en **Operator's manual**

Wheel loader

L 566-460

From serial number 35715

Document ID

ORIGINAL OPERATOR'S MANUAL

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Product ID

Manufacturer: Liebherr-Werk Bischofshofen GmbH
Type: L 566
Type no.: 460
From Serial no.: 35715

Conformity:

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 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	0-10.0
Travel range 2	km/h	0-20.0
Travel range A1-2 (automatic)	km/h	0-20.0
Travel range A1-3 (automatic)	km/h	0-40.0
Travel range A2-3 (automatic)	km/h	0-40.0

1.2.6 Axles


bpik0030

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	Description	Unit	Value	
	Breakout force (SAE)	kN	200	190
	Tipping load when straight	kg	17690	17010
	Articulated tipping load 37°	kg	15850	15240
	Articulated tipping load 40°	kg	15550	14950
	Operating weight	kg	22500	22625
	Tractive force	kN	173.31	173.31

Tab. 7: Complete machine with bucket

A) In practice, the bucket capacity can be around 10% greater than as calculated using the ISO 7546 method. This depends on the type of material.
B) Earth bucket with short, straight base
C) Welded tooth holder with plug-in teeth

1.2.22 Attachment - high lift (Z kinematics)

The values stated refer to the machine:

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

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

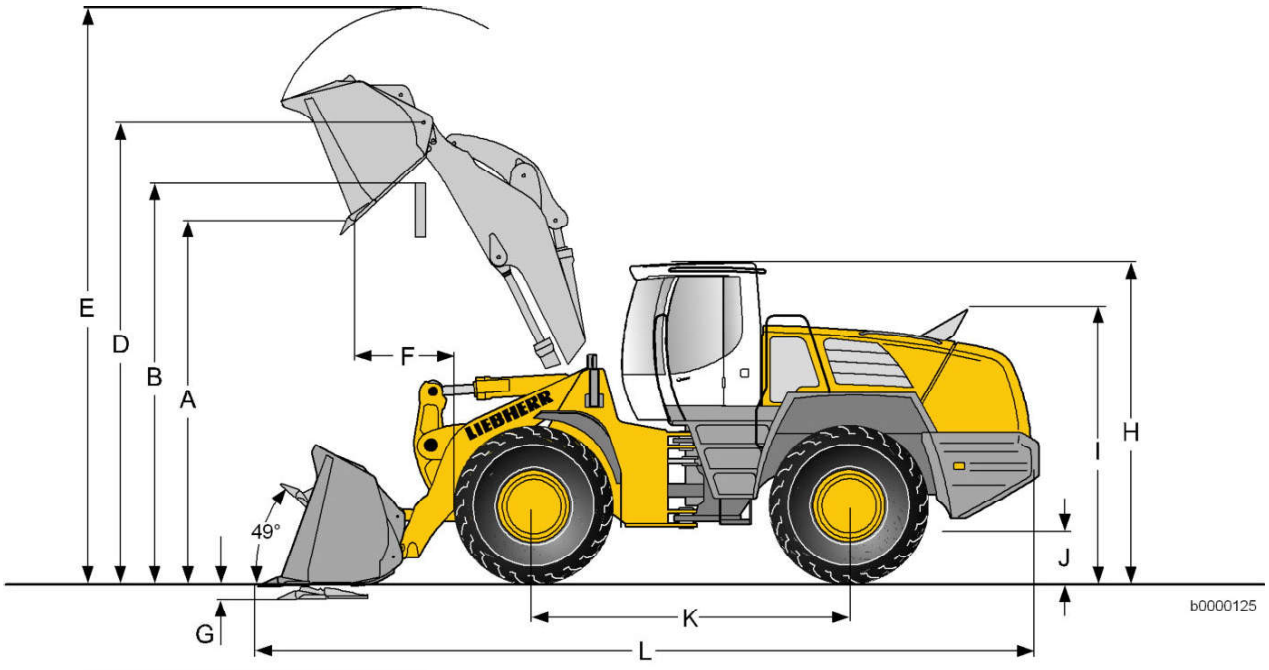

Fig. 20: Attachment - high lift

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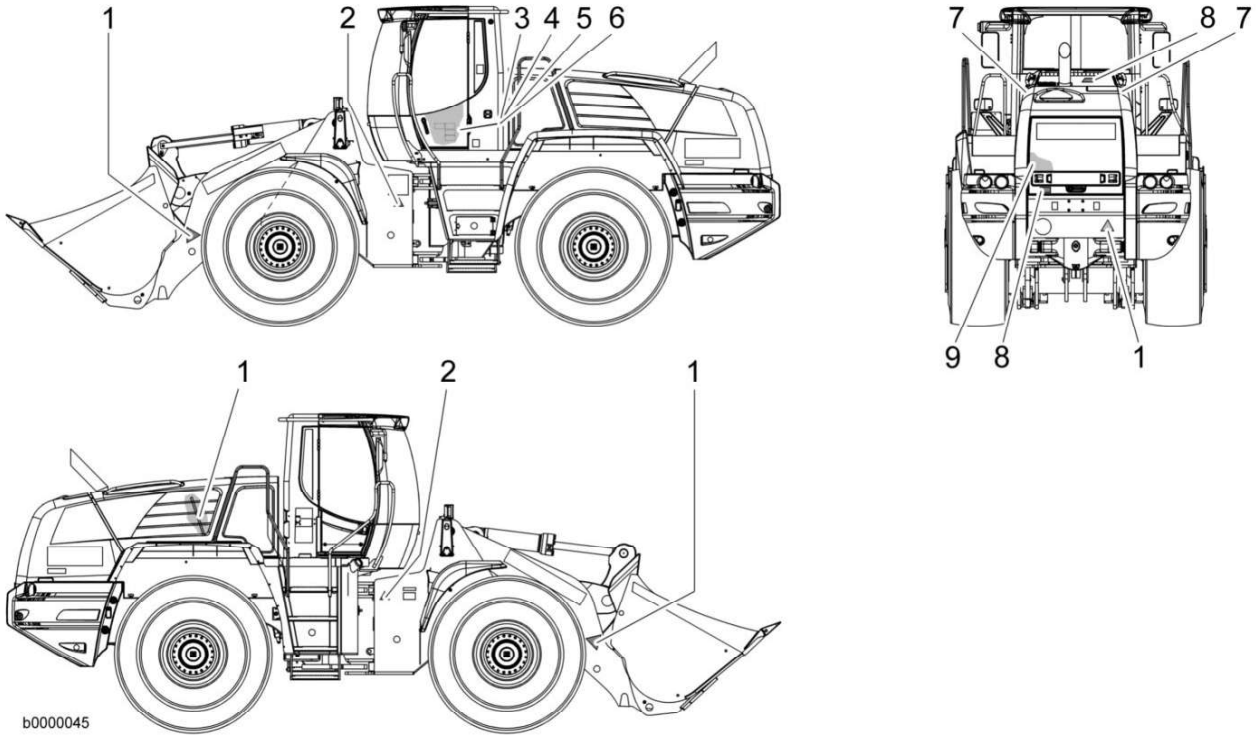

Fig. 30: Location of signs

1	*Keep clear* sign	**4**	*Steering* sign	**7**	*Coolant* sign
2	*Articulation area* sign	**5**	*ROPS/FOPS* sign	**8**	*Engine standstill* sign
3	*Accident prevention* sign	**6**	*Safety belt* sign	**9**	*Voltage* sign

Keep clear sign

Fig. 31: Keep clear sign

Warns of the risk of accidents, possibly resulting in severe or even fatal injuries.

Meaning: **Keep out of the danger area**

Articulation area sign

Fig. 32: Articulation area sign

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Hydraulic quick-change device open/close sign

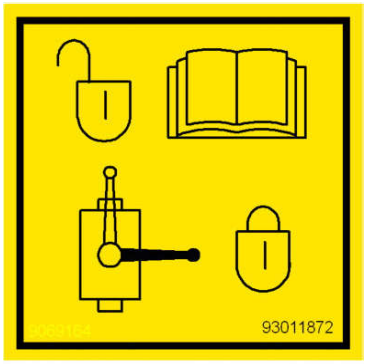

Fig. 59: Hydraulic quick-change device open/close sign

Indicates the directions for opening/closing the changeover valve of the hydraulic quick-change device.

2.3.3 Type plates

The machine and all its components, such as the engine, gearbox and axles, have type plates affixed to them.

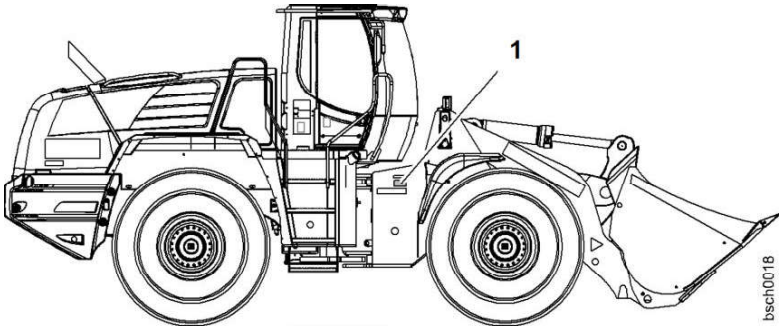

Fig. 60: Arrangement of type plates

1 Machine type plate

Machine type plate

Fig. 61: Type plate

Information on the type plate:
– Type

Hydro accumulators may only be filled with nitrogen, not with oxygen or air - otherwise there is a **risk of explosion**.
The accumulator can heat up, causing burns.
Do not use membrane accumulators which have been damaged during transportation.
New membrane accumulators must be filled with nitrogen before they are used. Remove the sealing caps on the fluid side.
The minimum and maximum operating data are permanently marked on the membrane accumulator. The marking must remain visible.

2.4.13 Safety instructions for welding work on the machine

1. Keep to the following procedure during welding work on the machine.
   - Switch off the ignition.
   - Switch off battery main switch (if available).
   - Bring the ground of the welding machine as close as possible to the welding point.
   - Only specialized personnel may carry out welding.

2.4.14 Instructions for working safely on the working attachment

1. Do not work under the attachment if it is not resting on the ground or supported.
2. When replacing attachment components (signs, cutting edge, teeth) . . do not let metal rest on metal.
3. Do not try to lift heavy parts. Only use suitable equipment with sufficient load capacity.
4. Always wear gloves when working with wire ropes.
5. Never release hydraulic lines or bolts before setting down the working attachment and shutting down the engine.
   Before starting any work on the hydraulic circuit, you must also press the working hydraulics lockout button and actuate all pilot control units (joystick and pedals) in both directions in order to reduce the control pressure and accumulated pressure in the operating circuits. You must then reduce the internal tank pressure.
6. Ensure that all lines and threaded couplings are reconnected and re-tightened on completion of the job.
7. Be especially careful when removing or inserting bolts and pins made of hardened steel, as they can splinter, causing serious injury.
   Wear safety gloves and goggles.
   Whenever possible use special tools (such as mandrels, extractors, . . etc.)

2.4.15 Safety instructions for transporting the machine by crane

1. Lower the working attachment and tilt back the loading equipment to its limit.
2. Apply the articulation lock (this only applies to wheel loaders with articulated steering).
3. Move all control levers to the neutral position and engage the parking brake.
4. Shut down the engine in accordance with the instructions in the **“operating instructions”** .
5. Lock the working hydraulics before leaving the driver's cab.
   Lock the working hydraulics in accordance with the instructions in the **“operating instructions”** .

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

3.2.3 Cab access

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

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

The right window is hinged.

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

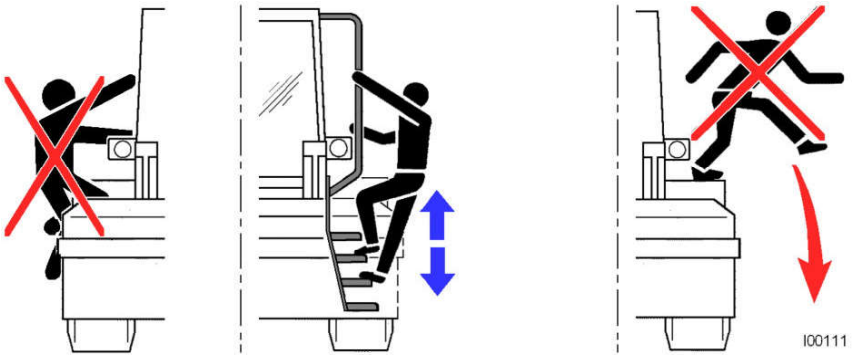

Fig. 67: Cab access

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

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

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

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

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

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

Adjusting the driver's seat shock absorber

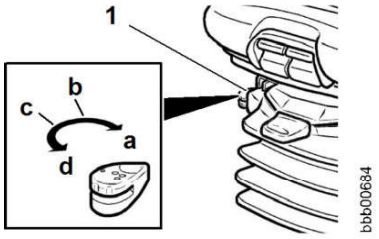

Fig. 86: Adjusting the driver's seat shock absorber

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

Adjust the shock absorber individually to the track or terrain.

Note

▶ The driver must be sitting in the normal position.

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

Adjusting the arm rest

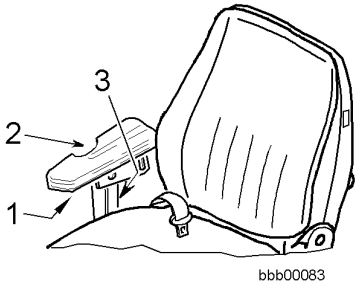

Fig. 87: Adjusting the arm rest

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

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

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

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

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

▶ Replace the cap **2**.

Adjusting the back rest inclination

Fig. 105: Adjusting the back rest inclination

1 Lever for back rest inclination adjustment

▶ Raise the lever **1**.

▶ Move the back rest to the angle required.

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

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

Fig. 106: Activating and deactivating the horizontal suspension on the driver's seat

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

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

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

▶ Position **1** = OFF

▶ Position **2** = ON

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

Tab. 17: Troubleshooting

If the problem could not be solved as described above:

▶ Contact Liebherr customer service.

3.2.14 Driver identification

This equipment is optional.

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

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

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

▶ Only use programmed starting keys to operate the machine.

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

Saving the driver profile

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

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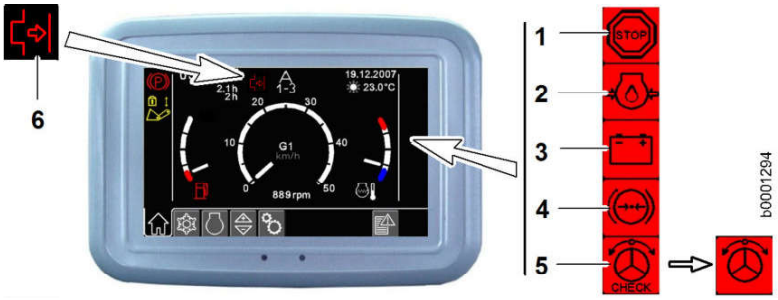

Fig. 139: Warning symbol indicator

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

STOP

b0000154

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

Engine oil pressure


b0000155

– Appears when the engine oil pressure is too low.

Battery charge (charge control)


b0000156

– Appears when the battery is not charged.

Brake accumulator pressure


b0000157

– Appears when the brake accumulator pressure is too low.

Emergency steering pump check, emergency steering pump

b0000158

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

Quick-change device

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

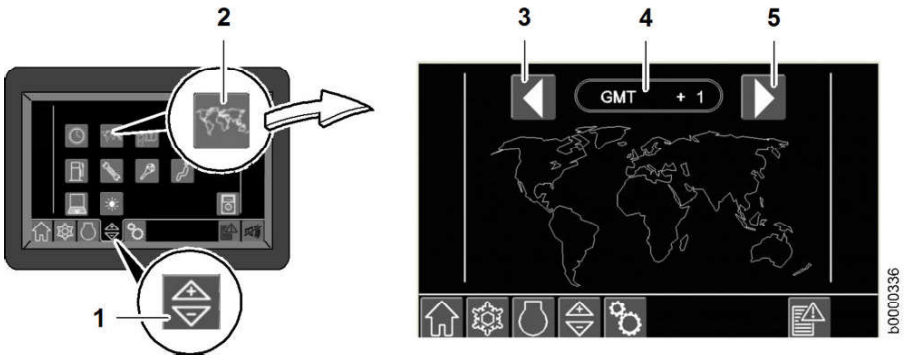

Fig. 188: Time zone setting

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

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

Language and unit setting

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

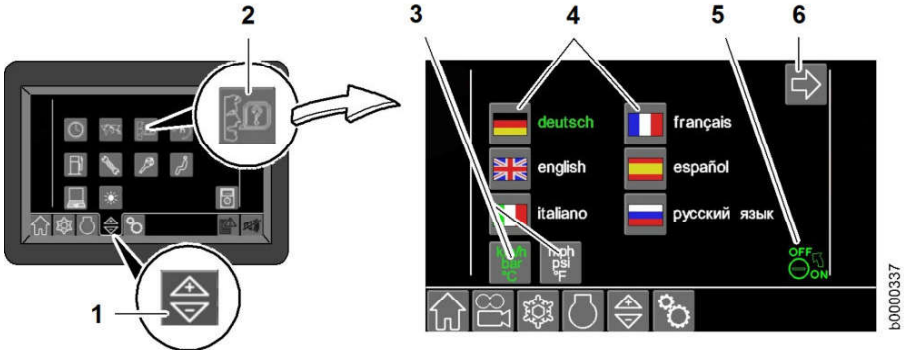

Fig. 189: Language and unit setting

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

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

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

Note
To display the selected language:

▶ Switch ignition off and on again.

Hazard warning system


bbb00540

Hazard warning system button

Switches the hazard warning system on and off.

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

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

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

Profile lights and low beam


bbb00541

Profile lights and low beam button

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

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

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

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

Flashing beacon

This equipment is optional.


bbb00546

Flashing beacon button

Switches the flashing beacon on and off.

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

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

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

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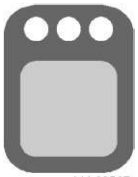
Spare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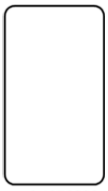
Spare button (unassigned)

For activating an optional function.

Spare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Dummy plug

Reserved for additional functions.

Working basket

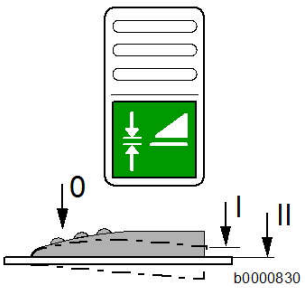
This equipment is optional.

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

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

Note
Information on controlling and operating the working basket!

▶ See the manufacturer's operating manual supplied.



b0000830

Working basket switch

Field colour - green

Switches the "Working basket" function on or off.

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

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

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

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

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

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

▶ Close the cab doors and windows.

▶ Turn the outlet nozzles away from the windows.

To speed up the warming process:

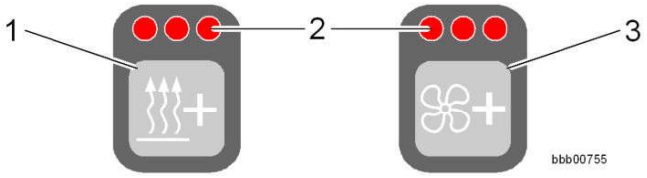

Fig. 257: Temperature and blower buttons

1 Temperature up button
2 LEDs
3 Blower speed up button

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

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

Adjusting the blower

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

The air flow is impaired if a filter is dirty. (For more information see: 5.18.3 Cleaning the fresh air and recirculated air filter, page 371)

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

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

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

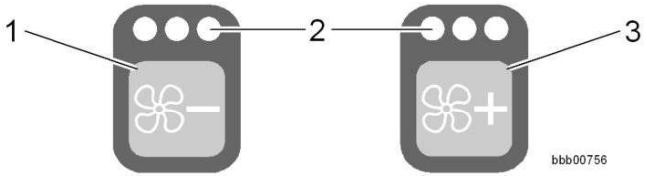

Fig. 258: Adjusting the blower

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

To increase the blower speed:

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

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

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Operating the central lubrication system

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

To start a non-scheduled lubrication:

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

Cycle error

Causes of cycle errors:

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

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

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

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

▶ Contact LIEBHERR CUSTOMER SERVICE to rectify the problem.

Grease level in reservoir too low

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

Filling the reservoir

NOTICE
There is a risk of damaging the system.

▶ Pay attention to cleanliness when filling.

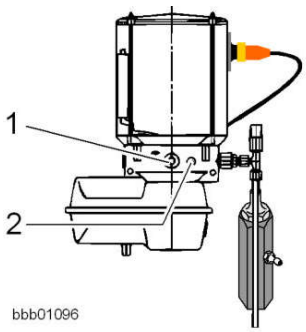

Fig. 275

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Boot phase of the main electronics (master)

“Boot phase” process.

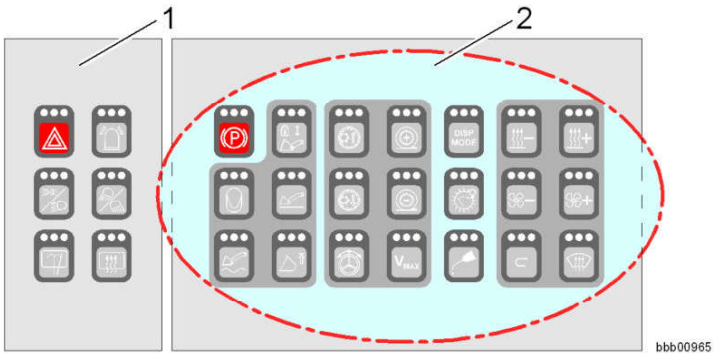

Fig. 291: Control units

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

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

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

Main electronics (master) standby

Standby for starting the engine is indicated as follows.

The LEDs on most of the buttons go out.

Fig. 292

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

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

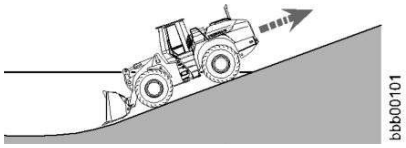

Fig. 314

c) Reversing up a steep slope

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

If you cannot wait 0.8 seconds:

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

If you want to use kick-down shifting:

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

Driving with the Vmax (Tempomat) function

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

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

If activated while the machine is moving:

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

If activated while the machine is at a standstill:

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

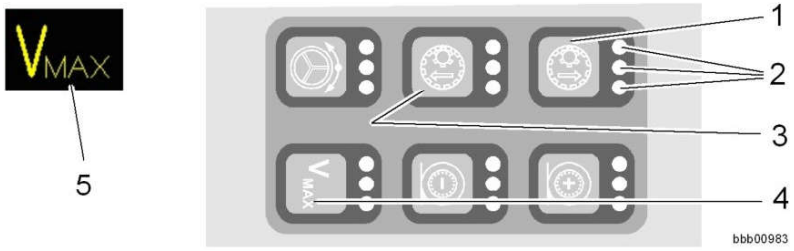

Fig. 315

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

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

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Switching off the engine

NOTICE
There is a risk of damaging the engine
This is especially important with turbo engines.
If you suddenly switch off the motor, the turbocharger continues running for a while with no oil supply.

▶ Do not switch off the engine suddenly when it is running at full speed.

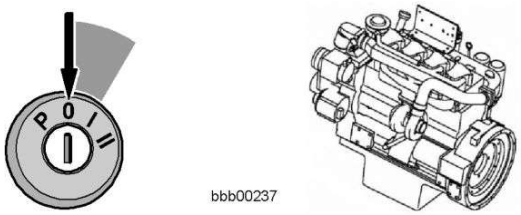

Fig. 337: Switching off the engine

▶ Reduce the engine speed to idle speed by taking your foot off the gas pedal.

▶ Let the engine continue idling briefly - for 10 to 15 seconds.

▶ Turn the ignition key to the **0** position and pull it out.
  ▷ All the symbol fields go out.
  ▷ Parking brake is engaged.
  ▷ Working hydraulics lockout is activated.

Turning off the battery main switch

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

If you are leaving the machine unattended:

NOTICE
Risk of damage to the electrical system.

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

(For more information see: 5.4.4 Turning off the battery main switch, page 324)

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

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

Securing the machine

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

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

▶ Secure the machine against rolling away.

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The exhaust counterpressure is recorded by the data logger. The data logger transmits the information via a data cable to the “diesel particulate filter” control unit in the driver's cab.

The following must be observed when operating at a sufficiently high exhaust temperature:

- ▶ Do not let the engine idle for a long period.
- ▶ Switch off the engine when the machine is not being used.
- ▶ Observe the control unit of the diesel particulate filter. If malfunctions are displayed the independent cleaning function of the filter is at risk. In this event take appropriate measures as quickly as possible. (For more information see: Function test, page 203)

NOTICE
Unsuitable diesel fuel can damage the particle filter!

- ▶ Only use commercially available diesel fuels to operate the machine. Additives must not be added.

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

- ▶ Contact Liebherr customer service.

Operation

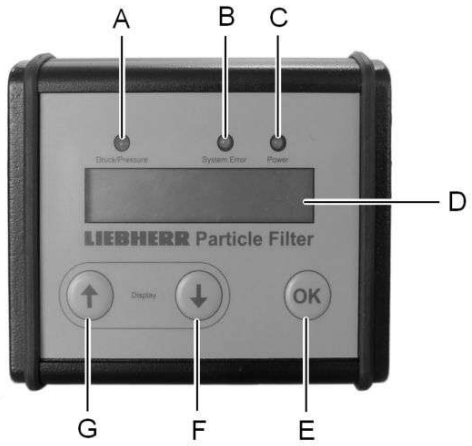

Fig. 360: “Diesel particulate filter” control unit in the driver's cab

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

Display in normal operation

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

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

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3.3.11 Timber grabber

An optional attachment is available for transferring timber.

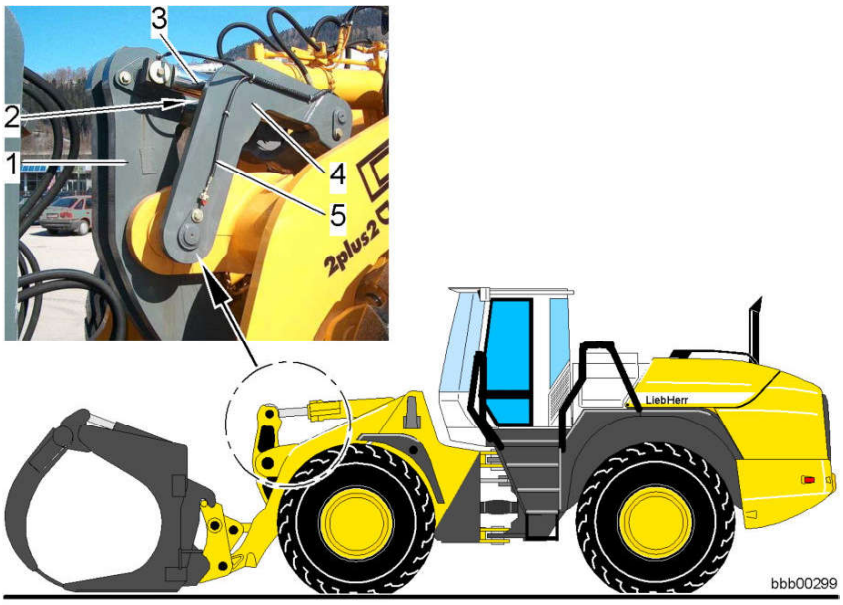

Fig. 370: Tilt cylinder support

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

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

Permissible payload, (For more information see: 1.2.26 Attachment - timber grabber, page 36)

Installing/removing timber grabber on quick-change device

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

Operating the timber grabber

Depending on the equipment, there are two options for controlling the additional function:
– using the control lever for additional working functions
(For more information see: 3.2.23 Control lever for additional working functions, page 148)
– using the Liebherr control lever (comfort control)
(For more information see: 3.2.22 LIEBHERR control lever, page 143)

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

▶ Test the function of the attachment.

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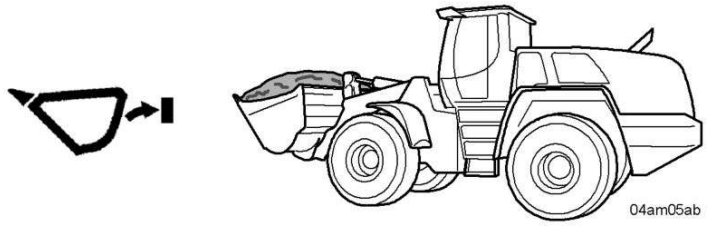

Fig. 386: Bucket position

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

Transporting material

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

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

Make sure that the bucket is in the transport position.

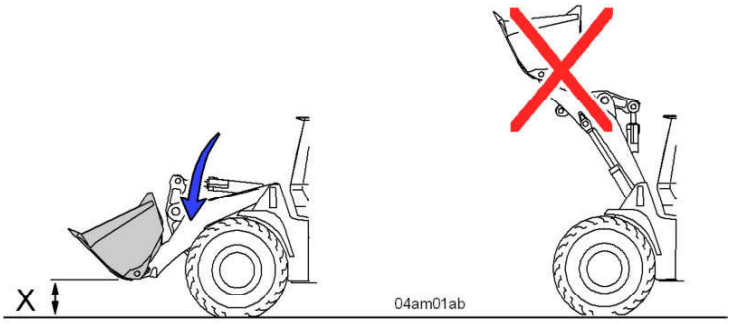

Fig. 387: Bucket position

▶ Move the bucket to the transport position.

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

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

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

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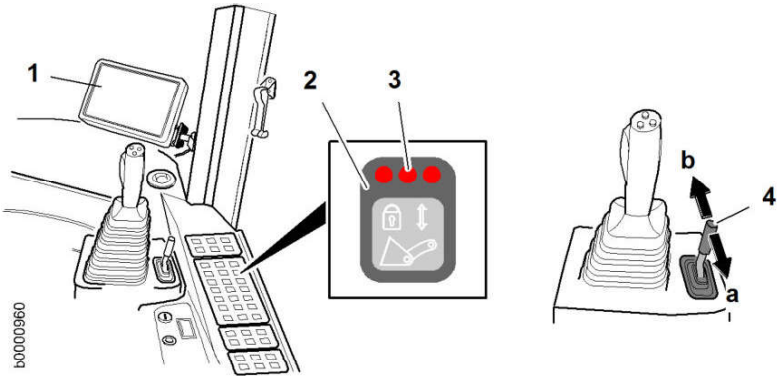

Fig. 408: Depressurising the hydraulics

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

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

Disconnecting the hydraulic lines

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

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

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

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

Note
Hydraulic oil is harmful to the environment.

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

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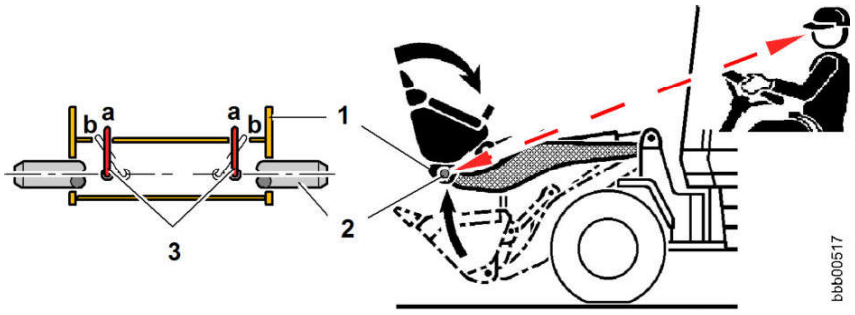

Fig. 420: Visual inspection

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

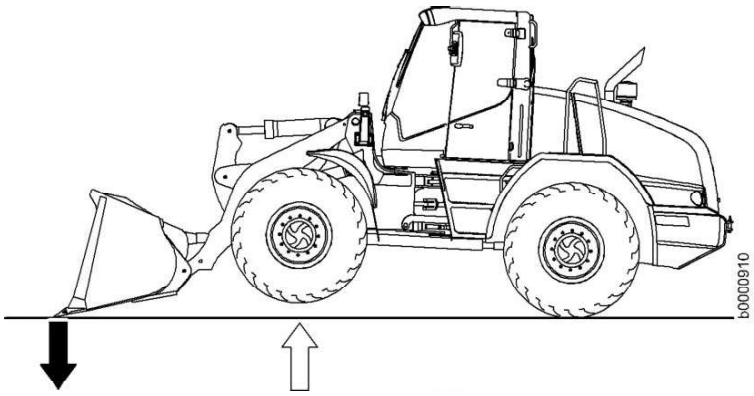

Fig. 421: Mechanical check

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

Connecting the hydraulic lines

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

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

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

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

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3.6 Transport

3.6.1 Transporting the machine

Lifting the machine by crane

NOTICE
The machine may leak fluids if it is tilted!

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

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

(For more information see: 2.4.15 Safety instructions for transporting the machine by crane, page 61)

Take the following precautions before lifting the machine by crane.

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

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

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

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

Find out about:
- The weight and collision dimensions of the machine: (For more information see: 1.2 Technical data, page 19)
- The required load bearing capacity and lengths of the lifting tackle.

Loading for lorry, rail or sea transport

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

Necessary equipment:

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Fig. 448: Transmission

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

Towing with the engine not running

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

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

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

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

Releasing the parking brake mechanically:

Fig. 449

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

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

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

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

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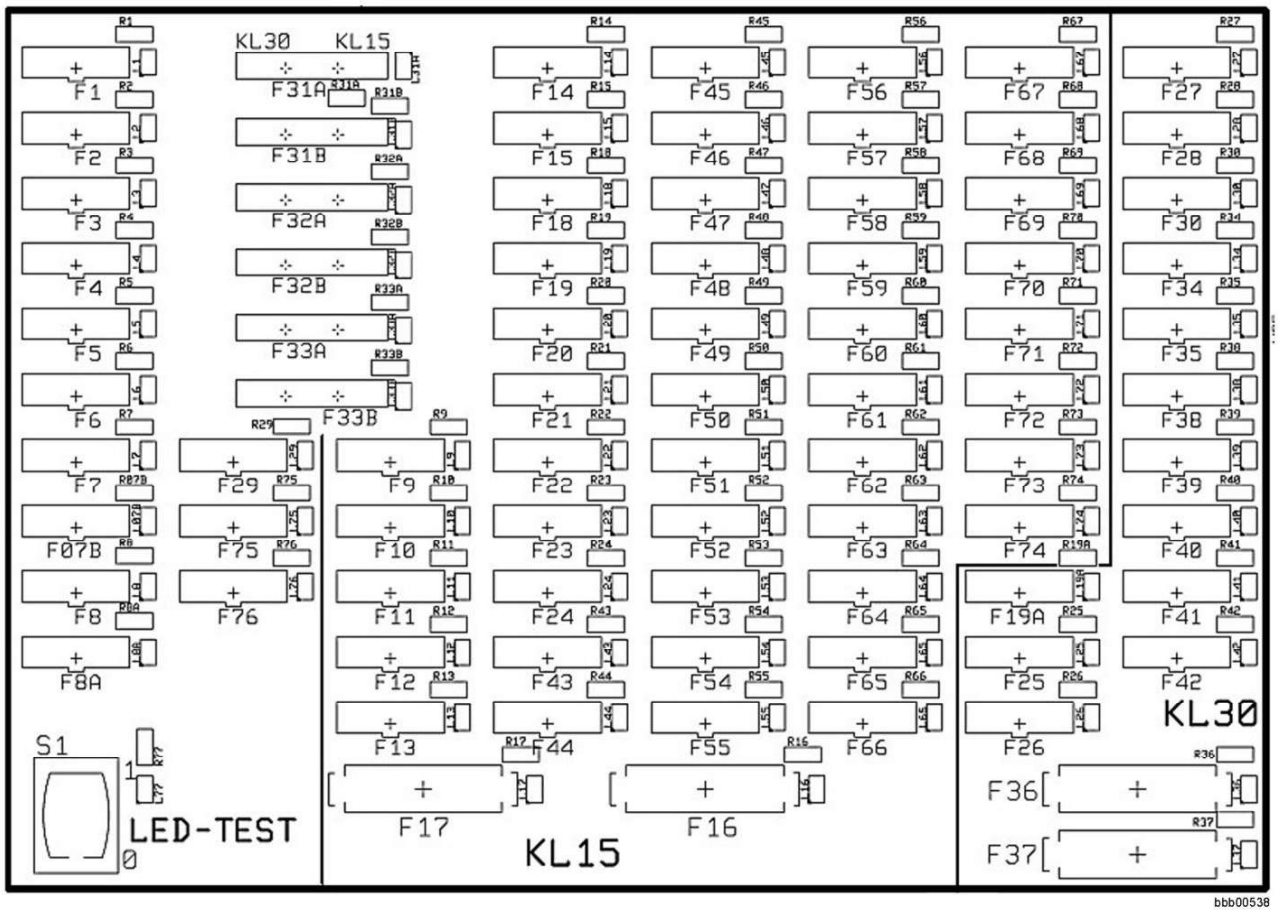

Fig. 462: Relay and fuse board

Fuse	Value	Unit	Designation/function	Location
F1	10	A	Spare	in the fuse box
F2	7.5	A	Left high beam	- II -
F3	7.5	A	Right high beam	- II -
F4	7.5	A	Left low beam	- II -
F5	7.5	A	Right low beam	- II -
F6	3	A	Left profile light/parking light	- II -
F7	3	A	Right profile light/parking light	- II -
F07b	10	A	Hazard warning lights	- II -
F8	15	A	Seat compressor (optional), (radio) cigarette lighter (X70)	- II -
F8A	10	A	Interior lighting, auxiliary heater clock (optional)	- II -
F9	10	A	LH control lever button, air conditioning system, optional keyboard	- II -
F10	5	A	Display unit	- II -
F11	10	A	Pressure switches B32, B28, B3, B3a	- II -
F12	20	A	Groeneveld central lubrication system	- II -

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Description	Recommended operating fluid	Symbol	Quantity
Diesel engine cooling system total capacity	Liebherr Antifreeze Mix Liebherr Antifreeze Concentrate	 06sy04ab	52 l
Windscreen washer system	Standard windscreen washer fluid or denatured alcohol	 b0000055	3.5 l
Air conditioning system refrigerant	R134a	 bsym0029	780^{+50} g
Refrigerant oil for air conditioning compressor	PAG ZXL 100PG		200 cm^3

Tab. 28: Recommended operating fluids

5.2.3 Lubrication chart

The lubrication chart provides an overview of the location of the maintenance points on the machine and of the maintenance intervals.

Information on:
- Performance of maintenance tasks (For more information see: 5.1 Maintenance and inspection schedule, page 295)
- Lubricants and fuels (For more information see: 5.3 Lubricants and fuels, page 304)
- Filling quantities (For more information see: 5.2 Filling quantities and lubrication chart, page 300)

Key:
1 = transmission
2 = front axle
3 = rear axle

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Liebherr hydraulic oil

Liebherr recommends the following hydraulic oils for the machine, according to the temperature range:

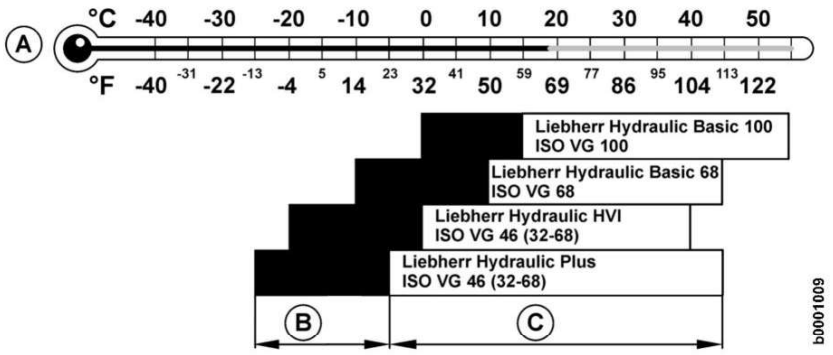

Fig. 471: Liebherr hydraulic oil, selection of viscosity class according to temperature

A Ambient temperature
B Cold start with warming-up procedure
C Operating range

Liebherr Hydraulic Plus is suitable as a bio oil as well as for long-term use.

If Liebherr oils cannot be purchased locally, you must use engine oils as described in the section on using “engine oil as hydraulic oil” (after consultation with customer service).

Using engine oil as hydraulic oil

When using non-Liebherr engine oils, we recommend that the customer first ask the oil manufacturer whether the product meets the following specifications.

Engine oils to be used as hydraulic oil must be selected according to the following specifications:

Single-grade oils (1)	API - CD / ACEA - E1
	(MB 226.0 and 227.0)
Multi-grade oils (2)	API - CD, CE, CF / ACEA - E2, E3, E4
	(MB 227.5, 228.1, 228.3 and 228.5)

Tab. 38: Classification of engine oil for use as hydraulic oil

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▷ Two gas-filled springs **3** hold the opened hatch in this position.

Troubleshooting
The function is not assured

▶ Contact Liebherr customer service.

Closing the engine compartment hatch

▶ Completely close the hatch **1** with the handle **2**.

▶ Lock the hatch with the ignition key.

Opening the engine compartment hood

When the hood is open, you can access the following units:
– Engine
– Splitter box
– Cooling system
– Hydraulic tank

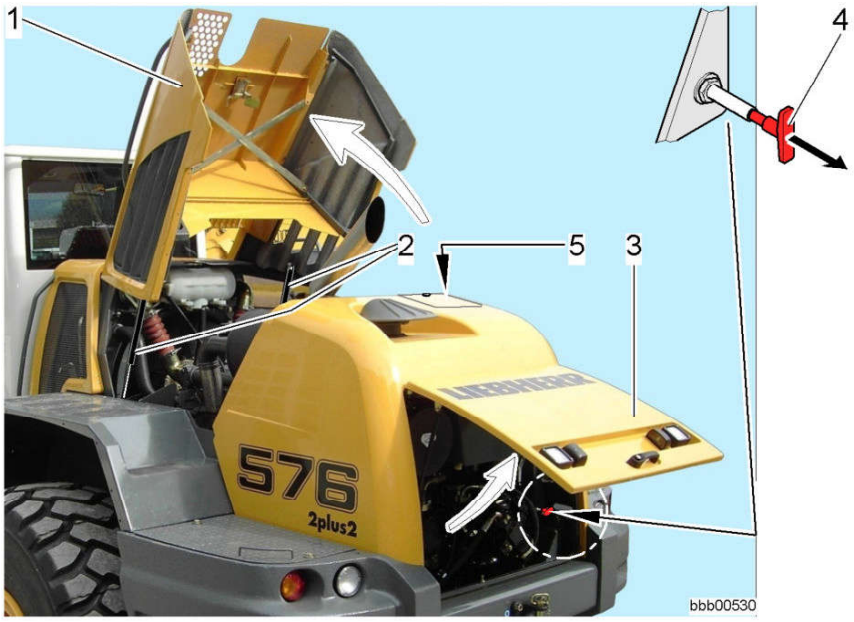

Fig. 485: Engine compartment hood

1 Engine compartment hood
2 Gas-filled springs
3 Engine compartment hatch
4 Cable lock
5 Hydraulic tank cover

▶ Open the engine compartment hatch **3**.

WARNING
Engine parts which are in motion can cause injury.
Rotating or moving engine parts, such as the fan blades or V-belts, can cause injury.

▶ Only open the engine compartment hood when the engine is shut down.

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- ❑ The engine compartment hood is open.
- ❑ The engine has cooled down.
- ❑ You have a suitable receptacle ready.
- ❑ Only use genuine LIEBHERR spare parts.
  (1 fuel pre-filter cartridge)

Procedure

DANGER
There is a risk of fire and explosions.

- ▶ Do not smoke.
- ▶ Avoid naked flames.
- ▶ Only work with the engine switched off and cooled down.

- ▶ Place a receptacle under the fuel pre-filter.
- ▶ Carefully clean the fuel pre-filter and the area around it.

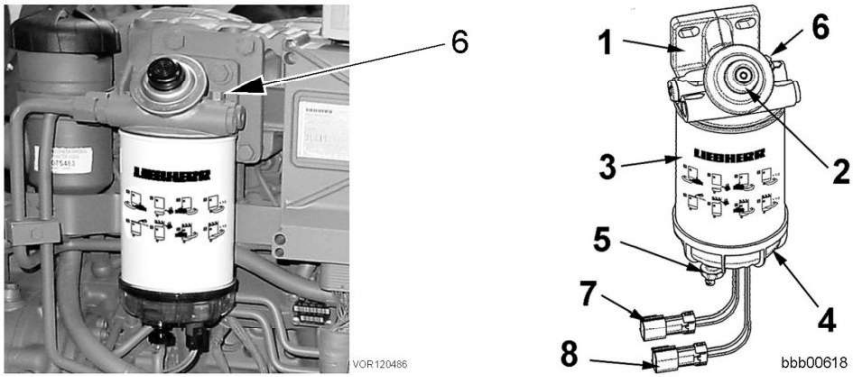

Fig. 497: Fuel prefilter cartridge

- ▶ Disconnect the electrical connections of the water level probe **8** and the fuel preheater **7** (optional).

Drain the fuel:

- ▶ Unscrew the bleeder screw **6** and drain plug **5**.
- ▶ Release the filter cartridges **3** with a strap wrench or similar tools and unscrew them.

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Procedure

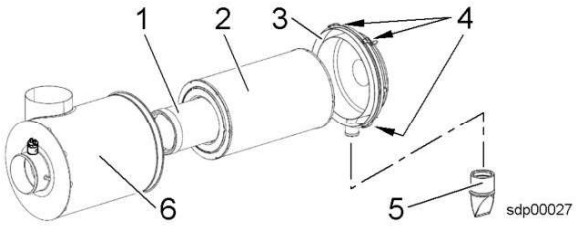

Fig. 509: Air filter

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 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.

Before installing the filter element, lightly oil the seal surface.

▶ (On the secondary element **1** this is the outside).

▶ Re-insert the filter elements **1** make sure that it is 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**.

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Procedure

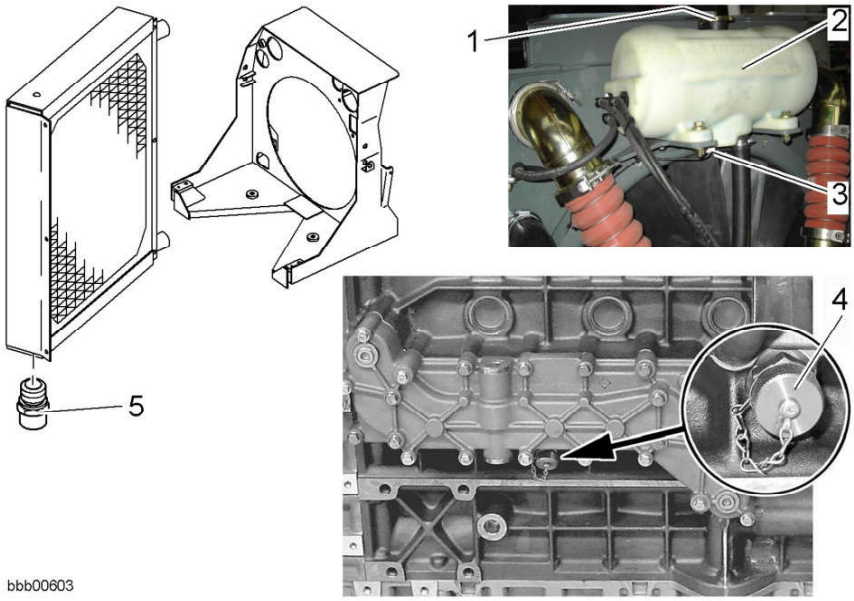

Fig. 521: Cooling system

1 Filler neck
2 Coolant equalizing reservoir
3 Coolant level sensor
4 Engine drain plug
5 Cooler drain valve

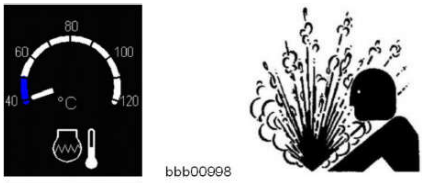

Fig. 522

CAUTION
There is a danger of scalding due to coolant escaping under pressure.

Only open the cap on the filler neck once the engine has cooled down.
▶ Check the coolant temperature.

▶ The coolant temperature display should be in the bottom third of the display.

▶ Open the sealing cap on the filler neck **1**.

▶ Unscrew the sealing cap on the cooler drain valve **5** and unscrew the drain hose. Drain the coolant into the receptacle.

▶ Take off the drain hose, screw the sealing cap onto the cooler drain valve **5** and tighten it.

Also drain the coolant from the engine:
▶ Open the drain plug **4** and let the coolant flow into the receptacle.

▶ Screw the drain plug **4** back in and tighten it.

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5.14 Transmission

5.14.1 Checking the transmission oil level

Note
Checking the oil level

▶ Check the oil level with the engine running and at a gear oil temperature of $20^{\pm 10}$ °C.

Make sure that the following requirements are fulfilled:
❑ The working attachment is lying flat on the ground.
❑ The articulation lock is engaged.

Procedure

▶ Start the engine and let it run at low idling speed.

Check the oil level with the engine running and at a gear oil temperature of $20^{\pm 10}$ °C.

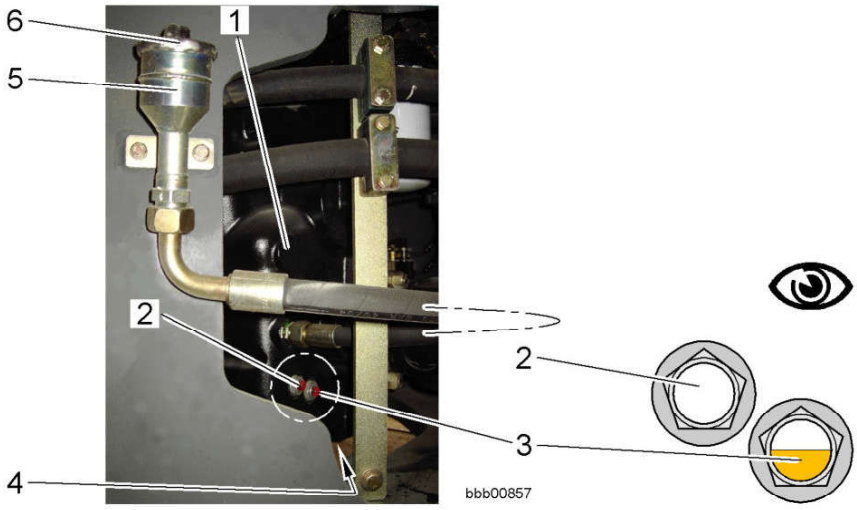

Fig. 534: Transmission

1	Transmission	**4**	Drain plug
2	Top sight glass	**5**	Filling tube
3	Bottom sight glass	**6**	Plug

▶ Check the oil level in the sight glasses **2, 3**.
▷ The oil level must be within the bottom sight glass **3**.

Troubleshooting
If the oil level is too low:

▶ Switch off the engine and top up with the required amount of gear oil. (For more information see: 5.3.8 Lubricating oils for transmissions, page 315)

▶ Repeat the check.

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5.18.3 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

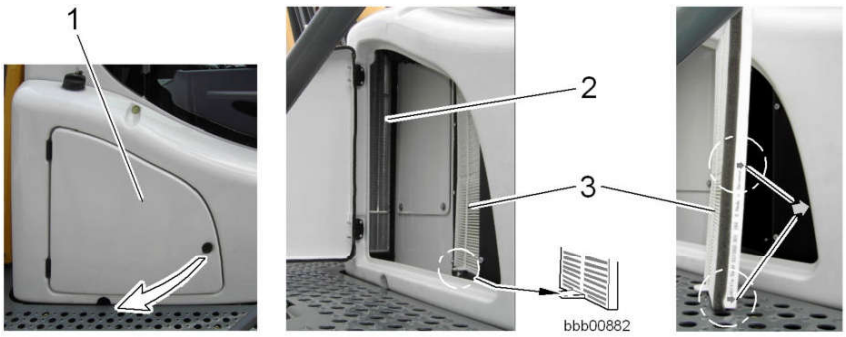

Fig. 552: Fresh air filter

- ▶ 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

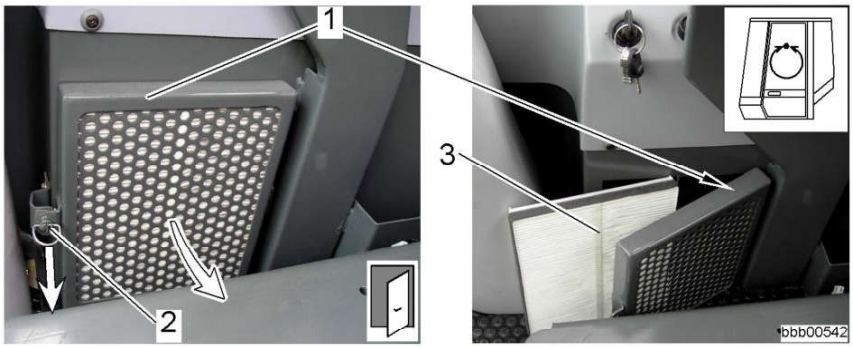

Fig. 553: Recirculated air filter

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

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5.21 Corrosion protection

If the machine will not be used for more than 4 weeks, especially on sea journeys, the following measures must be taken.

5.21.1 Protecting the piston rods from corrosion

Use a non-acidic corrosion protection grease to protect against corrosion.

Make sure that the machine is in maintenance position 1.

▶ Smear all exposed piston rods with a thick layer of oxygen-free anti-corrosion grease.

Note
If the cylinder piston rods are not coated with hydraulic oil for a prolonged period:

▶ Smear all piston rods with oxygen-free anti-corrosion grease.

When moving a machine thus protected for loading or transport, the scraper removes the grease from the piston rods in the cylinders.

If the machine is transported:

▶ Check the corrosion protection on the piston rods once again after loading.

5.21.2 Protecting the fuel tank from corrosion

If the machine is not used for a long time, condensation can collect in the tank.

Condensation in the tank leads to rust.

If the machine is not used for more than 2 months:

▶ Fill up the fuel tank with diesel.

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