en **Operator's manual**

Wheel loader

L 586-461

From serial number 39713

Document ID

	ORIGINAL OPERATOR'S MANUAL
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Manufacturer:	Liebherr-Werk Bischofshofen GmbH
Type:	L 586
Type no.:	461
From Serial no.:	39713

Contact

Address:	Liebherr-Werk Bischofshofen GmbH Dr. Hans Liebherr-Straße 4 A – 5500 Bischofshofen

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Description	Unit	Value
Battery voltage	V	12
Battery capacity	Ah	170
Number of batteries	pc.	2
Operating voltage	V	24
Alternator	V / A	28 / 80
Starter	V / kW	24 / 6.6

Battery fastening

When fitting or changing the battery:

Description	Unit	Value
Tightening torque	Nm	40

1.2.5 Travel drive


bpik0029

Continuously variable hydrostatic travel drive

Type “2plus2”:
- Swash plate variable displacement pump and two axial piston motors in a closed circuit with a transmission.
- Forward and reverse travel by switching the flow direction of the variable displacement pump

Control:
- Travel drive controlled by gas pedal and tractive force control pedal (inch pedal).
- The tractive force control pedal facilitates continuous adjustment of tractive or thrust force at full engine speed.
- Forward and reverse travel are selected using the Liebherr control lever.
- The travel ranges are selected using the buttons on the control unit.

Speed data:
- For forward and reverse travel
- With standard tyres

Description	Unit	Value
Travel range 1	km/h	0-8.0
Travel range 2	km/h	0-16.0
Travel range A1-2 (automatic)	km/h	0-16.0
Travel range A1-3 (automatic)	km/h	0-35.0
Travel range A2-3 (automatic)	km/h	0-35.0

1.2.6 Axles


bpik0030

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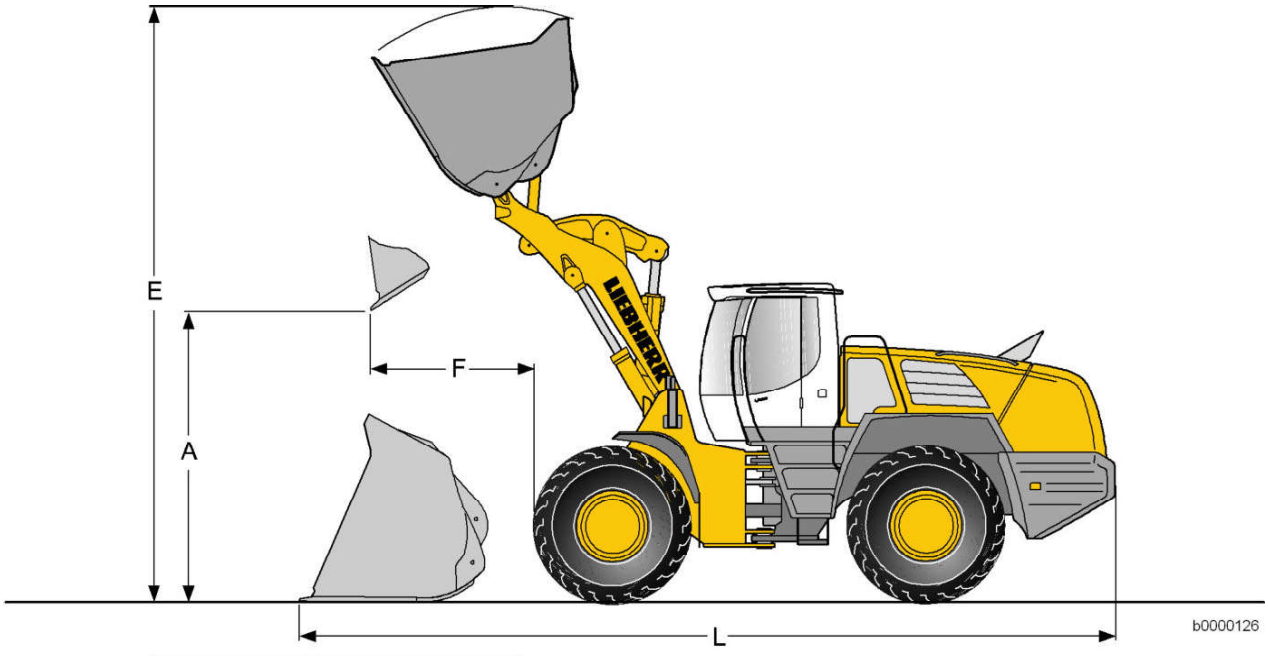

Fig. 20: Attachment - light material bucket

	Designation	Unit	Rating	
	Hydraulic quick-change device		No	No
	Bucket type		A)	A)
	Bucket capacity	m^3	8.5	11.0
	Bucket width	mm	3500	3700
	Specific material weight	t/m^3	1.1	0.8
A	Dump height at maximum lifting height	mm	3115	2940
E	Maximum height above bucket top	mm	6700	6835
F	Reach at maximum lifting height	mm	1525	1770
L	Overall length	mm	9950	10250
	Tipping load when straight	kg	21680	20920
	Tipping load when articulated at 37° (ISO 14397-1)	kg	19445	18690
	Operating weight	kg	31480	32070
	Tyre sizes (For more information see: 1.2.18 Tyres, page 26)		29.5R25 L3	29.5R25 L3

Tab. 7: Light material bucket attachment

A) Light material bucket with undercut blade

1.2.23 Attachment - forklift

The values stated refer to the machine:

- Including all lubricants
- With a full tank
- With ROPS/FOPS cab and driver

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Lubrication chart sign

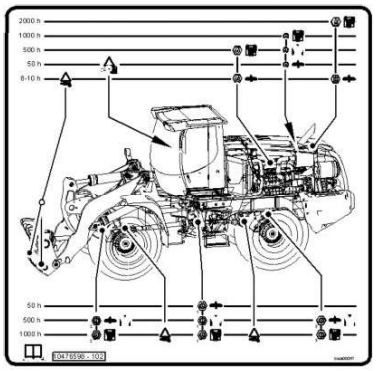

Fig. 38: Lubrication chart sign

Indicates the maintenance points and intervals in relation to lubricants and consumables for the machine.

Wheel lugs sign

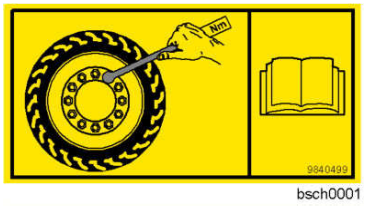

Fig. 39: Wheel lugs sign

Indicates the service interval for checking the tightness of the wheel lugs specified in the operating manual.

ROPS sign

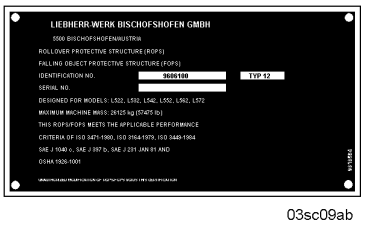

Fig. 40: ROPS sign

States the maximum load of the roll-over protection system.

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4. Make sure the damage is rectified immediately.
5. Ensure that all hoods and covers are closed and locked. Check that all the warning and instruction signs are in place.
6. Clean the windows and interior and exterior mirrors, and secure the doors and windows against inadvertent movement.
7. Make sure no-one is working on or underneath the machine. Warn any bystanders before you start up the machine.
8. After getting into the driver's cab, adjust the seat, the inside and outside mirrors, the control lever and the safety belt so that you can work comfortably.
9. Sound insulation equipment on the machine must be in place during operation.

2.4.5 Safety precautions during start-up

1. Before starting, check that all control lamps and instruments are working properly.
2. Move all control levers to neutral.
3. Before starting the engine, briefly sound the horn to warn anyone else in the vicinity of the machine.
4. Only start the machine when sitting in the driver's seat.
5. Unless otherwise instructed, start the engine in accordance with the instructions in the **operating manual**.
6. Start the engine and then check all display and monitoring equipment.
7. Only run the engine in enclosed spaces when there is sufficient ventilation. If necessary, open the windows and doors to ensure adequate fresh air.
8. Run the engine until both it and the hydraulic oil are at operating temperature. Low oil temperatures lead to sluggish performance.
9. Check that the attachment controls are working properly.
10. Carefully drive the machine to open ground and check the service brake, the steering, the signals and lighting.

2.4.6 Instructions for safe working

1. Before starting work, familiarise yourself with the features of the site, as well as any special regulations and warning signals.
   The working environment includes obstacles in the working area and on access roads, the firmness of the terrain and any protective barriers to prevent the public from entering the site.
2. Always keep a safe distance from overhangs, drops, slopes and unsafe terrain.
3. Be especially careful with variable terrain conditions, poor visibility and changeable weather.
4. Find out where the supply pipes to the site are, and be especially careful when working near them. If necessary, notify the relevant authorities.
5. Keep a safe distance away from overhead power lines.
   When working near overhead power lines, keep the attachment well away from them.
   - There is a risk of **FATAL INJURY**.
   - Find out about the safety clearances to be observed.

   If the machine comes into contact with live power lines:
   - Do not get out of the machine.
   - If possible, move the machine to a safe distance away from the danger area.
   - Warn any bystanders not to approach or touch the machine.
   - Arrange for the power to be switched off.
   - Only get out of the machine when you are sure that the power line you have touched or damaged has been switched off.

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- Avoid reverse travel where at all possible.
- Always try to ensure a direct view: plan the work so that your view of the working area is not blocked.
- Where visibility is restricted or if the visual aids are faulty, always have someone direct you. Agree hand signals and, with difficult tasks, also keep in voice contact (e.g. via radio).
- Use lighting when visibility is poor and as required by regulations.

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– 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.

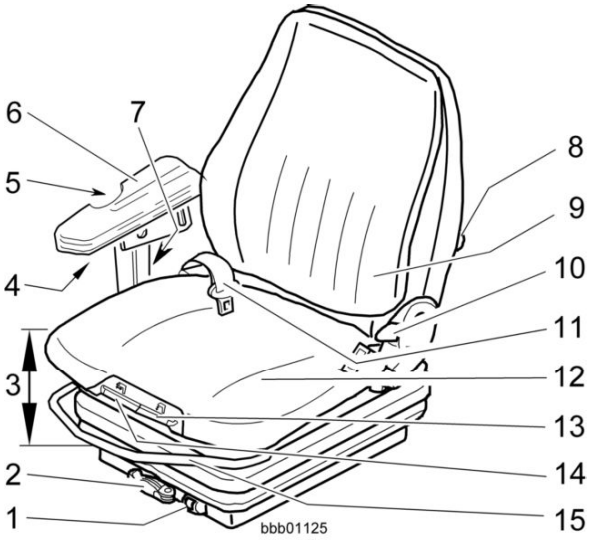

Fig. 70: Main components and adjustable elements of the driver' seat

1	Weight indicator	**9**	Back rest
2	Body weight adjustment knob	**10**	Lever for back rest inclination adjustment
3	Seat height adjuster	**11**	Seat belt
4	Locking screw for arm rest horizontal adjustment	**12**	Seat surface
5	Locking screw for arm rest inclination adjustment	**13**	Lever for seat surface inclination adjustment
6	Arm rest	**14**	Lever for seat surface horizontal adjustment
7	Locking screw for arm rest height adjustment	**15**	Lever for driver's seat horizontal adjustment
8	Lumbar support knob		

Adjusting the driver's seat

The seat can be adjusted to the driver's individual requirements to provide the highest possible degree of comfort.

WARNING
There is a risk of injuries if the driver's seat is not properly adjusted.

▶ Never adjust the driver’s seat when the vehicle is moving.

Adjusting the body weight

The seat suspension can be adjusted to the driver's individual body weight.

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▶ Adjust the driver's seat horizontally.

▶ Let go of the lever **1**.

3.2.8 Driver’s seat with active 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.

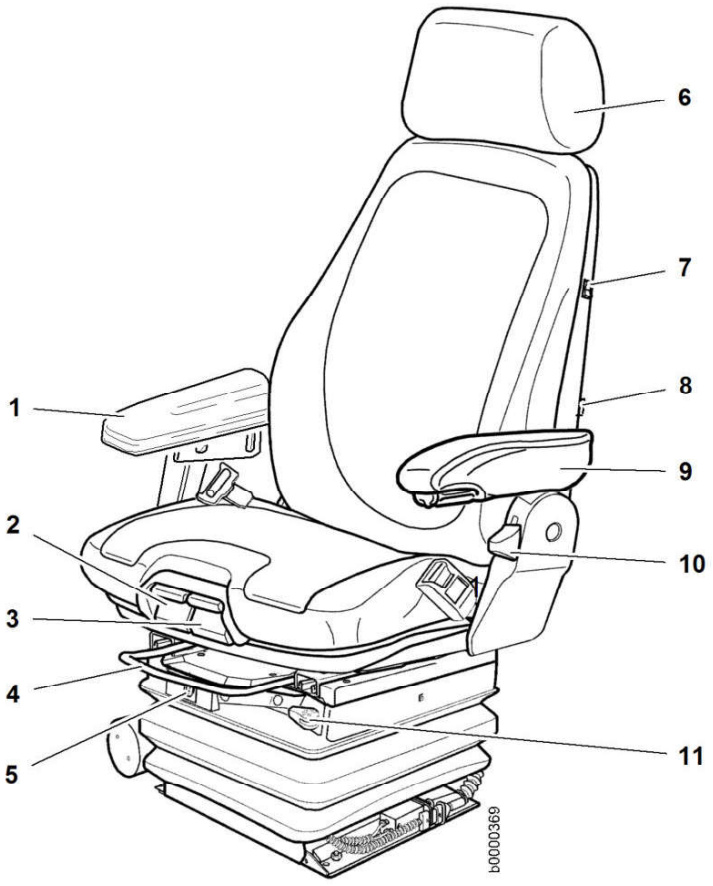

Fig. 91: Main components and adjustable elements of the driver’s seat

1	Right arm rest	**7**	Seat heating and climate control switch
2	Lever for seat surface horizontal adjustment	**8**	Lumbar support adjustment switch

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Adjusting the distance from the steering wheel to your body

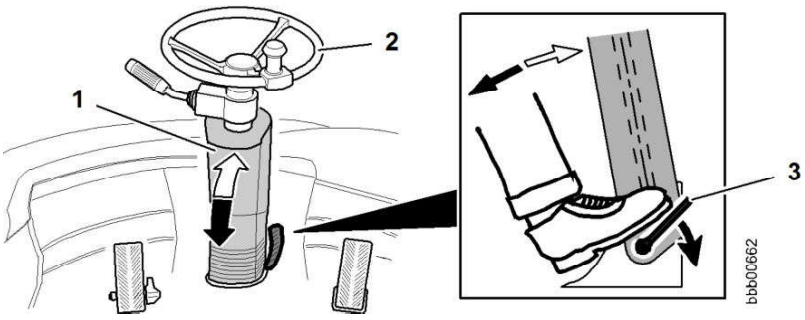

Fig. 107: Adjusting the distance from the steering wheel to your body

1 Steering column
2 Steering wheel
3 Lever

▶ Press down the lever **3** with your foot in the direction of the arrow.
▷ The steering column **1** is unlocked.

▶ Adjust the distance from the steering wheel to the driver's body.

▶ Let go of the lever **3**.
▷ The steering column **1** is locked.

Adjusting the height of the steering wheel

This equipment is optional.

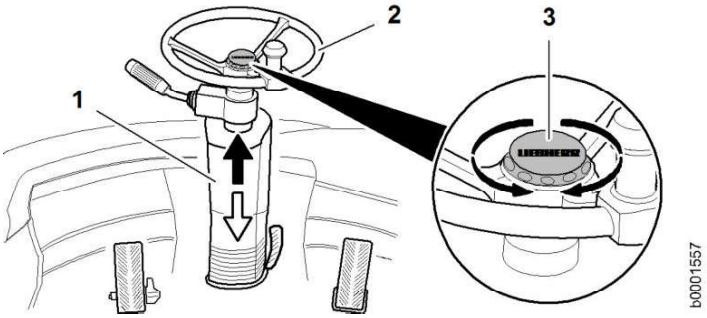

Fig. 108: Adjusting the height of the steering wheel

1 Steering column
2 Steering wheel
3 Steering wheel hub

▶ Loosen the steering wheel hub **3**.
▷ The steering column **1** is unlocked.

▶ Adjust the height of the steering wheel as required.

▶ Tighten the steering wheel hub **3**.
▷ The steering column **1** is locked.

3.2.11 Control panel

The control panel is mounted on the cab floor to the right of the driver's seat.

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3.2.16 Lighting

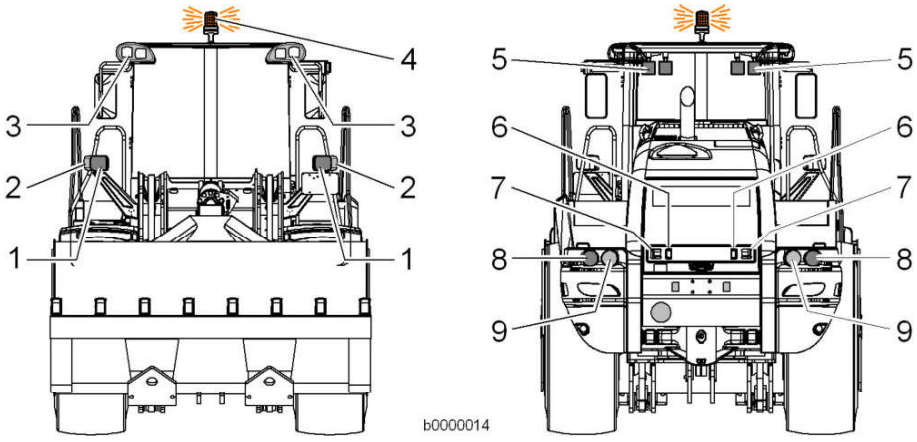

Fig. 121: Lighting

1 Front floodlights
2 Front indicator lights
3 Front working floodlights
4 Flashing beacon (optional)
5 Rear working floodlight (optional)
6 Number plate light (optional)
7 Rear working floodlights
8 Brake lights, tail lights, rear indicator lights
9 Reversing lights

The reversing lights **9** automatically light up when the machine is reversing.

Note
When you leave the driver's cab:

▶ Make sure that you have not left the lights on.

NOTICE
Risk of damage to the battery
If the battery is in a discharged condition over a long period of time (e.g. longer than one month), the battery can no longer be recharged.

▶ Avoid discharging the battery accidentally.

Switching the profile lights, low beam, tail lights and number plate light on and off

The profile lights, tail light and number plate light also work after you take out the ignition key.

Low beam can be switched off when the ignition key is in position **I** or **II**.

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Speed, speed unit

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- Speed indicator
- Selected speed unit (km/h or mph)

Tractive force reduction

b0000173

- Symbol appears if the tractive force is reduced to <100%
- Current setting in %

Engine speed, *engine overspeed* warning symbol

b0000174

- Engine speed (rpm)
- *Engine overspeed* warning symbol
  Flashes red when the engine overspeeds.

Heater/air conditioner

Note
All heater/air conditioner settings can be made using the “switching buttons on the display”.

▶ All settings remain stored after the ignition is switched off.

▶ The “blower speed”, “temperature control”, “fresh and recirculated air” and “defrost mode” settings can be made using the control unit (For more information see: 3.2.24 Heater/air conditioner, page 145) .

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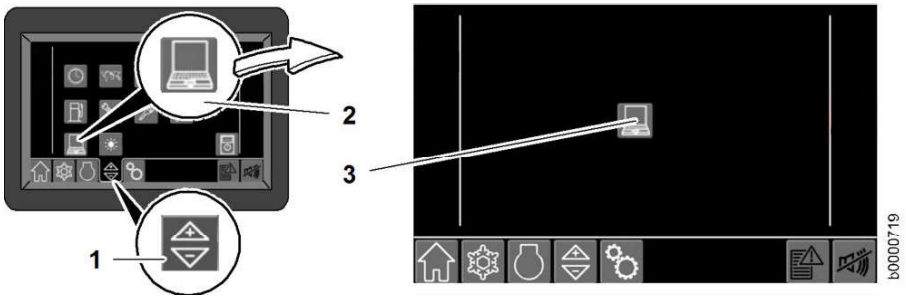

Fig. 190: Driver identification

1 *Settings* switching button
2 Teleservice
3 Permit connection

To operate teleservice:

▶ Contact Liebherr customer service.

Display unit brightness setting

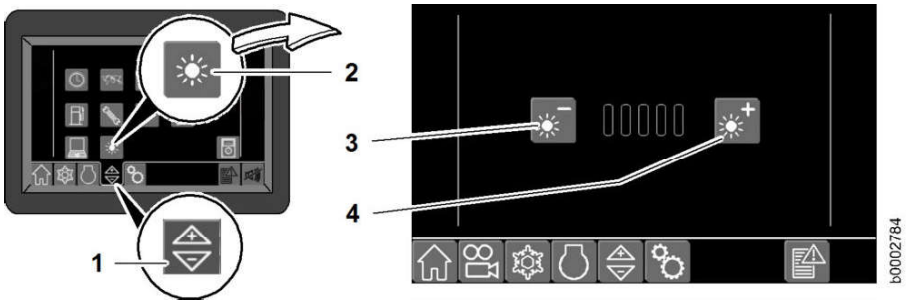

Fig. 191: Display unit brightness setting

1 *Settings* selector button
2 Brightness setting
3 Decrease brightness
4 Increase brightness

Service (display unit brightness control)

Press the *Settings* and *Service* buttons to open the display screen.

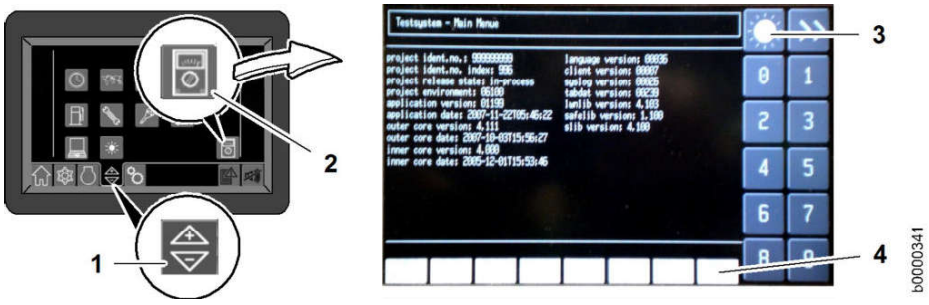

Fig. 192: Service (display unit brightness control)

1 *Settings* switching button
2 Service
3 Brightness control
4 Quit the submenu

The function is used for displaying machine service data and the brightness control of the display unit.

Display unit brightness control:

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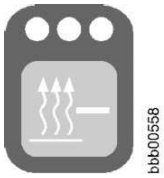
Note
Procedure for bleeding the fuel system using the engine bleeding system.

▶ (For more information see: 5.6.8 Bleeding the fuel system, page 318)

Lowering the temperature



Temperature down button

Reduces the temperature.

– With manual air conditioning, the temperature is adjusted in percentage levels from 0% to 100%.
– With automatic air conditioning, the temperature is adjusted between 16 °C and 28 °C.

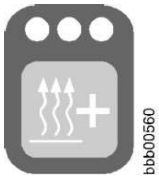
When you press the button, the LEDs light up according to the temperature level.

The selected temperature is shown on the display.

Note
The setting remains stored after the ignition is switched off.

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

Increasing the temperature



Temperature up button

Increases the temperature.

– With manual air conditioning, the temperature is adjusted in percentage levels from 0% to 100%.
– With automatic air conditioning, the temperature is adjusted between 16 °C and 28 °C.

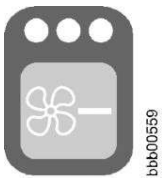
When you press the button, the LEDs light up according to the temperature level.

The selected temperature is shown on the display.

Note
The setting remains stored after the ignition is switched off.

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

Reducing the blower speed



Blower speed down button

For reducing the blower speed on 6 levels.

When you press the button, the LEDs light up according to the blower speed.

The selected blower speed is briefly shown in the display.

At blower speed 0 the air conditioning is switched off.

Note
The setting remains stored after the ignition is switched off.

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

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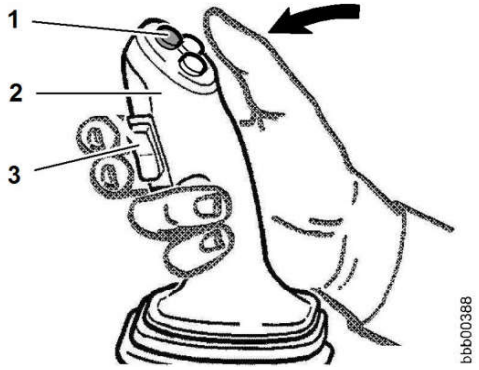

Fig. 242: Control lever

1 Control lever
2 Kick-down button
3 Travel direction switch

Selection procedures for kick-down shifting:

– When you press the button **2**, the machine is automatically hydrostatically braked.
  The gearbox then automatically shifts to “1st gear” (gear 1).
  This means that the transmission is automatically shifted from gear level 3 to 2 and then from 2 to 1.
– When not driving against a resistance, “1st gear” (gear 1) is active for 10 seconds from the time the button **2** is pressed.
  The machine then automatically shifts back to “2nd gear” (gear 2) when the travel speed increases again.
– When driving into the heap of excavation material, “1st gear” (gear 1) remains active as long a resistance is present.

As long as the “kick-down” function is active, the vehicle cannot be driven faster than 8 km/h in 1st gear.

To deactivate the “kick-down” function:

▶ press the switch **3** according to the direction you want to travel in.

Controlling the working attachment

The grip of the control lever is mechanically linked to the pilot control device directly underneath it.

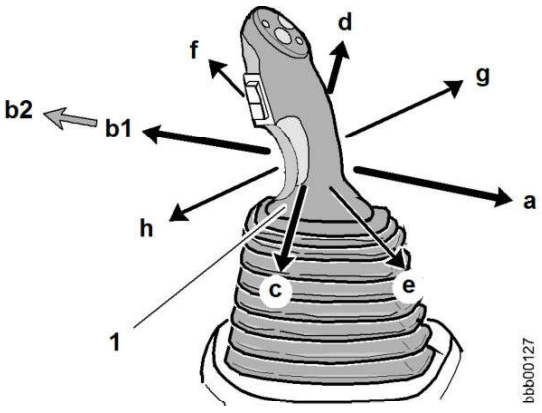

Fig. 243: Directions of movement of the control lever

a Back
c To the left

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Adjusting the sun visor

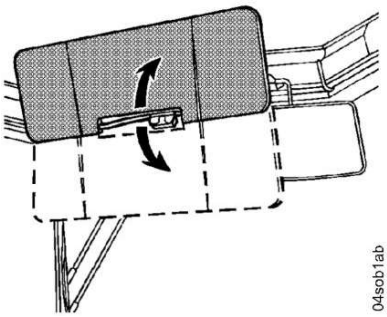

Fig. 258: Adjusting the sun visor

▶ Adjust the sun visor according to your individual requirements by pulling it up or down.

3.2.28 Radio

This equipment is optional.

Switching on and using the radio

The radio also works when the ignition is switched off.

Fig. 259: Using the radio

1 Radio

▶ See the manufacturer's operating manual supplied.

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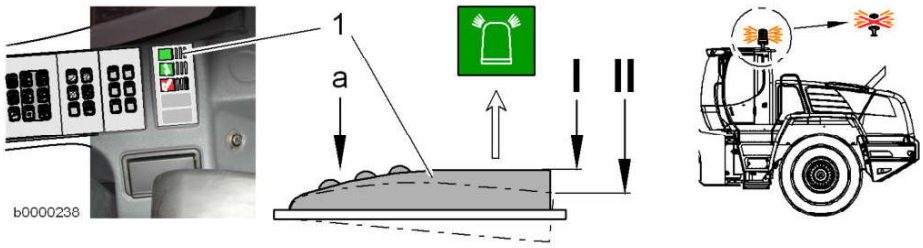

Fig. 276: Flashing beacon on the driver's cab

1	Flashing beacon/back-up alarm switch	**II**	Back-up alarm position
I	Permanently on position	**a**	Off

▶ Move the switch **1** to position **I**.
  ▷ The switch symbol lights up
  ▷ The flashing beacon is always on, whatever the travel direction.

▶ Move the switch **1** to position **II**.
  ▷ The switch symbol lights up
  ▷ The flashing beacon is only active in **R = REVERSE** travel direction.

▶ Move switch **1** to pos. **a**.
  ▷ The switch symbol goes out.
  ▷ The flashing beacon goes out.

Note
Flashing beacon button on the control unit.

▶ Flashing beacon button on the control unit not working.

3.2.32 Reversible fan drive

This equipment is optional.

The fan can be reversed to clean the cooler.

The interval for reversing the fan drive can be adjusted according to the conditions of use and need for cleaning.

The time interval can be set between 5 and 90 minutes.

The default setting for fan reversal is:
– Fan runs for 20 seconds.
– The interval is 30 minutes.

Note
Fan reversal can be operated using the “control unit” and the “display unit”.

▶ For operation using the display unit – (For more information see: 3.2.18 Display unit, page 105)

Setting the fan reversal interval

Make sure that the electrical system of the machine is switched on.

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Releasing the parking brake

When the parking brake is engaged, the travel lockout is active.

The travel direction cannot be preselected.

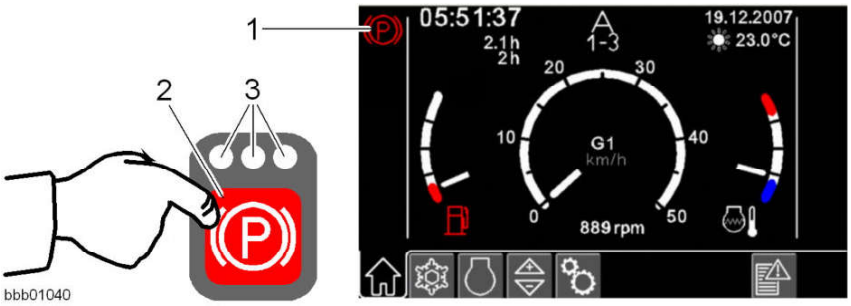

Fig. 293: Releasing the parking brake

1 Parking brake symbol field
2 Parking brake button
3 LEDs

▶ Press the button **2** to release the parking brake.
▷ All 3 LEDs on the button go out.
▷ The symbol field **1** for the parking brake goes out.

Selecting a travel direction

WARNING
Select a travel direction!

▶ When the travel direction is selected, the machine can also pull away without pressing the gas pedal.

This might be the situation after the electrical system is switched on.

The forward or reverse travel direction symbol field flashes:
– When the ignition key is in position **I** or **II**
If the travel direction switch is set to forward or reverse.
– When the ignition key is in position **II**
When the parking brake button has been pressed.

The flashing symbol field is accompanied by a warning beep.

If this is the situation:
▶ Move the travel direction switch to the middle, neutral position.
▷ Make sure that the parking brake is deactivated.
▷ You can now preselect forward or reverse travel again by pushing the travel direction switch.

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The set tractive force is shown in the segment display while you press the button **1** or **2** on the display unit.

The LEDs **2** on the two buttons **1** and **3** light up according to the set tractive force:
– 6 LEDs light up at 95%
– 1 LED lights up at 50%

When the tractive force is set to 100%:
▶ The function is deactivated.
▷ No LEDs light up.

Driving on public roads

Before driving on public roads, find out about the route (roads, bridges, tunnels, underpasses, bottlenecks etc.) as regards the weight limit, bridge load, width and height restrictions.

Wheel loaders which are limited by design to a maximum speed of 20 km/h and have no official registration number must be labelled on both sides with the operating company's address and require an operational liability insurance certificate.

The wheel loader may only be driven on public roads when unloaded.

Before driving on public roads, find out the following:
– Ask the vehicle owner whether the necessary conditions for permission to drive on public roads have been met.
  • “Operating permit”
  • “Special license”
– Make yourself familiar with the appropriate safety regulations.
  • (For more information see: 2.4.7 Safety instructions for driving on slopes, page 52)
  • (For more information see: 2.4.6 Instructions for safe working, page 51)

Make sure that you have carried out all the preparations for driving.

Preparing for driving on roads

Make sure that the safety devices listed below are all stowed on board, in accordance with the provisions of the **Roadworthiness Certification**.

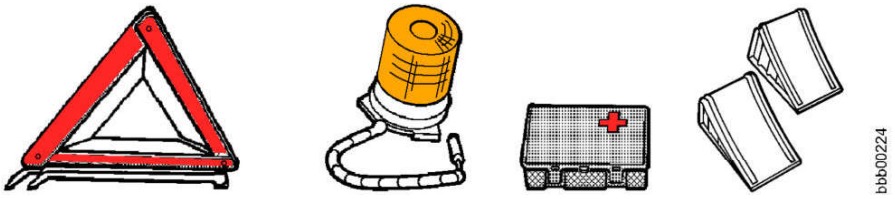
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Fig. 321

❑ Warning triangle
❑ Flashing beacon
❑ First aid kit
❑ Wheel wedges

Also make sure that you have carried out all the tasks listed below.

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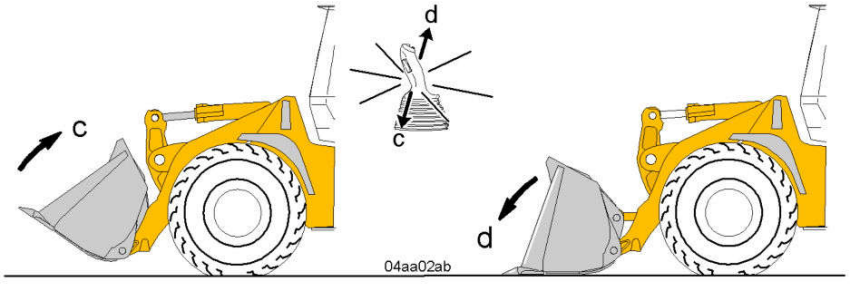

Fig. 340: Tilting the bucket in and out

Tilting the bucket in or out

▶ Move the LH control lever in direction **c**.
▷ The bucket is tilted in.

▶ Move the LH control lever in direction **d**.
▷ The bucket is tilted out.

Operating the lift and tilt cylinders simultaneously

You can extend or retract the lift and tilt cylinders simultaneously by moving the LH control lever diagonally.

Raising the lift arms while tilting the bucket in or out

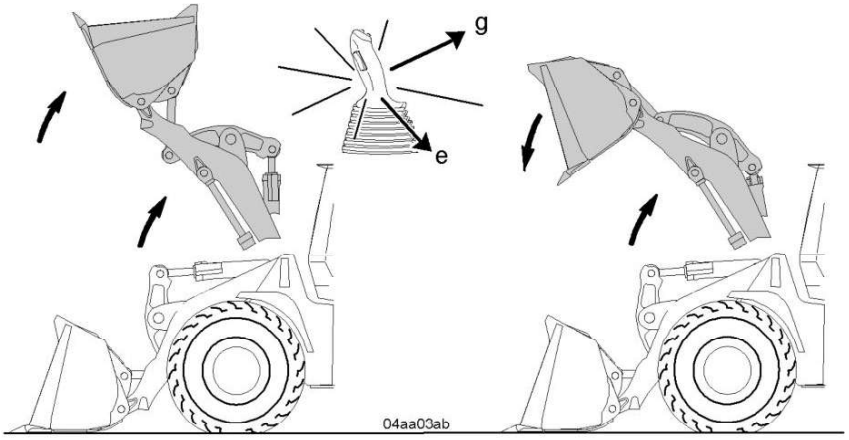

Fig. 341: Working movements

▶ Move the LH control lever in direction **e**.
▷ The lift arms are raised while the bucket is tilted in.

▶ Move the LH control lever in direction **g**.
▷ The lift arms are raised while the bucket is tilted out.

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DANGER
There is a risk of fire or explosion.

- ▶ Do not smoke and avoid naked flames when refuelling.
- ▶ Only refuel when the engine is switched off.

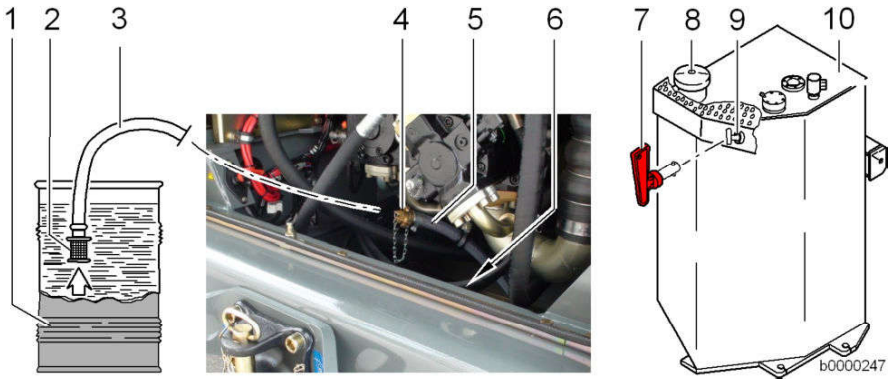

Fig. 357: Filling the tank using the filling pump

1	Fuel tank	**6**	Refuelling pump
2	Strainer	**7**	Key
3	Suction line extension	**8**	Tank cap
4	Dummy plug	**9**	Switch cap
5	Suction line	**10**	Fuel tank

NOTICE
Beware of damaging the refuelling pump.
Do not switch on the refuelling pump for more than 15 min at a a time.

- ▶ Switch off the refuelling pump after 15 min at the latest.

Note
The refuelling pump does not switch itself off automatically.
Fuel can overflow at the filler neck.

- ▶ Watch the filling process via the fuel tank filler neck.

- ▶ Open the engine compartment hood.
- ▶ Open the dummy plug **4**.
- ▶ Connect the suction line extension **3** to the suction line **5**.
- ▶ Lower the suction line extension **3** with the strainer **2** into the fuel tank **1**.
- ▶ Open the tank cap **8**.
- ▶ Take off the switch cap **9** and insert the key **7**.
- ▶ Turn the key **7** to “ON”.
  ▷ Refuelling begins.

To finish refuelling:
- ▶ Turn the key **7** to “OFF” and pull it out.
  ▷ Refuelling is completed.
- ▶ Plug in the switch cap **9**.

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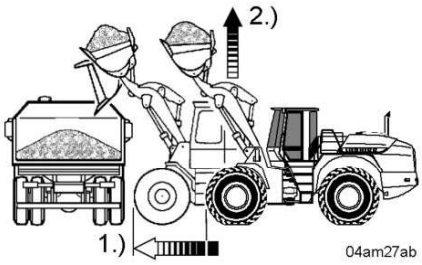

Fig. 374: Unloading point

This achieves the following:
1.) Sensitive speed adjustment
2.) Optimum power adjustment for the working attachment

(For more information see: 3.4.1 Picking up and moving material, page 203)

Put the machine in the unloading position.

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

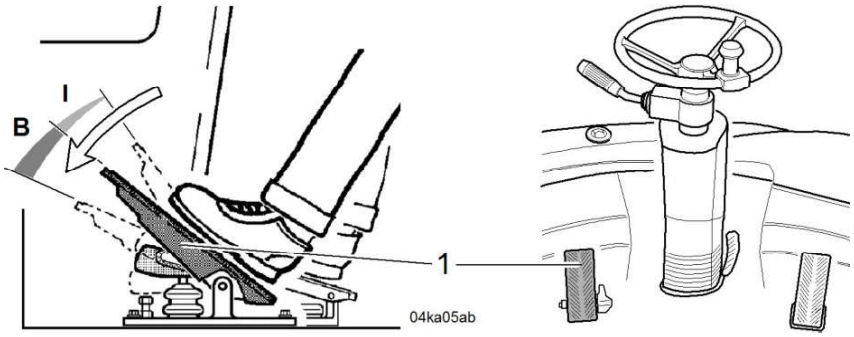

Fig. 375: Inch/brake pedal

1 Inch/brake pedal
I Inching range
B Braking range

Brake the machine

▶ Push down the inch/brake pedal **1** in range **I** with the required force.

WARNING
There is a risk of accidents due to falling material.

▶ The driver may only swing the working attachments over occupied driver cabs, operating and working stations of other machines if they are protected by reinforced roofs (FOPS).

▶ If the driver's cab is not equipped to provide the necessary degree of protection, then the driver of the machine in question must leave his cab during overhead operations.

▶ Load the truck so that the material falls into the middle of the skip.

▶ Load long transport vehicles from front to back.

When working near overhead power lines:

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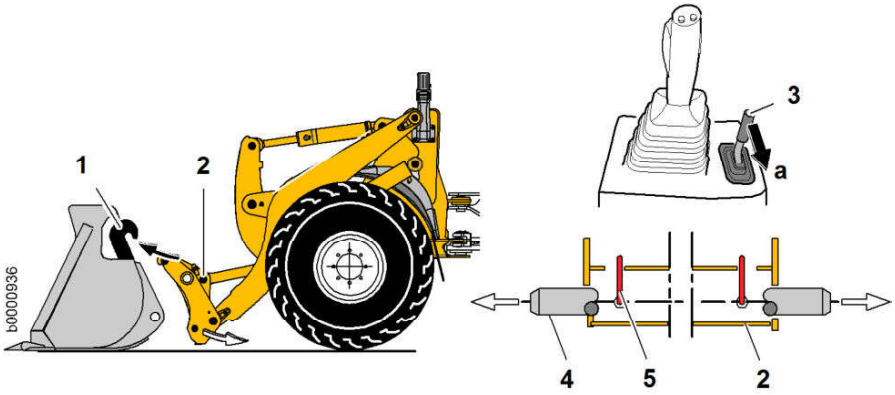

Fig. 393: Connecting and locking the working attachment

1	Working attachment holder	**4**	Locking pin
2	Quick-change device	**5**	Locking indicator *lock position*
3	Control lever for additional working functions	**a**	Locking the working attachment

▶ Carefully move the quick-change device **2** into the working attachment holder **1**.

▶ Slightly raise and tilt in the working attachment.
▷ The working attachment latches into the quick-change device.

▶ Move the control lever **3** as far as it will go in direction **a** and hold it there.
▷ The locking pins **4** of the quick-change device are extended.

When the pins are completely extended:

▶ Let go of the control lever **3**.
▷ The working attachment is locked.

Checking that the working attachment is locked

The fact that you can change the attachment from the cab does not excuse you of the duty to check it afterwards. Every time you change the attachment, make a *visual inspection* and a *mechanical check* to make sure that the working attachment is correctly locked.

WARNING
Beware of the working attachment dropping.

▶ Do not carry out any working movements of the attachment before checking whether it is locked.

Visual inspection

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.

▶ Release the hydraulic lines and quick-release couplings from the machine.

▶ Seal the line couplings with a cap.

▶ Place the hydraulic lines in the hose retainer.

Activating 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.

DANGER
Beware of the working attachment dropping.

▶ Do not actuate the switch lever when the working attachment is raised.

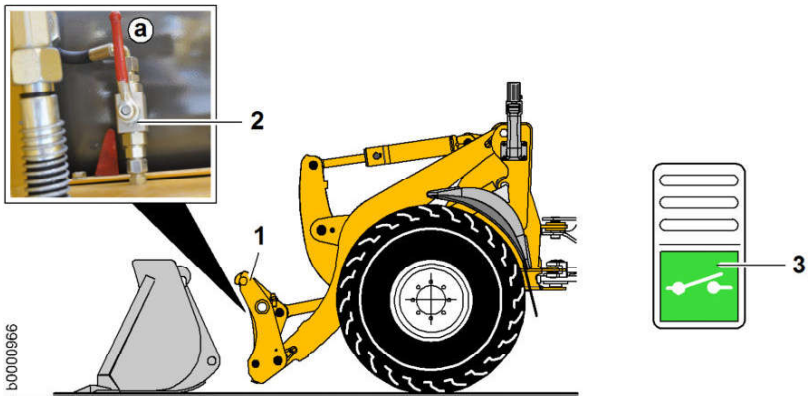

Fig. 406: Activating the quick-change device

1	Quick-change device	**3**	Switch for *comfort control*
2	Switch lever	**a**	Lever position when the *quick-change device is activated*

▶ Pull the switch lever **2** out of the twist lock, turn it to position **a** and engage it in the twist lock again.

▶ Press switch **3**.
▷ The function for unlocking the quick-change device is activated.

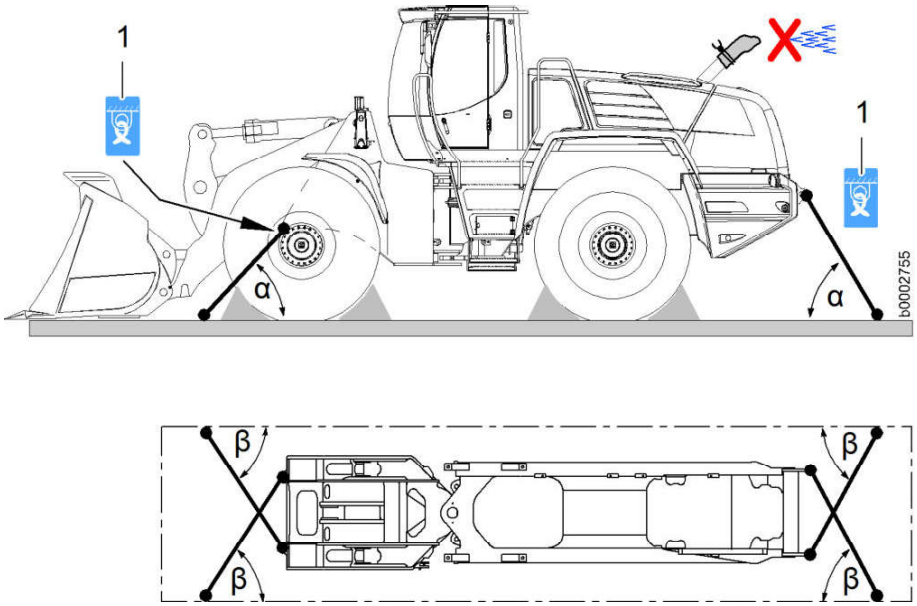

Fig. 417: Securing the machine

1 *Lashing point* information decal
α Lashing angle 20° to 40°
β Lashing angle 20° to 40°

▶ Fasten the lashing material to the lashing points on the machine.

▶ Fasten the lashing material crosswise to the lashing points on the low-bed truck.

NOTICE
Beware of damage to the turbocharger!
If air blows into the exhaust pipe opening, it causes the turbocharger of the engine to rotate.
The turbocharger is not lubricated if the engine is not running.

▶ Prevent the air stream produced during transport from entering the exhaust.

▶ Seal the exhaust pipe opening using airtight material which cannot slip.

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4 Malfunctions

Warning and error messages:
- Various faults are indicated by corresponding symbols or service codes in the display.
- Some warning functions are accompanied by audible warning signals.

Finding and eliminating errors and malfunctions:
- Faults can often be traced back to incorrect operation or servicing of the machine.
  Therefore, carefully read the appropriate section of the operating manual each time a fault occurs.
- **Analyse the cause of the fault and correct it immediately.**
- Describe the fault and all related circumstances if you contact **Liebherr Customer Service**. Precise information helps to locate and eliminate the cause of the fault. This means that the exact type and serial number of the machine need to be stated.
- Never perform any work for which you have not been trained or instructed.

Note
If cause of the fault cannot be detected or eliminated using the service code table.

▶ Contact Liebherr customer service.

4.1 Servicecodes

4.1.1 Service code indication on the display

The control system monitors many of the machine's functions.

It monitors for short circuits, cable rupture, external voltage and incorrect input and output signals.

In addition, the controller continuously checks the program sequence and communication with the control modules.

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Servicecode	Effect	Cause	Remedy
M402A	Driving is not possible	Control pressure (pump 1): shorted at output	Check fuse F55 - contact LIEBHERR CUSTOMER SERVICE
M402B	Driving is not possible	Control pressure (pump 1): interruption at output	Check fuse F55 - contact LIEBHERR CUSTOMER SERVICE
M402C	Driving is not possible	Control pressure (pump 1): fault current at output	Check fuse F47 - contact LIEBHERR CUSTOMER SERVICE
M402D	Driving is not possible	Control pressure (pump 1): the measured return current at the output does not match the output current	Check fuse F55 - contact LIEBHERR CUSTOMER SERVICE
M402E	Driving is not possible	Control pressure (pump 2): shorted at output	Check fuse F55 - contact LIEBHERR CUSTOMER SERVICE
M402F	Driving is not possible	Control pressure (pump 2): interruption at output	Check fuse F55 - contact LIEBHERR CUSTOMER SERVICE
M4030	Driving is not possible	Control pressure (pump 2): fault current at output	Check fuse F47 - contact LIEBHERR CUSTOMER SERVICE
M4031	Driving is not possible	Control pressure (pump 2): the measured return current at the output does not match the output current	Check fuse F55 - contact LIEBHERR CUSTOMER SERVICE
M4032	No emergency steering	Emergency steering: shorted at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4033	No emergency steering	Emergency steering: interruption at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4034	No fan reversal available	Fan reversal: shorted at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4035	No fan reversal available	Fan reversal: interruption at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4036	No ride control available	Ride control: shorted at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4037	No ride control available	Ride control: interruption at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4038	No ride control or float position	Float position / ride control: shorted at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M4039	No ride control or float position	Float position / ride control: interruption at output	Check fuse F56 - contact LIEBHERR CUSTOMER SERVICE
M403A	Only reverse travel possible	Forward travel direction (pump 2): shorted at output	Check fuse F52 - contact LIEBHERR CUSTOMER SERVICE
M403B	Only reverse travel possible	Forward travel direction (pump 2): interruption at output	Check fuse F52 - contact LIEBHERR CUSTOMER SERVICE
M403C	Only forward travel possible	Reverse travel direction (pump 2): shorted at output	Check fuse F52 - contact LIEBHERR CUSTOMER SERVICE
M403D	Only forward travel possible	Reverse travel direction (pump 2): interruption at output	Check fuse F52 - 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 251) - Contact LIEBHERR CUSTOMER SERVICE

Tab. 16

4.2.2 Troubleshooting the LIEBHERR automatic central lubrication system

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 251)

Malfunction	Cause	Remedy
Pump working but not delivering	Air pocket in pump piston	Bleed pump
	Filling level below minimum	Fill reservoir
	Pump element defective	Replace pump element
No grease collar on any lubrication points	Pump not working	Contact LIEBHERR CUSTOMER SERVICE

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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 **By authorised specialist staff** ☐ Once-only activity ❍ Repeat interval ✧ If necessary **Additional labelling** Assistance required Have this task carried out exclusively by a certified electrician	Confirm tasks	See page
						✦		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 - check the counterpressure monitor for function, leaks and blockages		
				❍	❍	✧		Clean the diesel particulate filter (at least once annually)		
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 294)		
☐		■	❍	❍	❍	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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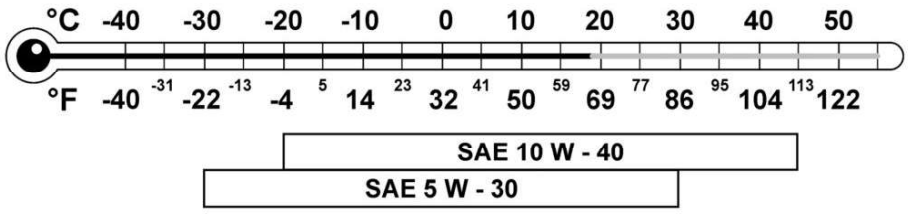

Fig. 443: Selection of the SAE class according to temperature

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 279)

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. 38

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. 39

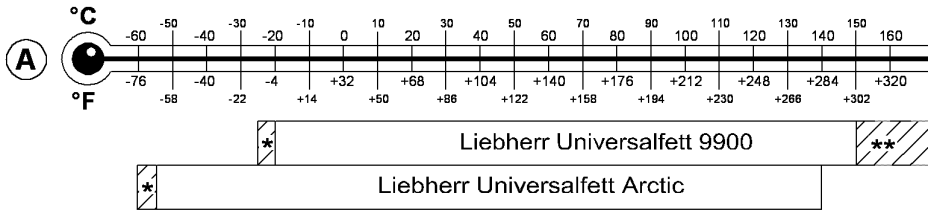

Fig. 452: Operating temperature of Liebherr lubrication greases

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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5.6 Diesel engine

5.6.1 Checking the engine oil level

Make sure that the following requirements are fulfilled:
- ❑ The machine is in maintenance position 1.
- ❑ The engine compartment hood is open.
- ❑ The engine is level and has not been started for 2 or 3 minutes.
- ❑ The engine has cooled down.

Procedure

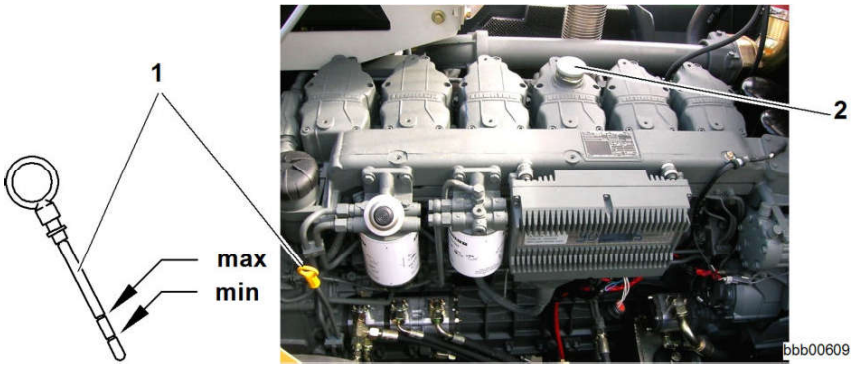

Fig. 465: Diesel engine

- ▶ Pull out the dipstick **1**, wipe it clean, and re-insert it.
- ▶ Pull out the dipstick once again and read off the oil level.
  - ▷ The oil level must be between the MIN and MAX markings.

If the oil level is too low:
- ▶ Top up with oil via the oil filler neck **2**. (For more information see: 5.3.4 Lubricating oils for diesel engines, page 290)
- ▶ Clean the sealing cap, place it on the filler neck **2** and tighten it.

5.6.2 Changing the engine oil

Make sure that:
- ❑ The machine is in maintenance position 1.
- ❑ The engine compartment hood is open.
- ❑ The engine is level.
- ❑ The engine is warm.
- ❑ A suitable receptacle, an oil drain hose and the specified engine oil are at hand. (For more information see: 5.2 Filling quantities and lubrication chart, page 284)

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Fig. 478: Engine bleeding function

1 Button on the control unit
2 LEDs
3 Switch button on the display unit

Procedure for activating the engine bleeding function on the control unit:
– Turn the ignition on.
– With the engine not running, press the button **1** for 10 seconds.
– All three LEDs on the button light up - the engine bleeding function is activated.

Procedure for activating the engine bleeding function on the display unit:
– Turn the ignition on.
– With the engine not running, press the switch button **3**.
– The symbol **3** flashes green - the engine bleeding function is activated.

▶ Turn the ignition key to the starting position **II** and keep it in there until the engine starts.

▶ Do not hold the key in the starting position for more than 20 seconds at a time.
▷ The engine control unit (ECU) ends the engine bleeding function automatically as soon as the engine starts again.

Troubleshooting
If the engine does not start again within 20 seconds:

▶ Turn the ignition key back to the 0 position.

Wait a minute and repeat the procedure.
▶ In the meantime, continue to operate the hand pump until you feel strong resistance.

5.6.9 Draining off condensate and sediment from the fuel tank

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.
❑ You have a suitable receptacle ready.
❑ The machine has been out of operation for at least 3 hours.

Procedure

DANGER
Beware of fire

▶ Naked flames and smoking are prohibited.

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Checking the mixing ratio with a refractometer

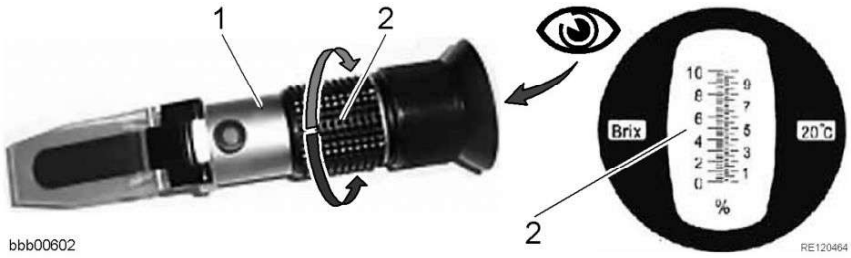

Fig. 490: Gefo refractometer no. 2710

1 Refractometer **2** Eyepiece

Brix value:

The measure for soluble dry substance in a liquid.

Test procedure

- ▶ Clean the cover and the prism carefully.
- ▶ Place 1 or 2 drops of test fluid on the prism.
  ▷ The fluid is distributed by closing the prism.
- ▶ Look through the eyepiece **2** against a light background and focus the scale.
- ▶ Set the focus by turning the eyepiece **2**.
- ▶ Read off the value on the blue line in the eyepiece **2**.

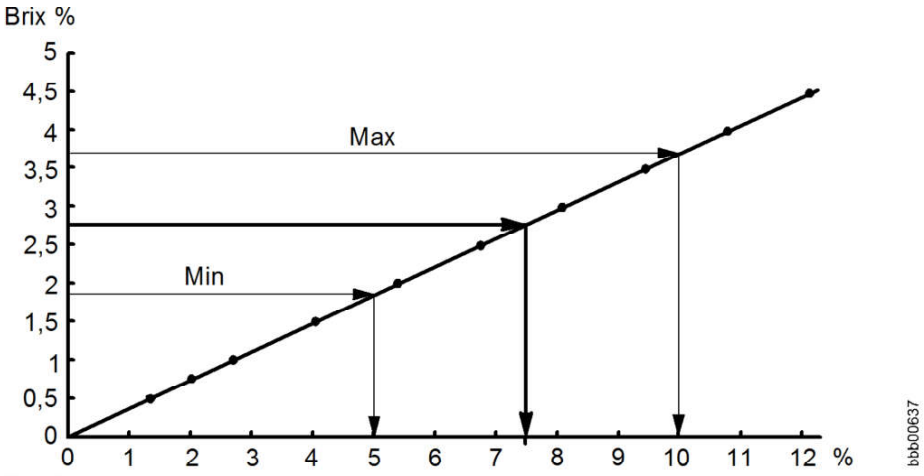

Fig. 491: Conversion diagram from Brix to corrosion inhibitor concentration (%vol)

- ▶ Convert the Brix value using the conversion diagram to find the actual corrosion inhibitor concentration.

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▶ Press the parking brake button while travelling.
▷ The machine must come to an **abrupt** halt.

Troubleshooting
If the braking effect is too slight or entirely absent:

▶ Contact LIEBHERR CUSTOMER SERVICE.

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5.16.3 Cleaning the fresh air and recirculated air filter

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

Cleaning the fresh air filter

Procedure

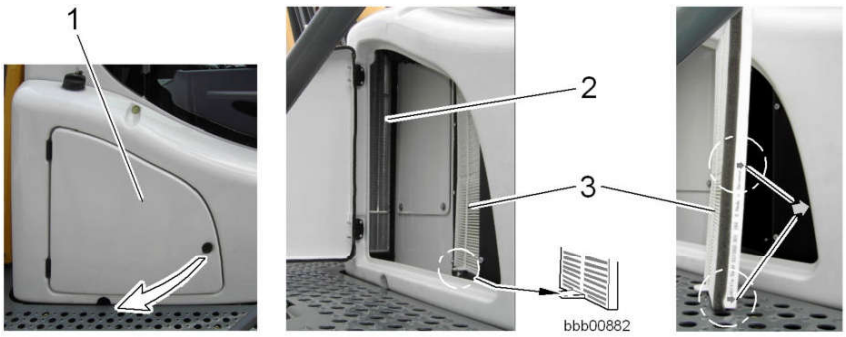

Fig. 520: Fresh air filter

- ▶ Open the door **1**.
- ▶ Take out the lint filter **2** and clean it (blow it out) or replace it.
- ▶ Unscrew the fresh air filter **3** at the bottom on the front lug and clean it (blow it out or wash it).
- ▶ Insert the clean filter, making sure it is correctly fitted (the arrows moulded on the filter frame point towards the air taken in).
- ▶ Close the door again.

Cleaning the recirculated air filter

Procedure

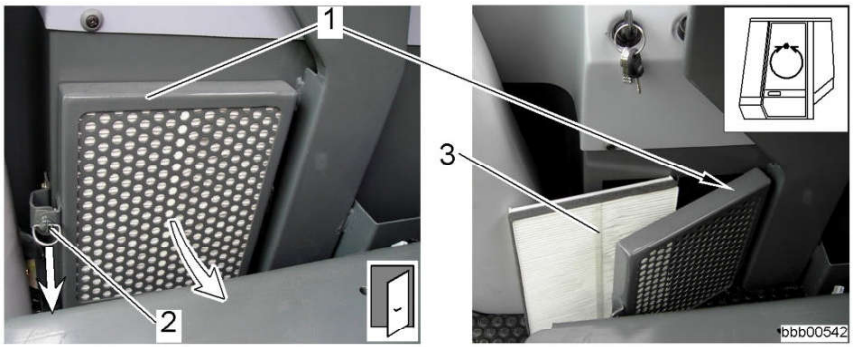

Fig. 521: Recirculated air filter

- ▶ Remove the pin **2**.
- ▶ Open the door **1**.

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5.20 Deactivating the machine

To deactivate the machine:

▶ Contact Liebherr customer service.

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