  ▷ **a -** (function depends on the type of optional equipment attached)
  ▷ **b -** (function depends on the type of optional equipment attached)

Make sure you are familiar with the operation of the additional equipment attached.

▶ (For more information see: 3.3 Operation, page 170) or the operating manual for the additional equipment.

3.2.24 Heater/air conditioner

Switch the heater on or off using the blower speed button.

Note
The air conditioning system can only be activated or deactivated using the display unit.

▶ The full settings for the heating and air conditioning system can be configured using the display unit. (For more information see: Heater/air conditioner, page 118)

You can use the buttons on the control unit to make the following settings:
– Temperature regulation
– Blower speed
– Fresh or recirculated air
– Defrost mode

The selected settings are briefly shown in the display.

LBH/11696293/04/09-2014/en

Other components of the automatic central lubrication system:
- Central lubrication system button (in the driver's cab)
- LEDs for monitoring functions
- One main progressive distributor
- Several secondary progressive distributors
- Motor

Basic function

The LIEBHERR automatic central lubrication system is a progressive system.

It lubricates progressively, i.e. all connected lubricating points in succession.

The central grease pump pumps the lubricant through all the supply lines and through one main and several secondary distributors to the lubrication points.

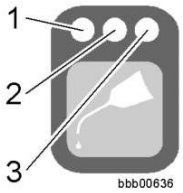
A pressure relief valve monitors the lubrication of all points.

After starting the engine and releasing the parking brake, lubrication is activated.

The connected lubrication points are lubricated at the set intervals.

Lubrication stops when the transparent reservoir is empty.

Function of the LEDs



The functions of the central lubrication system are indicated by the LEDs on the central lubrication system button.

LED 1 - light-duty operation
LED 2 - medium-duty operation
LED 3 - heavy-duty operation

LED	Function
One LED lights up	Mode 1, 2 or 3 has been set
One LED flashes	Pump is lubricated in mode 1, 2 or 3
All 3 LEDs light up	Grease reservoir is empty
All 3 LEDs flash	Fault in the central lubrication system

Tab. 18

Lubrication, cycle and idle times

The main electronics system (MASTER) controls the central lubrication system.

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Putting the working attachment in the starting position

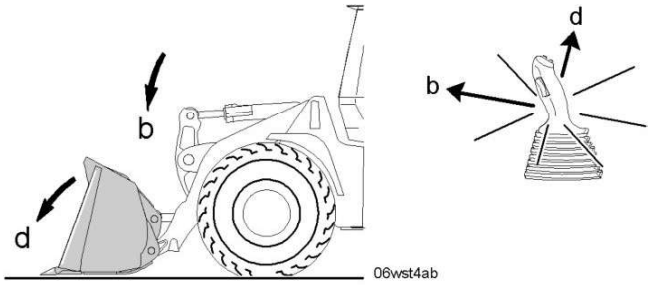

Fig. 287: Starting position

▶ Set the bucket down flat on the ground.

Refuelling with diesel fuel

First make sure that the machine is in its operating position.

Fig. 288: Safety while refuelling

DANGER
There is a risk of fires and explosions.

▶ Do not smoke. Make sure there are no naked lights when refuelling.

▶ Only refuel with the engine switched off.

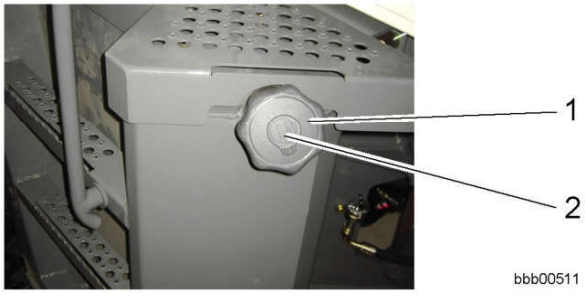

Fig. 289: Fuel tank

1 Tank cap **2** Cap

▶ It is essential to observe the safety regulations for refuelling (For more information see: 2.4.3 Instructions on preventing fires and explosions, page 56) .

▶ Only use clean diesel fuel (For more information see: 5.3.3 Diesel fuels, page 306) .

▶ Carefully clean around the tank cap before taking it off.

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Driving on a steep downhill slope

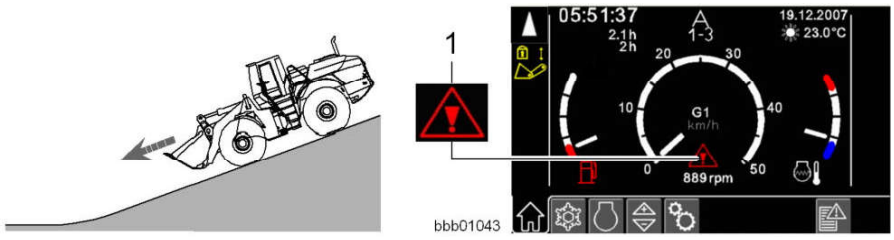

Fig. 311

1 Overspeed protection indicator

When a certain speed is reached in each travel range (forward and reverse), the pump flow of the working hydraulics pump is reduced.

The machine is braked hydrostatically.

If the steep slope causes the machine to greatly exceed the stated maximum speed in each travel range (forwards and reverse), the overspeed protection system is activated.

Overspeed protection functions:
- Protects against excessive output speed
- Protects the engine from overspeed
- Protects from rolling downhill too fast
- Visual and audible response

Overspeed causes the following actions:
- The automatic rear axle brake is activated.
- The warning buzzer sounds for one second.

NOTICE
When driving down a steep slope recklessly or too fast, the diesel engine and the variable displacement motors can overrev.

▶ Do not drive recklessly down steep slopes.

Deliberately reckless driving down slopes means:
- The driver drives downhill too fast.
- The automatic rear axle brake (overspeed) is active for more than 3 seconds due to excess engine speed or travel speed.

Note
If the speed continues to increase due to the steepness of the downhill slope:

▶ Use the brake pedal to reduce the speed.

If driving on a long, steep downhill slope:
▶ First activate kick-down mode. (For more information see: Driving with kick-down shifting, page 181)
  ▷ The machine is automatically hydrostatically braked and the mains electronics (MASTER) switches to first gear (travel range **I**).
  ▷ The machine remains in first gear until you press the gas pedal.

Driving with kick-down shifting

The kick-down function allows temporary manual shifting to first gear.

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Engaging the parking brake

Do not engage the parking brake until the machine has come to a full standstill.

When you engage the parking brake the travel direction is automatically switched to neutral.

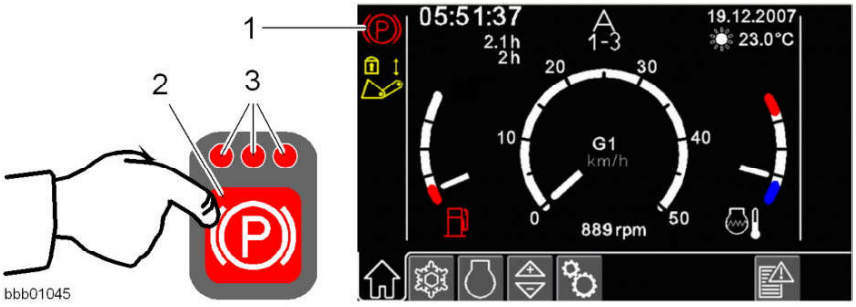

Fig. 334: Control unit

1 Parking brake symbol field
2 Parking brake button
3 LEDs

▶ Activate the parking brake with the button **2**.
▷ All three LEDs **3** on the pressed button flash.
▷ The symbol field **1** for the parking brake lights up.
▷ The parking brake is engaged and the travel direction is switched to neutral.

Locking the working hydraulics

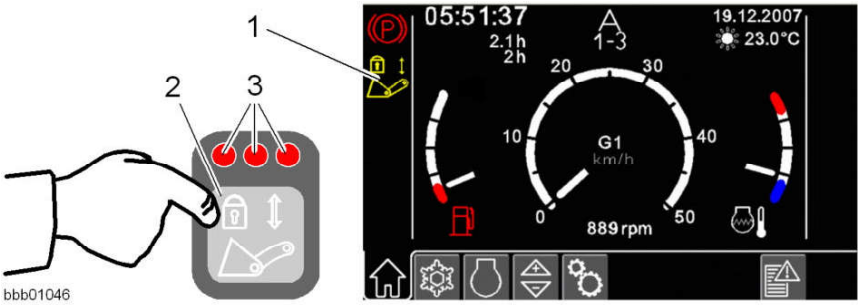

Fig. 335: Control unit

1 Working hydraulics lockout symbol field
2 Working hydraulics lockout button
3 LEDs

▶ Press the button **2** for the working hydraulics lockout to prevent inadvertent activation of the working attachment.
▷ All three LEDs **3** on the pressed button flash.
▷ The symbol field **1** for the working hydraulics lockout lights up.
▷ The working hydraulics are no longer operational.

Securing the machine

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

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Setting the lift kick-out for reduced dumping height

The proximity switch is adjusted at the factory. If necessary, it can be adjusted for a lower dumping height.

Note
To change the factory adjustment to a reduced dumping height:

▶ Contact Liebherr customer service.

Automatic bucket return-to-dig function

The “automatic bucket return-to-dig” function is used for jobs that require a particular digging position time and time again. The factory adjustment of the proximity switched can be changed if necessary.

Note
To change the factory adjustment for the digging position:

▶ Contact Liebherr customer service.

Activating the automatic bucket return-to-dig function

The procedure for activating the automatic bucket return-to-dig function is as follows:

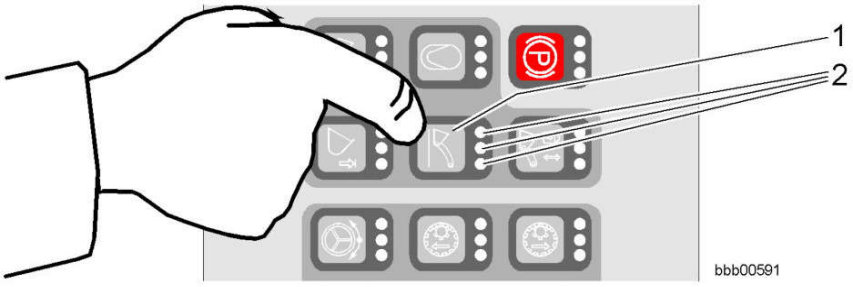

Fig. 357: Control unit

1 Bucket return-to-dig button **2** LEDs

▶ Press the bucket return-to-dig button **1**.
▷ All three LEDs **2** on the pressed button flash.
▷ The automatic bucket return-to-dig function is now activated.

Using the automatic bucket return-to-dig function

Make sure the automatic bucket return-to-dig function is activated.

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For forklift operation with lift arms with P-kinematics:
– This only applies for machines with a P-lift arm attached.
The parallel kinematics permit parallel guidance of the load over the entire lifting range during lifting or lowering.

For forklift operation with lift arms with Z-kinematics:
– Parallel load movement is not guaranteed with lift arms with Z-kinematics.
This means that the attachment tilts in during the lift movement up to 2/3 of the maximum lift height and then tilts out again, but does not tilt down forwards.
– The less favourable lever ratio of the Z-kinematics in the topmost lifting range means that the load bearing capacity may be restricted. (For more information see: 1.2.25 Attachment - forklift, page 37)

Adjusting the prongs on the fork carrier

The fork prongs are attached to the fork carrier and are secured against slipping with the fork lock on the upper fork hook.

Make sure that the following requirements are fulfilled:
❑ The forklift is approx. 10 cm above the floor.
❑ The engine is switched off.

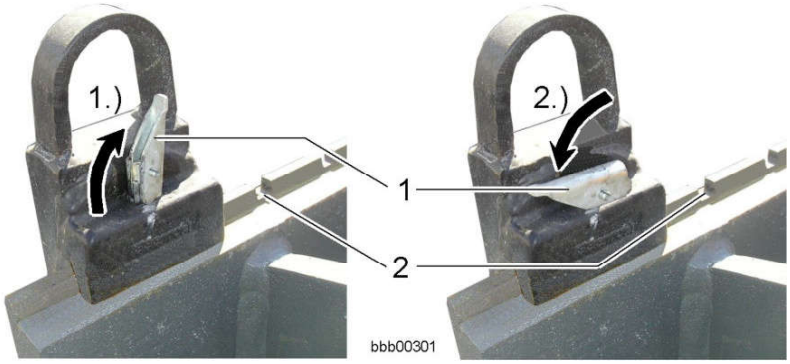

Fig. 369

1 Fork lock
2 Groove
1.) Opening the fork lock
2.) Closing the fork lock

▶ Open the fork lock **1**.

▶ Push the prongs to the correct position.

▶ When closing the fork lock **1** let it latch in the groove **2**.
▷ The prongs are held tight.

Jobs for the forks

WARNING
There is a risk of accidents if the forklift tilts out forward.
If the forklift is not parallel to the ground (0°) in its starting position, it may tilt out forwards.

▶ Avoid incorrect operation during forklift operation.

When lifting in forklift mode, the load is not parallel to the ground.

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3.4.3 Grading work

Keep the bucket base horizontal when grading.

Grading

The following procedure is recommended to avoid any possible loss of traction.

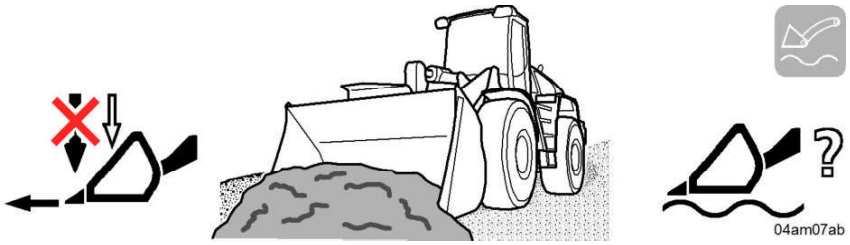

Fig. 383: Procedure for grading

- ▶ Do not work with a strong downwards pressure on the bucket.
  or
  Use the float position function: (For more information see: Float position, page 198)

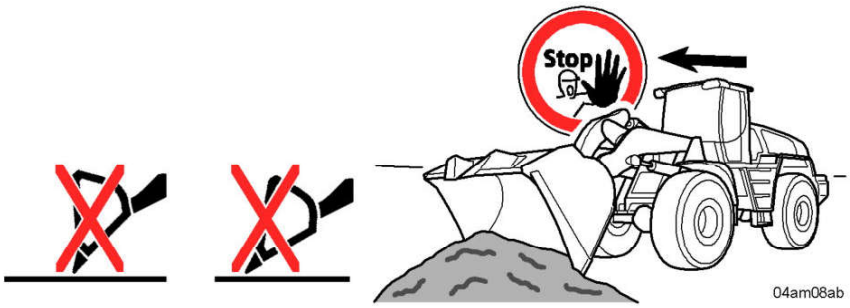

Fig. 384: Impermissible bucket positions

NOTICE
There is a risk of damage to the machine.
The machine may be damaged during grading work if the bucket hits a hard object when it is tipped down while the machine is moving forward.

- ▶ Do not grade in the forward travel direction with the bucket tipped down.

- ▶ Keep the base of the bucket parallel to the ground.
  or
  Gently set the bucket base down.

LBH/11696293/04/09-2014/en

▶ Use the bucket to make a first trench along the side of the pit.

When the first trench is down to a depth of 1 metre:

▶ Start a second trench along the opposite side.

▶ Excavate the area between to the same depth as the two side trenches.

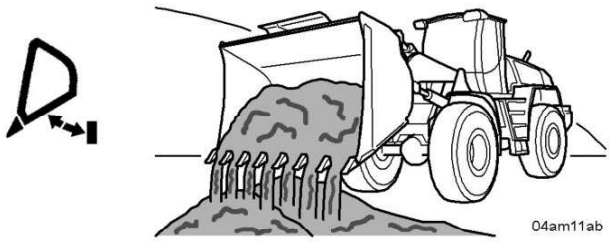

Fig. 405: Heaping material

▶ Heap the material in one corner, leaving the sides of the foundations clear.

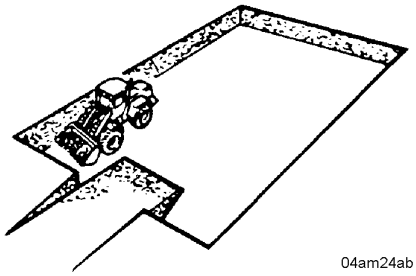

Fig. 406: Pit corner

When the foundations have been excavated to the required depth,

▶ dig out the corners and transport the material out of the pit.

Driving out of the pit

You must make a ramp so that you can drive the machine out of the pit.

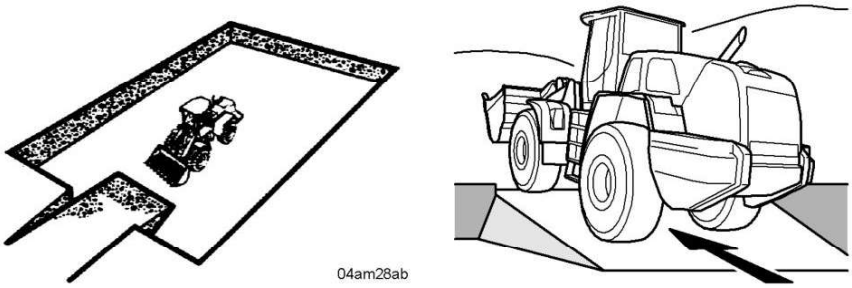

Fig. 407: Exit ramp and transport direction

To make an exit for the machine

▶ Dig out the centre of the ramp.

▶ Keep the loaded bucket low during transport.

▶ Drive forwards out of the pit.

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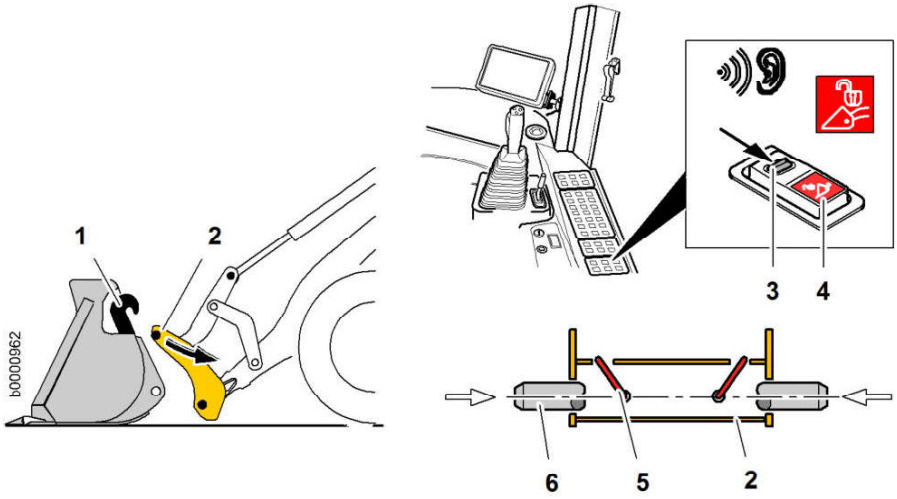

Fig. 418: Unlocking the working attachment

1	Working attachment holder	**4**	*Quick-change device* button
2	Quick-change device	**5**	*Unlocked position indicator*
3	Lockout	**6**	Locking pin

▶ Set down the working attachment flat on firm, even ground.

▶ Secure the working attachment against falling over.

▶ Loosen the activation lock **3** in the direction of the arrow and simultaneously push and hold the front of the button **4**.
  ▷ A warning tone sounds.
  ▷ The locking pins **6** of the quick-change device **2** are retracted.
  ▷ The quick-change device warning symbol appears in the display unit.

When the locking pins are completely retracted:

▶ Release the button **4** again.
  ▷ The working attachment is unlocked.

▶ Carefully move the quick-change device **2** out of the working attachment holder **1**.
  ▷ The working attachment is disconnected.

If you are not going to install a working attachment:

▶ Press the back of the *quick-change device* **4** button.
  ▷ The locking pins for the quick-change device are extended.
  ▷ The warning tone stops.

Mounting the working attachment

Carry out the following steps:
1. Connecting and locking the working attachment
2. Checking that the working attachment is locked
3. Connecting the hydraulic lines[39)]

Connecting and locking the working attachment

Make sure that the quick-change device is completely unlocked.

[39)] If the working attachment has an independent hydraulic supply

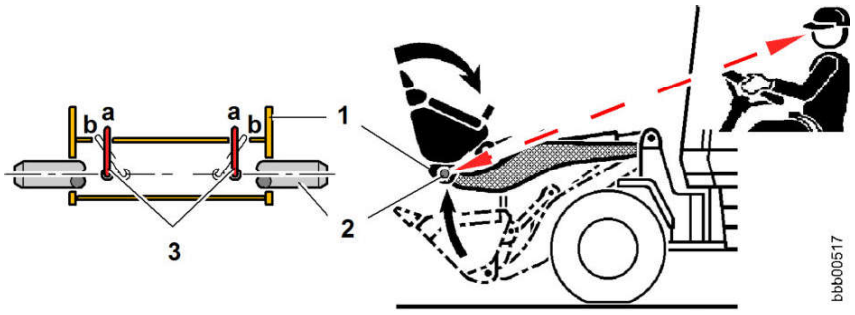

Fig. 430: Visual inspection

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

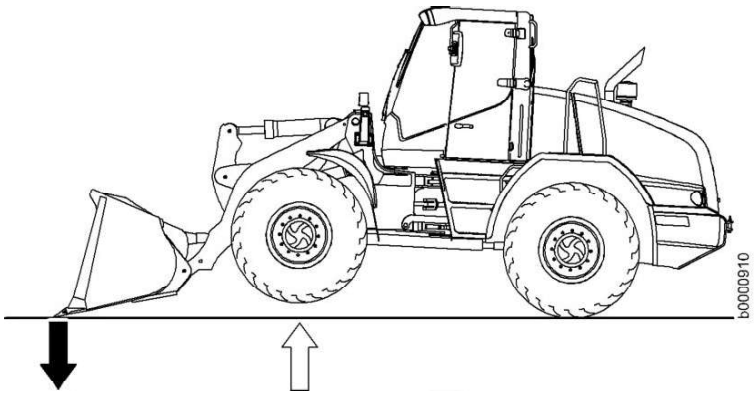

Fig. 431: Mechanical check

▶ 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.

Deactivating the quick-change device

The quick-change device is activated and deactivated by manually actuating the changeover valve using the control lever and comfort control switch.

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Putting the machine in the towing position:

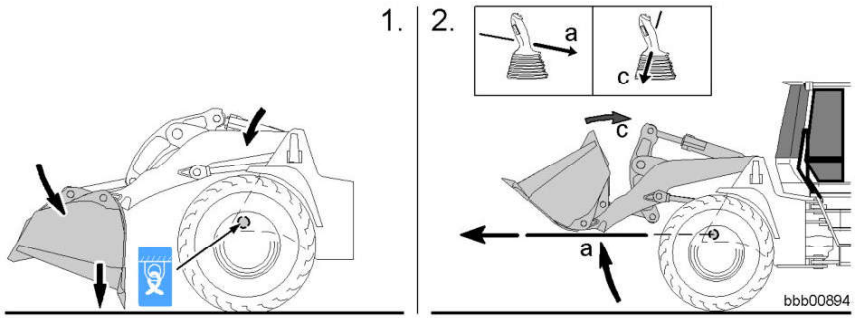

Fig. 445: 1. Maintenance position 2 / 2. Towing position

- ▶ Start the engine.
- ▶ Put the lift arms in maintenance position 2.
- ▶ Feed the two towing ropes through the bore holes in the front section and secure them.
- ▶ Raise the lift arms above the towing drill hole.
- ▶ Tilt in the bucket as far as it will go.
- ▶ Turn off the engine.

Putting all travel functions out of operation:

Fig. 446: Transmission

- ▶ Detach the plug **1** from the powershift section **2** of the transmission **3**.
  - ▷ This disconnects the solenoid valve on the gearbox from the electronics.
  - ▷ The machine's travel functions are now out of operation.

Towing the machine:

- ▶ Start the engine.

LBH/11696293/04/09-2014/en

Servicecode	Effect	Cause	Remedy
M2000	No emergency steering function	Emergency steering pump pressure switch is closed even though the engine is not running	Contact LIEBHERR CUSTOMER SERVICE
M2001	No emergency steering function	Emergency steering pump pressure switch does not switch after the engine starts	Contact LIEBHERR CUSTOMER SERVICE
M2003	No emergency steering function	Emergency steering: pressure switch closed without check	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M2013	The output of the travel pump is reduced	Hydraulic oil too hot: temperatures above 95 °C	Clean the cooling system, contact LIEBHERR CUSTOMER SERVICE
M2016	Brake system accumulator pressure switch H19 lights up, after 2 mins the warning beep sounds constantly, travel direction cannot be selected	Brake accumulator pressure: pressure too low	Check fuse F44 - contact LIEBHERR CUSTOMER SERVICE
M2017	All three LEDs on the control unit switch light up, central lubrication system does not work	Central lubrication system: electrical fault at output (cable rupture) of grease supply line fault	Check the distributor, grease supply lines and lubrication points, contact LIEBHERR CUSTOMER SERVICE
M2018	Gerotor steering (2in1) is deactivated	Gerotor steering (2 in 1 steering): signal at output does not correspond to the activation (fault current)	Contact LIEBHERR CUSTOMER SERVICE
M201A	The enabled options have no function	Incorrect options enabled	Contact LIEBHERR CUSTOMER SERVICE
M201B	Variable displacement motor 1 (YEP1), variable displacement motor 2 (YEP2), forward travel direction (Y2), reverse travel direction (Y3) do not work	Output module 1 / Bank 4: no power supply. Wiring or fuse defective.	Check fuse F59 - contact LIEBHERR CUSTOMER SERVICE
M201C	Travel directions do not work	Output module 1 / Bank 3: no power supply. Wiring or fuse defective.	Check fuse F60 - contact LIEBHERR CUSTOMER SERVICE
M201D	2in1 Gerotor steering joystick does not work	Output module 2 / Bank 4: no power supply. Wiring or fuse defective.	Check fuse F51 - contact LIEBHERR CUSTOMER SERVICE
M201E	Travel direction (driving with reduced power only) and additional equipment do not work	Output module 2 / Bank 3: no power supply. Wiring or fuse defective.	Check fuse F52 - contact LIEBHERR CUSTOMER SERVICE

LBH/11696293/04/09-2014/en

Servicecode	Effect	Cause	Remedy
M405C	No joystick steering available	Joystick steering safety shut-down: interruption at output	Check fuse F52 - contact LIEBHERR CUSTOMER SERVICE
M405D	No joystick steering available	Joystick steering, left: insufficient current at output	Check fuse F51 - contact LIEBHERR CUSTOMER SERVICE
M405E	No joystick steering available	Joystick steering, left: excessive current at output	Check fuse F51 - contact LIEBHERR CUSTOMER SERVICE
M405F	No joystick steering available	Joystick steering, left: deviation at output	Check fuse F47 - contact LIEBHERR CUSTOMER SERVICE
M4060	No joystick steering available	Joystick steering, right: insufficient current at output	Check fuse F51 - contact LIEBHERR CUSTOMER SERVICE
M4061	No joystick steering available	Joystick steering, right: excessive current at output	Check fuse F51 - contact LIEBHERR CUSTOMER SERVICE
M4062	No joystick steering available	Joystick steering, right: deviation at output	Check fuse F47 - contact LIEBHERR CUSTOMER SERVICE
M4076	Option not available	Direction 1 output signal (3rd control circuit) - electrical fault at output (insufficient current)	Contact LIEBHERR CUSTOMER SERVICE
M4077	Option not available	Direction 1 output signal (3rd control circuit) - electrical fault at output (excessive current)	Contact LIEBHERR CUSTOMER SERVICE
M4078	Option not available	Direction 1 output signal (3rd control circuit) - electrical fault at output (deviation)	Contact LIEBHERR CUSTOMER SERVICE
M4079	Option not available	Direction 1 output signal (3rd control circuit) - electrical fault at output (short circuit)	Contact LIEBHERR CUSTOMER SERVICE
M407A	Option not available	Direction 2 output signal (3rd control circuit) - electrical fault at output (insufficient current)	Contact LIEBHERR CUSTOMER SERVICE
M407B	Option not available	Direction 2 output signal (3rd control circuit) - electrical fault at output (excessive current)	Contact LIEBHERR CUSTOMER SERVICE
M407C	Option not available	Direction 2 output signal (3rd control circuit) - electrical fault at output (deviation)	Contact LIEBHERR CUSTOMER SERVICE
M407D	Option not available	Direction 2 output signal (3rd control circuit) - electrical fault at output (short circuit)	Contact LIEBHERR CUSTOMER SERVICE
M407E	Option not available	Direction 1 output signal (4th control circuit) - electrical fault at output (insufficient current)	Contact LIEBHERR CUSTOMER SERVICE
M407F	Option not available	Direction 1 output signal (4th control circuit) - electrical fault at output (excessive current)	Contact LIEBHERR CUSTOMER SERVICE
M4080	Option not available	Direction 1 output signal (4th control circuit) - electrical fault at output (deviation)	Contact LIEBHERR CUSTOMER SERVICE

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4.3 Problem remedy

4.3.1 Replacing fuses

NOTICE
There is a risk of damaging the electrical system.

▶ In order to prevent damage to the electrical system, only use fuses with the correct rating.

Make sure that:
- ❑ The electrical circuit has been checked before changing the fuse.
- ❑ For safety reasons, after checking the circuit, that the machine's electrical system has been switched off.

WARNING
Danger of electrocution
If you touch live parts you can be electrocuted.

▶ Switch off the machine's electrical system before working on live components.

▶ For safety reasons, turn off the battery main switch.

Mega fuses

If you need to access the fuses:

▶ Open the rear hatch.

▶ Remove the cover of the fuse boxes **6**.

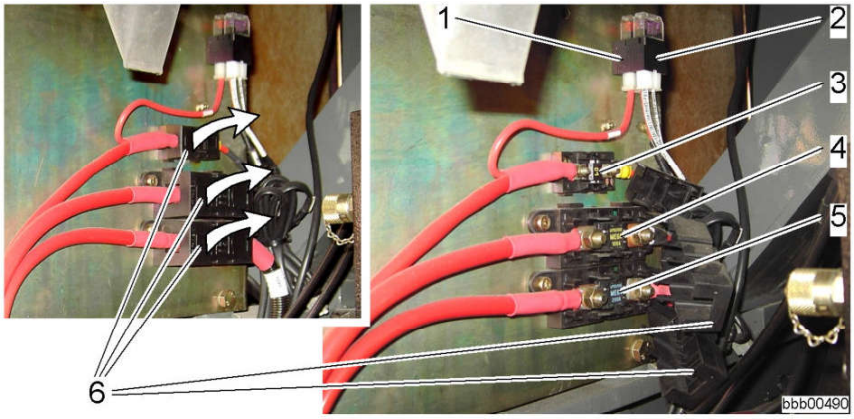

Fig. 461: Main fuse

Fuses 1 to 5 **6** Fuse box cover (removed)

Fuse	Value	Unit	Designation/function	Location
1 - F07	10	A	Hazard warning system	Rear left of engine compartment
2 - F010	5	A	Feedback heating flange	Rear left of engine compartment
3 - F02	100	A	Preglow	Rear left of engine compartment

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5.2 Filling quantities and lubrication chart

Specifications in the quantity column:
- The values stated for the filling quantities in the table are only guidelines.
- The dipstick and level markings are always mandatory.
- Each time the oil is replaced or topped up, check the level in the unit in question.

5.2.1 Recommended lubricants

Description	Recommended lubricant	Symbol	Quantity
Engine (with filter change)	Liebherr Motoroil 10W-40 Liebherr Motoroil 10W-40 low ash Liebherr Motoroil 5W-30	 06sy05ab	43 l
Hydraulic system System capacity Tank capacity	Liebherr Hydraulic Basic 68 Liebherr Hydraulic Basic 100 Liebherr Hydraulic HVI Liebherr Hydraulic Plus	 06sy03ab	 260 l 135 l
Splitter box	Liebherr Gear Basic 90LS Liebherr Syntogear Plus 75W-90 Liebherr Hypoid 85W-140 EP	 06sy08ab	2.5 l
Transmission	Liebherr Hydraulic-Gear ATF 5W-20	 1 06sy14ab	11.5 l
Front axle	Liebherr Gear Basic 90LS	 2 06sy15ab	51 l
Rear axle	Liebherr Gear Basic 90LS	 3 06sy16ab	51 l

Tab. 27: Recommended lubricants

5.2.2 Recommended operating fluids

Description	Recommended operating fluid	Symbol	Quantity
Fuel tank Fuel reserve, approx.	Conventional diesel fuel with sulphur content less than or equal to 0.5 %	 bsym0057	350 l 35 l

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Note
If Liebherr coolant is not available at your location:

▶ Use coolant that meets the “coolant specifications for Liebherr engines” (consult customer service).

NOTICE
Mixing different antifreeze and corrosion inhibitors can degrade the properties of the coolant.

▶ Do not combine different products.

▶ Never mix coolants with and without silicates, as this can damage the cooling system.

Corrosion inhibitors without antifreeze

In **exceptional cases** and if **ambient temperatures constantly remain above freezing point**, for example in tropical regions where there is demonstrably no authorised antifreeze and corrosion inhibitor available, prepare coolant by mixing water with the following inhibitors:

– **DCA 4 Diesel Coolant Additives**
– **Caltex XLI / Delo XLI / Texaco XLI / Havoline XLI**

In this case, change the coolant annually.

When carrying out maintenance tasks, test the concentration and adjust it as necessary.

NOTICE
Mixing different corrosion inhibitors can degrade the properties of the coolant.

▶ Do not combine different products.

▶ Never mix coolants with and without silicates, as this can damage the cooling system.

If changing between corrosion inhibitor with and without antifreeze:
▶ Drain the coolant completely.

Product designation	Manufacturer
DCA 4 Diesel Coolant Additives	Fleetguard / Cummins Filtration
Caltex XLI / Delo XLI	Caltex (Asia)
Texaco XLI / Havoline XLI	Chevron (North and South America)
Havoline XLI	Arteco (Asia and Europe)

Tab. 37: Corrosion inhibitors without antifreeze

5.3.6 Hydraulic oil

The following oils may be used as hydraulic oils according to the following specifications.

Maximum water content of the hydraulic fluid: < 0.1 %

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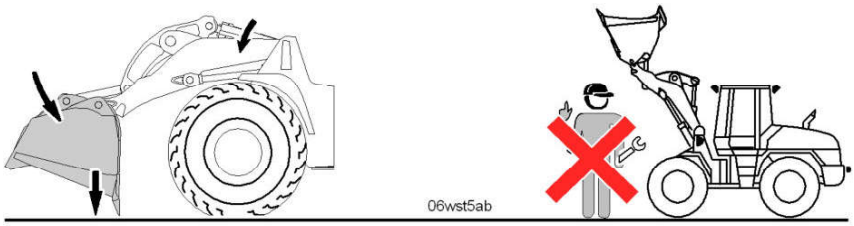

Fig. 484: Maintenance position 2

- ▶ Set the machine down on level ground.
- ▶ Engage the articulation lock.
- ▶ Lower the lift arms.
- ▶ Tilt the bucket out and set it down on the ground on its teeth or cutting edge.
- ▶ Engage the parking brake.
- ▶ Turn off the engine.
- ▶ Take out the starting key.
- ▶ Turn off the battery main switch.

5.4.3 Opening the service hatches, doors and hoods

Opening the engine compartment hatch

Open the hatch if you need to access the following units or components:
– Hydraulic pumps
– Hydraulic tank
– Hydraulic tank shut-off valve
– Air filter
– Battery main switch

Fig. 485: Engine compartment hatch

1 Engine compartment hatch
2 Handle with lock
3 Gas-filled springs

CAUTION
There is a risk of injury if the flap falls shut.

- ▶ Check that the gas-filled springs securely hold the hood fully open.

- ▶ Open the lock with the ignition key.
- ▶ Completely open the hatch **1** with the handle **2**.

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Troubleshooting
Is the oil level between the min. and max. levels?

▶ Correct the oil level.

5.6.4 Checking the engine heating flange

Make sure that:
❑ The machine is in maintenance position 1.
❑ The engine compartment hood is open.
❑ You have an ohmmeter or a multimeter ready.

Procedure

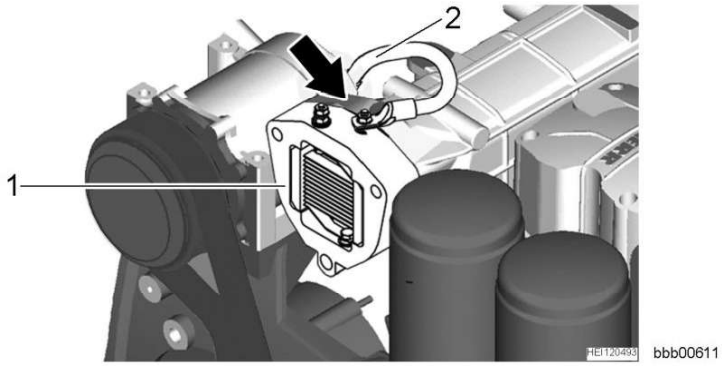

Fig. 497

▶ Turn off the battery main switch.

▶ Disconnect the electric connection cable **2** on the heating flange **1**.

▶ Connect the ohmmeter or multimeter to the terminal and check the resistance.

Troubleshooting
If the resistance is not 0.25 ohm ± 10% at 20 °C:

▶ Replace the heating flange.

▶ Disconnect the electric connection cable on the heating flange.

▶ Turn on the battery main switch

5.6.5 Changing the fuel pre-filter

On the right side of the engine you can find:
– Fuel pre-filter
  with water separator
  with fuel preheating, depending on the equipment of the engine (optional).
– Water level probe
– Integrated fuel hand pump.

Bleeding the water of the fuel prefilter must be conducted after the water level probe activates.

Make sure that:
❑ The machine is in maintenance position 1.

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Procedure

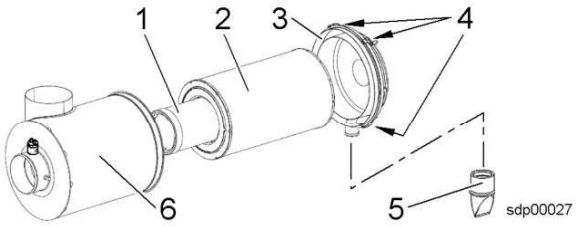

Fig. 509: Air filter

1	Secondary element	**4**	Fixing clips
2	Primary element	**5**	Dust extraction valve
3	Service cap	**6**	Air filter housing

▶ Open the fixing clips **4** on the service cap **3** and take the cap off.

Remove the primary element **2** and the secondary element **1**.
▶ To loosen the seal: pull or twist the elements slightly up, down or sideways.

Make sure that all dirt has been removed from the filter housing
▶ Before you put in a new or cleaned filter element.

▶ The secondary element **1** should be replaced every third time the main filter element **2** is replaced.

Before installing the filter elements, lightly oil the seal surfaces.
▶ (On the primary element **2** this is the inside, on the secondary element **1** it is the outside).

▶ Re-insert filter elements **1** and **2** and make sure that they are correctly fitted.

▶ Clean the service cap **3** and put it on the filter housing with the dust extraction valve **5** facing down.

Only when the lid completely covers the filter housing can you close the fixing clips without excessive force.

▶ Close the fixing clips **4**.

5.6.12 Changing the air filter secondary element

If the air filter contamination symbol field remains lit after the primary element **2** has been serviced then the secondary element **1** must also be replaced.

Change the secondary element:
– After replacing the primary element three times
– Otherwise, at least once a year

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.
❑ The engine compartment hatch is open.
❑ Appropriate protective equipment is used.

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CAUTION
Beware of burns

▶ Do not touch the cooler units until they have cooled down.

▶ Swing out the fuel cooler **3**.

NOTICE
Risk of damage to the cooling system
Careless handling can damage the cooler fins.

▶ Do not use hard objects or excessive water pressure for cleaning.

▶ Clean the cooler units with compressed air, steam or water.

▶ Close the fuel cooler **3** again.

▶ Close the cooling system hood(s) (left/right) again.

5.9.3 Changing the coolant

Use clean, fresh water with a pH value between 6.5 and 8.5 and a low sulphate / chlorine content for preparing the coolant.

The coolant must be prepared outside the cooling system.

Always dispose of any coolant which you have drained off but no longer need, according to the applicable regulations.

Make sure that:
- ❑ The machine is in maintenance position 1.
- ❑ A receptacle with a minimum capacity of at least 25 litres is available for the used coolant, along with a drain hose.
- ❑ The mixing ratio of the new coolant must be correct. (For more information see: 5.9.1 Checking the coolant antifreeze and corrosion inhibitor concentration, page 345)
- ❑ The shut-off valves on the heating hoses are open.

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5.13 Electrical system

Make sure that the following requirements are fulfilled:
- ❑ The machine is parked in a safe place.
- ❑ The electrical system of the machine is switched on.

5.13.1 Checking the indicator lamps

When you turn the ignition switch to the I position, the lamps on the display unit are tested. All symbol fields light up for three seconds.

▶ Check that the symbol fields on the display unit light up.

5.13.2 Checking the lights

All the lights can be tested without starting the machine. The machine only needs to be started when testing the reversing headlights.

WARNING
Beware of accidents when testing the lighting equipment with another person.

▶ Always maintain visual contact with the other person.

▶ Do not allow anyone into the danger area of the machine.

CAUTION
Beware of fires caused by the heat of the working floodlights.

▶ Observe the minimum interval of 1 m to persons and material.

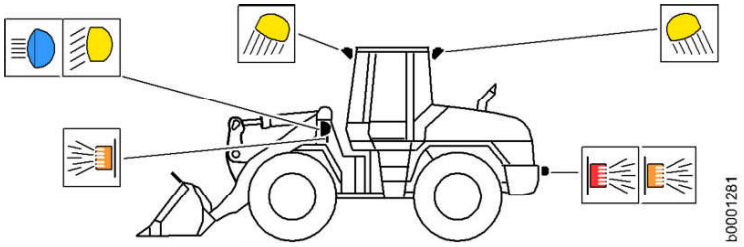

Fig. 534: Checking the lights

▶ Turn on all the lights.

▶ Make a visual inspection.

Checking the reversing headlights

▶ Start the machine.

▶ Select the “reverse” travel direction.

▶ Make a visual inspection.

To adjust lights or replace deflective lamps:
▶ Contact Liebherr customer service.

LBH/11696293/04/09-2014/en

5.18 Cab, heating and air-conditioning

5.18.1 Greasing the cab door hinges

Make sure that the machine is in maintenance position 1.

Procedure

Lubricate the door hinges with a grease gun.

▶ Grease specifications:

5.18.2 Checking / topping up the windscreen washer reservoir

Make sure that the machine is in maintenance position 1.

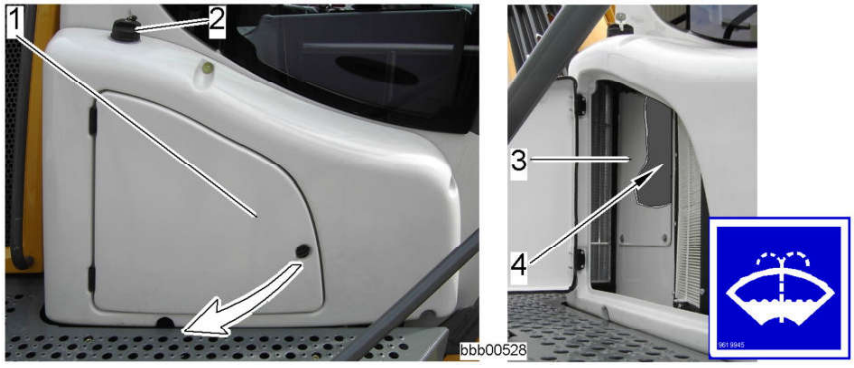

Fig. 551: Windscreen washer fluid reservoir

1	Door	**3**	Cover
2	Reservoir cap	**4**	Windscreen washer fluid reservoir

The reservoir with filling inlet is mounted on the right-hand side of the driver's cab.

The filling quantity is approximately 3.5 litres.

▶ Unlock the cap on the reservoir and take it off.

▶ Top up with standard windscreen washer fluid as necessary.

NOTICE

Ice can damage the windscreen wiper and washer system.
Icing up can damage the windscreen wiper and washer system and cause it to fail.

▶ You must protect the windscreen wiper and washer system using antifreeze.

▶ Use commercially available windscreen antifreeze.

▶ Top up with an appropriate quantity of antifreeze before the winter starts.

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NOTICE
There is a risk of damaging electrical devices.
When using a high-pressure cleaner, you may damage electrical devices such as the emergency steering pump, refuelling pump, sensors and electrical components in the cab.

▶ Do not expose electrical devices to water or steam jets.

▶ Wash the machine.

▶ Regrease all lubrication points on the machine.

Cleaning the engine

When washing the engine using water or steam jet, take care not to expose electronic devices such as the starter, alternator, sensors and oil pressure switches directly to the jet.

After cleaning, start up the engine to allow it to dry out.

NOTICE
There is a risk of damaging the engine and its electric components.
Moisture penetration can cause corrosion and electrical malfunctions.

▶ Do not expose devices such as the starter, alternator, sensors and oil pressure switches to water or steam jets.

▶ Carefully clean the engine.

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