en **Operator's manual**

Machine for Industrial Applications

Document ID

ORIGINAL OPERATOR'S MANUAL

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Product ID

Manufacturer: Liebherr-Hydraulikbagger GmbH
Type: LH 40 M Litronic
Type no.: 1202
From Serial no.: 89596

Conformity: CE

Contact

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1.1.2 Uppercarriage

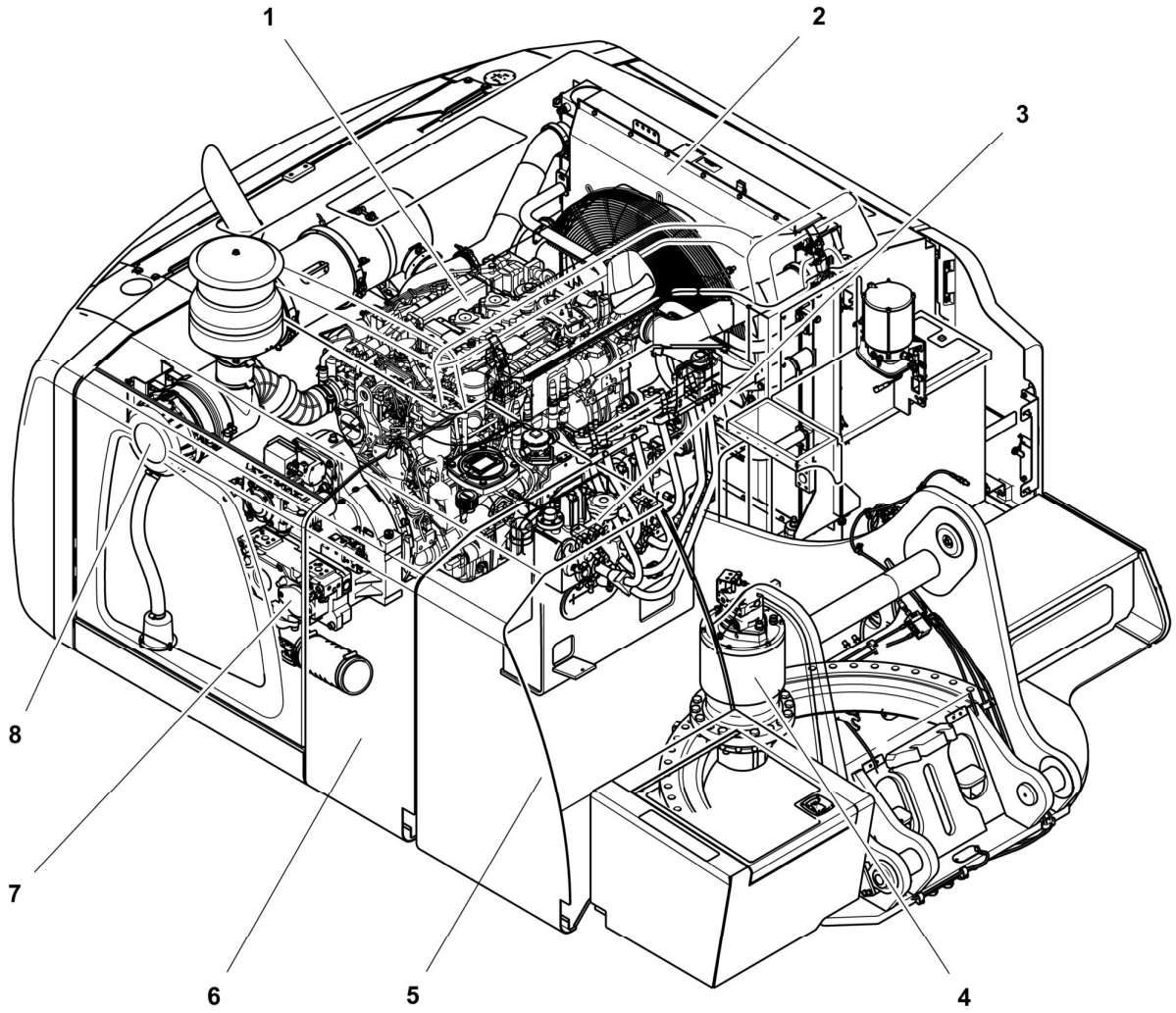

Fig. 3: Uppercarriage

1	Diesel engine	**4**	Slewing gearbox	**7**	Hydraulic pump
2	Control valve block	**5**	Fuel tank	**8**	Engine air filter
3	Engine cooling	**6**	Hydraulic tank		

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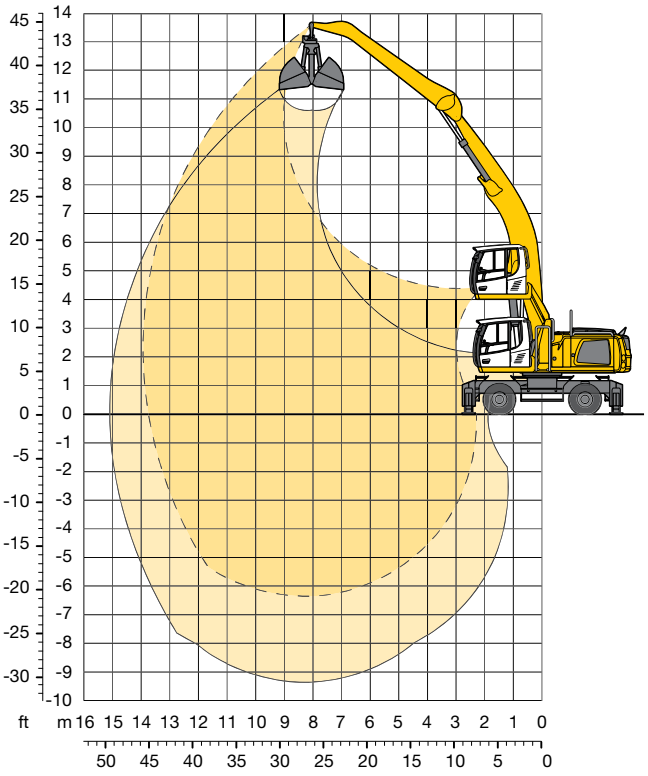
Attachment AF14 (Kinematic 2C)

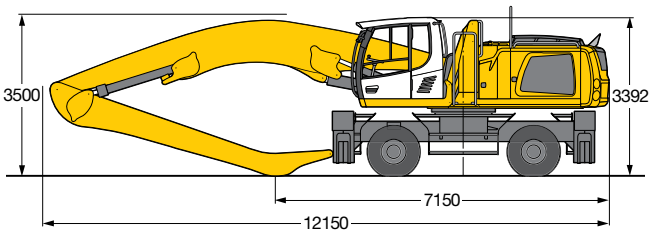


Operating Weight

The operating weight includes basic machine with 4 point outriggers, hydr. cab elevation, 8 solid tires plus intermediate rings, industrial-type angled mono boom 8.60 m and industrial-type flat angled stick 6.00 m.

with clamshell model GM 20B/1.50 m³ shells for loose material	38,600 kg

Dimensions



Industrial Stick 6.00 m

m	Undercarriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m		10.5 m		12.0 m		13.5 m		15.0 m				m
15.0	Stabilizers raised 4 pt. outriggers down																					
13.5	Stabilizers raised 4 pt. outriggers down																					
12.0	Stabilizers raised 4 pt. outriggers down									4.9 5.4*	5.4* 5.4*									4.1 5.2*	5.2* 5.2*	9.8
10.5	Stabilizers raised 4 pt. outriggers down									4.9 5.3*	5.3* 5.3*	3.6 5.0*	4.7 5.0*							3.2 4.9*	4.2 4.9*	11.1
9.0	Stabilizers raised 4 pt. outriggers down									4.9 5.3*	5.3* 5.3*	3.6 4.9*	4.7 4.9*	2.7 4.7*	3.6 4.7*					2.6 4.7*	3.6 4.7*	12.1
7.5	Stabilizers raised 4 pt. outriggers down									4.7 5.5*	5.5* 5.5*	3.5 5.0*	4.6 5.0*	2.7 4.7*	3.6 4.7*					2.3 4.6*	3.1 4.6*	12.8
6.0	Stabilizers raised 4 pt. outriggers down							6.0 6.6*	6.6* 6.6*	4.4 5.8*	5.8* 5.8*	3.4 5.2*	4.5 5.2*	2.6 4.8*	3.5 4.8*					2.0 4.5*	2.8 4.5*	13.3
4.5	Stabilizers raised 4 pt. outriggers down			11.2* 11.2*	11.2* 11.2*	7.7 8.6*	8.6* 8.6*	5.5 7.1*	7.1* 7.1*	4.1 6.1*	5.5 6.1*	3.1 5.4*	4.2 5.4*	2.4 4.9*	3.4 4.9*	1.9 4.5	2.7 4.5*			1.8 4.4	2.6 4.5*	13.7
3.0	Stabilizers raised 4 pt. outriggers down	3.1* 3.1*	3.1* 3.1*	9.8 13.1*	13.1* 13.1*	6.7 9.6*	9.2 9.6*	4.9 7.7*	6.7 7.7*	3.7 6.5*	5.1 6.5*	2.9 5.6*	4.0 5.6*	2.3 5.1*	3.2 5.1*	1.8 4.4	2.6 4.6*			1.7 4.2	2.5 4.5*	13.8
1.5	Stabilizers raised 4 pt. outriggers down	2.0* 2.0*	2.0* 2.0*	8.1* 8.1*	8.1* 8.1*	5.8 10.4*	8.2 10.4*	4.4 8.2*	6.1 8.2*	3.4 6.8*	4.7 6.8*	2.7 5.9*	3.8 5.9*	2.2 5.2	3.1 5.2*	1.7 4.3	2.5 4.6*			1.7 4.2	2.4 4.5*	13.8
0	Stabilizers raised 4 pt. outriggers down	3.1* 3.1*	3.1* 3.1*	6.8* 6.8*	6.8* 6.8*	5.2 11.0*	7.6 11.0*	4.0 8.6*	5.7 8.6*	3.1 7.1*	4.4 7.1*	2.5 6.0*	3.6 6.0*	2.0 5.0	2.9 5.3*	1.7 4.3	2.4 4.6*			1.6 4.2	2.4 4.5*	13.7
-1.5	Stabilizers raised 4 pt. outriggers down	4.4* 4.4*	4.4* 4.4*	7.1* 7.1*	7.1* 7.1*	4.9 11.1*	7.2 11.1*	3.7 8.7*	5.4 8.7*	2.9 7.2*	4.2 7.2*	2.4 6.0	3.4 6.1*	1.9 4.9	2.8 5.2*					1.7 4.3	2.4 4.5*	13.3
-3.0	Stabilizers raised 4 pt. outriggers down	5.6* 5.6*	5.6* 5.6*	7.1 7.8*	7.8* 7.8*	4.8 10.6*	7.1 10.6*	3.5 8.5*	5.2 8.5*	2.8 7.0*	4.1 7.0*	2.3 5.9	3.3 5.9*	1.9 4.9	2.8 4.9*					1.7 4.4*	2.6 4.4*	12.8
-4.5	Stabilizers raised 4 pt. outriggers down			7.2 8.7*	8.7* 8.7*	4.8 9.5*	7.1 9.5*	3.5 7.8*	5.2 7.8*	2.8 6.5*	4.1 6.5*	2.3 5.4*	3.3 5.4*	1.9 4.2*	2.8 4.2*					1.9 4.1*	2.8 4.1*	12.0
-6.0	Stabilizers raised 4 pt. outriggers down							3.6 6.5*	5.3 6.5*	2.8 5.4*	4.1 5.4*									2.4 4.3*	3.5 4.3*	10.4

Height | Can be slewed through 360° | In longitudinal position of undercarriage | Max. reach | * Limited by hydr. capacity

The lift capacities on the stick end without attachment are stated in metric tons (t) and are valid on a firm, level supporting surface with blocked oscillating axle. These capacities can be slewed through 360° with the undercarriage in the transverse position. Capacities in the longitudinal position of the undercarriage (+/– 15°) are specified over the steering axle with the stabilizers raised and over the rigid axle with the stabilizers down. Indicated loads comply with the ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity. The lift capacity values indicated are attained at the corresponding operating temperature. This operating temperature is ensured by continuous movement of the boom. Weights of fitted working tools (grabs, load hooks, etc.) and load accommodation equipment are to be deducted from the lift capacity values. The lift capacity of the unit is limited by its stability, the lifting capability of the hydraulic elements, or the maximum permissible lifting capacity of the load hook.
In accordance with the harmonised European Standard EN 474-5, hydraulic excavators used for lifting operations must be equipped with pipe fracture safety valves, an overload warning device, a load hook and a lift capacity chart.

2 Safety warnings

2.1 Information on these instructions

2.1.1 Representation of warning messages

Warning symbol

	The warning symbol warns of potential dangers. Obey all measures marked with this symbol to avoid injury or death.

Tab. 2: Warning symbol

Grading of warning messages

The grading of warning messages is defined by following signal words:

DANGER
WARNING
CAUTION
NOTICE

Definition of warning levels

	**DANGER**	Indicates an immediately hazardous situation which, if not avoided, will result in death or serious injury.
	**WARNING**	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	**CAUTION**	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE	Indicates a hazardous situation which, if not avoided, could result in property damage.

Tab. 3: Warning levels

2.1.2 Graphic symbols in these instructions

Symbol	Meaning
	**Note** Identifies useful information and tips.

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2.4 Signs on the machine

2.4.1 Warning signs

Note

- ▶ Make sure that all safety signs are in place on the machine and legible.
- ▶ Adhere to warning signs.

Safety belt sign

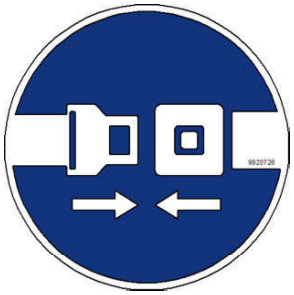

Fig. 15: Safety belt sign

Before putting machine into service, put on safety belt.

Safety glasses sign

Fig. 16: Safety glasses sign

Put on safety glasses before starting work.

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Sound power level L_{WA} sign

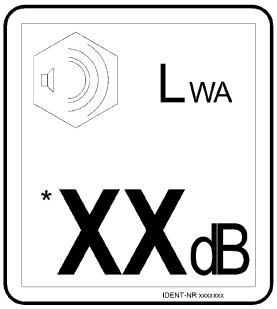

Fig. 40: Sound power level L_{WA} sign

Shows sound power level of the machine in dB(A).

Emergency lowering of operator's cab sign

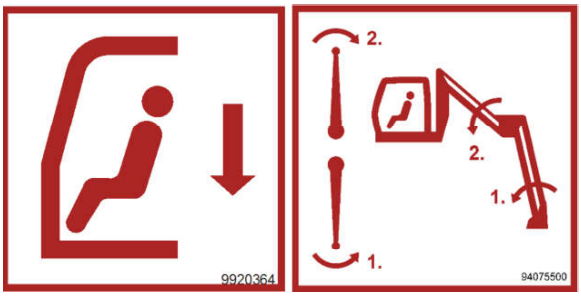

Fig. 41: Emergency lowering of operator's cab sign

This sign contains following information:
- Identifies location of emergency lowering.
- Identifies position of the levers for emergency lowering of the operator's cab.

Applies to machines with height adjustable cab

Windscreen washer tank sign

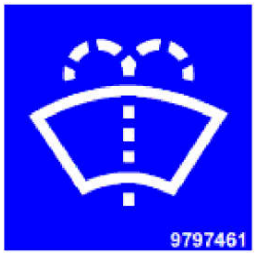

Fig. 42: Windscreen washer tank sign

Indicates filler pipe for windscreen washer fluid.

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- Make sure that everyone is able to operate the fire extinguishers.
- Make sure that everyone knows the local fire alarm possibilities.
- Make sure that everyone knows the local fire-fighting possibilities.
- Make sure that the source of fire is accessible.
- Before starting, unlock all locks of hoods and doors of machine.

2.6.3 Emergency command devices of machine

Depending on equipment, machine has following emergency command devices:
- Emergency stop device
- Emergency cut-off device
- Emergency brake

Danger to life

Defective emergency command devices

- Make sure that all emergency command devices are functioning correctly.
- Regularly check all emergency command devices for function.
- Have defective emergency command devices repaired immediately.

Damage to machine

Incorrect use of emergency command devices

- Exclusively use emergency command devices if there is immediate danger.

2.6.4 Emergency stop function of machine

Damage to diesel engine

Incorrect use of emergency stop equipment

- Exclusively use emergency stop equipment if there is immediate danger.
- If emergency stop equipment has been activated: Let diesel engine run in idle mode for a few minutes after next start.

2.7 Safe operation

2.7.1 Intoxicants

Danger to life

Physical and mental impairment

- Make sure that no persons working on or with the machine are under the influence of drugs.
- Make sure that no persons working on or with the machine are under the influence of alcohol.

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- Have installation and adjustment of safety equipment and safety valves approved by the manufacturer.
- Have welding work on load-bearing parts approved by the manufacturer.
- If attachment parts and add-on parts are not approved generally by Liebherr for installation or attachment: Do not attach or install attachment parts and add-on parts to machine without written approval from Liebherr.
- Send all technical documents required for approval to Liebherr.

Damage

- If attachment parts and add-on parts are supplied via the machine's hydraulic system: Make sure that different oil types are not mixed.

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Symbol	Meaning
	Rotary stick; neutral position required
	Grapple active
	Turn grapple; neutral position required
	Open grapple and close grapple; neutral position required
	Main movements of working attachment and slewing gear blocked
	Main movements of working attachment and slewing gear; neutral position required
	Hoist cylinder damping switched off
	Stick cylinder damping switched off
	Boom line break safety open
	Stick cylinder shut-off active
	Stick cylinder shut-off bypassed
	Stick cylinder shut-off for heavy working tool active
	Stick cylinder shut-off for heavy working tool bypassed
	Hoist cylinder shut-off active

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Symbol	Meaning
	Bleeding of cooling circuit active
	Heating circuit active

Tab. 17: Status symbols of SCR system

Rail guide system

Symbol	Meaning
	Rail guide system: Additional tyres blocked
	Automatic mode not active
	Neutral position required
	Rail guide system automatically blocked

Tab. 18: Status symbols of rail guide system

3.2.3 *Start page* menu

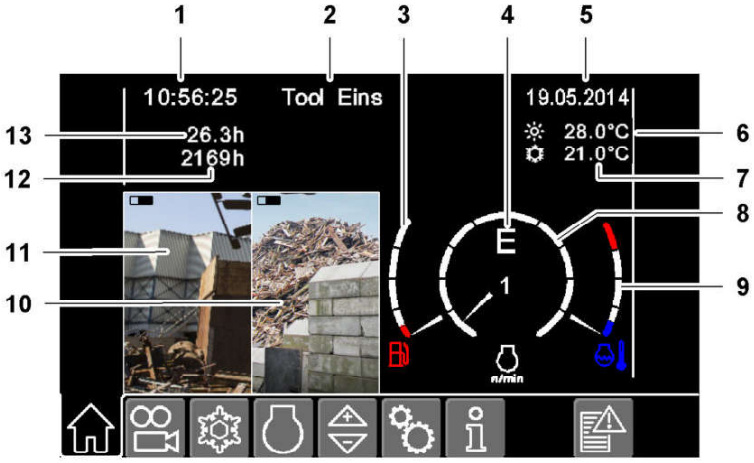

Fig. 219: Start page menu

1 Time **8** Rev counter

See next page for continuation of the image legend

Activating write access

DANGER
Unexpected machine movement!
Danger to life.

▶ Make sure there are no persons in working area of machine.

Note
Malfunctions in machine control!

▶ Do not operate machine during write access by Liebherr customer service.

▶ Press *teleservice* **1** button when asked to do so by Liebherr customer service.
▷ *Teleservice* **1** button is displayed in green:

▷ *Teleservice active* symbol is displayed:

▷ Online connection is enabled.
▷ Liebherr customer service has write access to machine control parameters.

Deactivating write access

Liebherr customer service deactivates write access.

Read access

Read access is always possible for Liebherr customer service. It is not necessary that the operator enables the online connection.

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Super Finish submenu

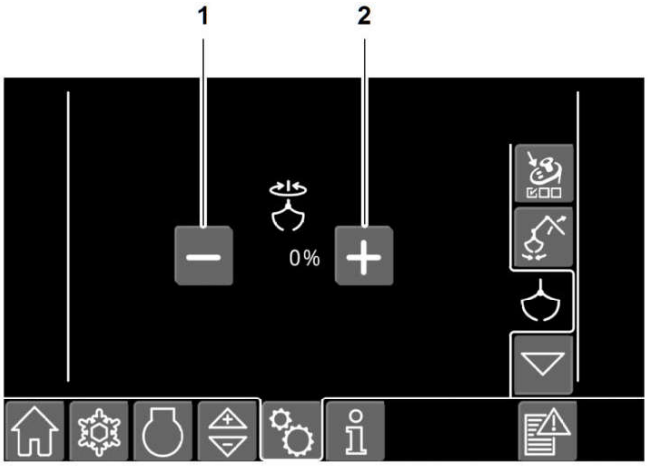

Fig. 287: SF submenu: Grapple fine adjustment

1 *Reducing sensitivity* button **2** *Increasing sensitivity* button

AutoLift fine adjustment menu button[7)]

Fine adjustment of speed of automatic lifting of boom while the grapple is closed.
(For more information see: 3.4.32 AutoLift (Option), page 176)

Grapple fine adjustment menu button

Fine adjustment of speed and force[8)] for *closing grapple* and *turning grapple*

Servo control fine adjustment menu button[9)]

Fine adjustment of speed as upper limit for all SuperFinish functions

Slewing gear fine adjustment menu button

Fine adjustment of rotating speed of uppercarriage

Travel drive fine adjustment menu button[10)]

Fine adjustment of speed of travel drive

Travel gear fine adjustment menu button[11)]

Fine adjustment of speed of travel gear

Boom and stick fine adjustment menu button

Fine adjustment of speed of boom and stick

Adjustable boom fine adjustment menu button[12)]

Fine adjustment of speed of adjustable boom

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7) Applies to machines with AutoLift
8) Option LH 110 and LH 150
9) Applies to machines with adjustable control pressure limitation
10) Applies to wheeled excavators
11) Applies to machines with travel gear
12) Applies to machines with adjustable boom

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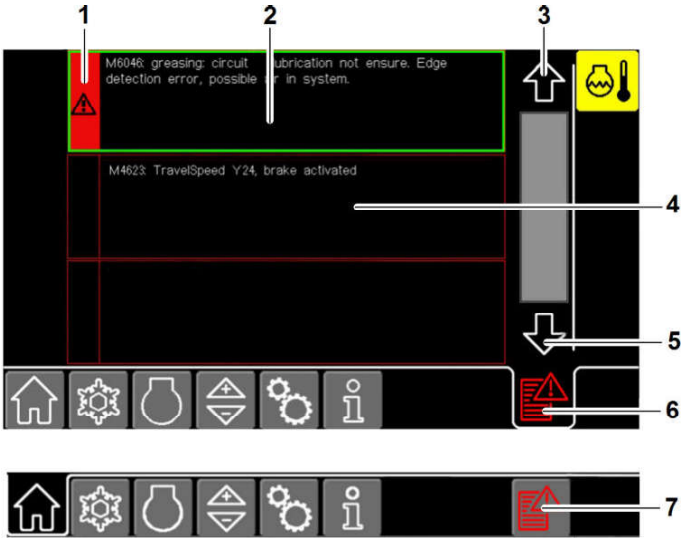

Fig. 320: Service codes menu

1	*New service code* button	**5**	*Scroll-down* button
2	Text field	**6**	*Service codes* menu
3	*Scroll-up* button	**7**	*Service codes* button
4	Text message		

If exclusively a text message **4** appears in *service codes* menu **6**:
– Message is not up to date.
– Message is not confirmed.

If *service codes* button **7** flashes red:
▶ Open *service codes* menu **6**: Press *service codes* button **7**.
▷ *New service code* button **1** appears in red:

▶ Read message in text field **2**.

▶ Confirm message: Press *new service code* button **1**.
▷ *New service code* button **1** appears in white:

▷ *Service codes* button **7** flashes white:

▶ Rectify fault.

If it is not possible to rectify fault:
▶ Contact Liebherr customer service.

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Adjusting horizontal suspension

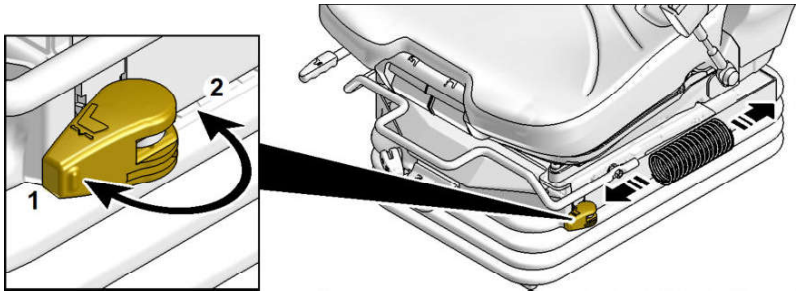

Fig. 345: Adjusting horizontal suspension

1 Horizontal suspension inactive **2** Horizontal suspension active

Adjusting height and adjusting seat to body weight

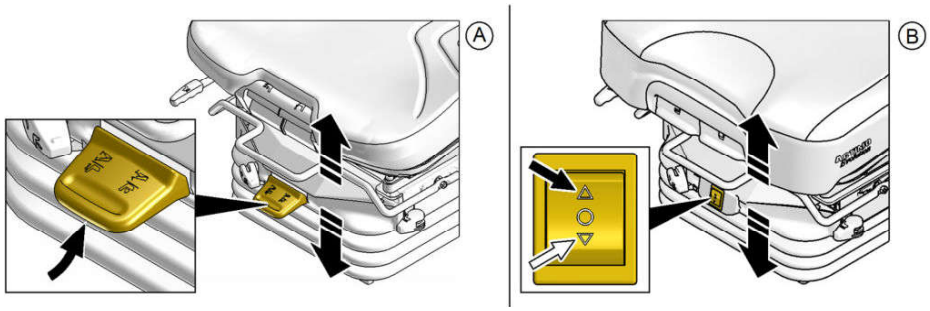

Fig. 346: Adjusting height and adjusting seat to body weight

A Manual adjustment **B** Pneumatic adjustment[15)]

Adjusting seat height

Adjusting seat hight manually

▶ Raise operator's seat: Pull lever up.

▶ Lower operator's seat: Push lever down.

When limit stop is reached during adjustment:

▶ Make sure that operator's seat has finished automatic height adjustment to ensure minimum travel.

Adjusting seat height pneumatically (option)

NOTICE
High load on compressor!
Damage to compressor.

▶ Do not press button for longer than 1 minute.

▶ Raise operator's seat: Press top of button.

15) Option

▶ Pull lower windscreen downwards until it engages.

▶ Simultaneously turn extender wheels **2** downwards.

Upper windscreen

NOTICE
Windscreen collides with steering wheel!
Damage to windscreen.

▶ Make sure that steering column is swivelled away from windscreen during opening and closing.

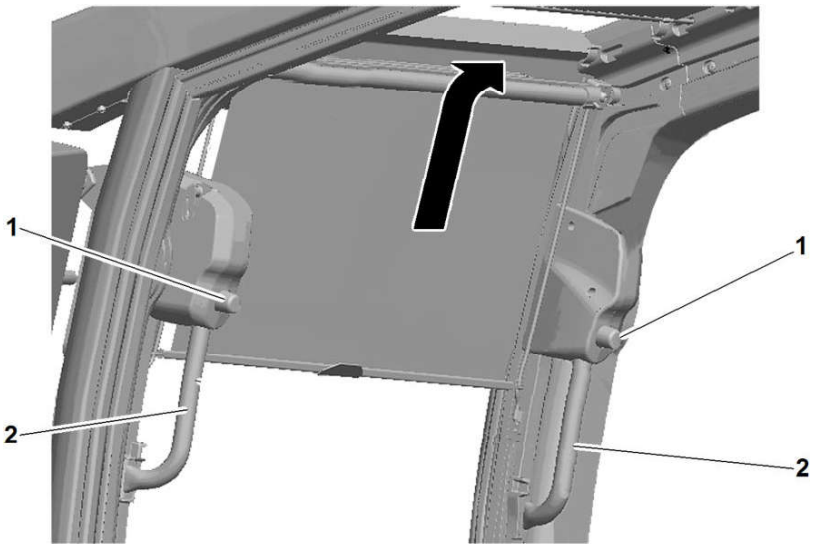

Fig. 372: Upper windscreen

1 Knob **2** Handle

Opening upper windscreen

Make sure the following preconditions are met:
❑ Steering column is swivelled away from windscreen.

▶ Unlock upper windscreen: Press knobs **1** simultaneously.

▶ Push upper windscreen upwards with handles **2** and pull back until it engages in roof of operator's cab.

▶ Swivel steering column into working position.

Closing upper windscreen

Make sure the following preconditions are met.
❑ Steering column is swivelled away from windscreen.

▶ Unlock upper windscreen: Press knobs **1** simultaneously.

▶ Pull upper windscreen forwards and downwards with handles **2** until it engages in front in operator's cab.

▶ Swivel steering column into working position.

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3.4.2 Refuelling

The machine is refuelled at the top of fuel tank. The tank lid can be locked.

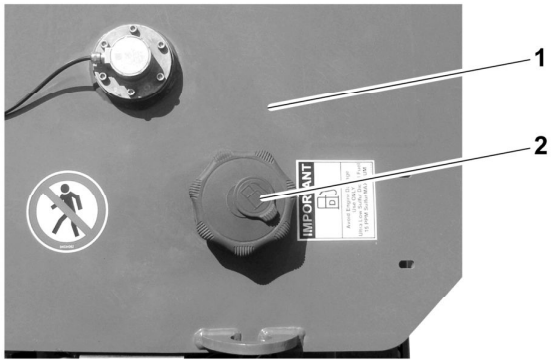

Fig. 410: Fuel tank

1 Fuel tank **2** Tank lid

DANGER
Explosion of highly flammable fuel!
Danger to life.

- ▶ Avoid naked flames.
- ▶ Do not smoke.

Note
Sulphur content of fuel affects change interval of engine oil and oil filter.

- ▶ Adhere to sulphur content of fuel and change intervals of engine oil.

If sulphur content of fuel is not known:

- ▶ Determine sulphur content with oil analysis set.

- ▶ Shut off diesel engine.
- ▶ Unlock tank lid **2**.
- ▶ Open tank lid **2**.
- ▶ Fill with clean fuel through strainer until required fuel fill level is reached.
- ▶ Close tank lid **2**.
- ▶ Lock tank lid **2**.

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▶ Assume last active operating mode: Press *MODE* key.

or

Select operating mode S, E and P: Press *MODE* key until required operating mode is active.

or

Select operating mode P+: Turn engine speed controller.

3.4.12 After starting

Operating machine

DANGER
Exhaust gases!
Danger to life.

▶ Exclusively run diesel engine in enclosed rooms if there is adequate ventilation.

▶ Ensure sufficient fresh air supply.

DANGER
Sluggish control!
Danger to life.

▶ Before putting load on machine, bring diesel engine and hydraulic oil to operating temperature.

▶ Carefully move machine to open ground.

▶ Before starting work, check all safety relevant functions.

During operation, check following points:
– Oil pressure is constant.
– Output and speed are constant.
– Exhaust gas is colourless.
– Coolant temperature is constant.
– Diesel engine sounds are normal.

▶ Plan a warm-up phase.

▶ Plan work so that the diesel engine can run at operating temperature for as long a period as possible.

▶ Monitor diesel engine during operation.

▶ Adhere to error messages and status symbols on the display.

If malfunctions occur in diesel engine:
▶ Shut off diesel engine immediately.

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Oscillating axle switch and service brake		Angle of rotation of uppercarriage	Effect on oscillating axle	Symbol on the display
Automatic system active and service brake closed	A	α < 15°	Oscillating axle is locked by oscillating axle support automatic.	
		α > 15°	Oscillating axle is locked by angle-controlled oscillating axle locking.	
Automatic system active and service brake open	A	α < 15°	Oscillating axle is unlocked.	-
		α > 15°	Oscillating axle is locked by angle-controlled oscillating axle locking.	

Tab. 39: Behaviour of oscillating axle in different settings

Locking and unlocking oscillating axle in oscillating axle support automatic operating mode

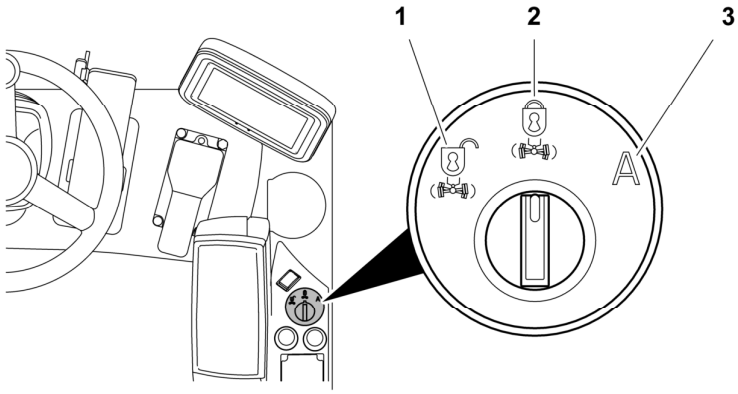

Fig. 481: Oscillating axle switch

1 Oscillating axle unlocked
2 Oscillating axle locked
3 Oscillating axle support automatic

DANGER
Machine tipping over!
Danger to life.

- ▶ Release service brake exclusively if travelling without load.
- ▶ Release service brake exclusively if working without load.

- ▶ Activate oscillating axle support automatic: Set oscillating axle switch to oscillating axle support automatic **3**.
- ▶ Lock oscillating axle: Lock service brake.
  ▷ *Oscillating axle locked* status symbol appears on the display:

Controlling working tool

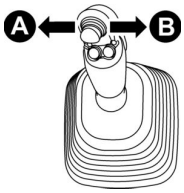

Fig. 518: Controlling working tool with mini-joystick

▶ Move right mini-joystick **1** in direction **A** or **B**.

3.4.31 Grapple priority (option)

For reduced grapple priority adhere to following points:
– Control limits hydraulic pressure of grapple.
– Closing force of grapple is reduced.
– Hydraulic system has sufficient oil flow for fast and smooth working attachment movements.

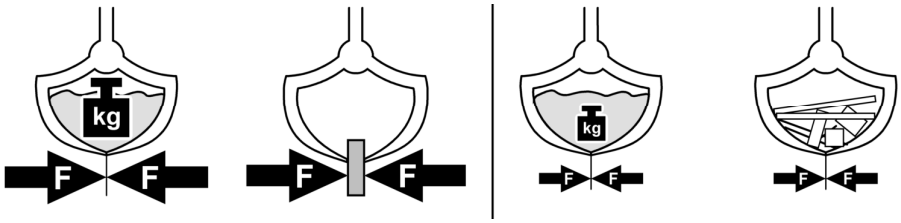

Fig. 519: Differently powerful closing forces for loads of different weights

WARNING
Falling load!
Danger to life.

▶ Make sure there are no persons in danger zone

▶ Deactivate grapple priority before picking up heavy loads.

Key	Status of LEDs	Function
	○ ○ ○	Grapple priority: Suitable for loads that require a significant closing force from the grapple. Working attachment movements are slower.
	✹ ✹ ✹	Reduced grapple priority: Suitable for loads that require a low closing force from the grapple. Working attachment movements remain fast and smooth.

Tab. 46: Grapple priority key

Make sure the following preconditions are met:
❑ Grapple is selected in *Tool Control* menu.
❑ *Grapple* status symbol appears on the display.

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▶ Hand over key to supervisor.

Switching on height limitation

Make sure the following precondition is met:
❑ Height limitation is enabled.

▶ Press *height limitation* button.

▶ Press confirmation button.
▷ *Height limitation* button lights up green:

Switching off height limitation

Make sure the following precondition is met:
❑ Height limitation is enabled.

▶ Press *height limitation* button.

▶ Press confirmation button.
▷ *Height limitation* button lights up white:

Setting limits of height limitation

DANGER
Incorrectly set limit values!
Danger to life.

▶ After changing limit values inform all operators of machine.

▶ When changing working tool, make sure that correct operating mode is selected.

▶ Make sure that oscillating working tools do not collide with obstacles.

DANGER
Geometry data settings incorrect!
Danger to life.

▶ When changing working attachment make sure that Liebherr customer service reprograms geometry data.

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3.6 General working methods

3.6.1 Working without damaging the machine

Comply with the following points in order to increase the service life of the machine and to avoid unnecessary damage and the need to carry out repairs as a result:

- Repeated striking of the working attachments against hard material will lead to damage to the machine. Do not use the working attachment to strike against material or objects to be demolished.
- Certain combinations of boom, stick and working tool mean that the working tool can strike against or penetrate the operator's cab. This can damage the operator's cab and injure the machine operator.
- The slewing gear can be damaged if the rotary motion is obstructed by an opposing force. Do not use the slewing gear to force the working attachment to penetrate material.
- The machine can be damaged by being raised using the working attachment. Do not lift the machine using the working attachment. If this does happen inadvertently nevertheless, lower the machine slowly onto the ground. Do not allow the machine to drop quickly, and do not attempt to cushion the drop using the hydraulics.

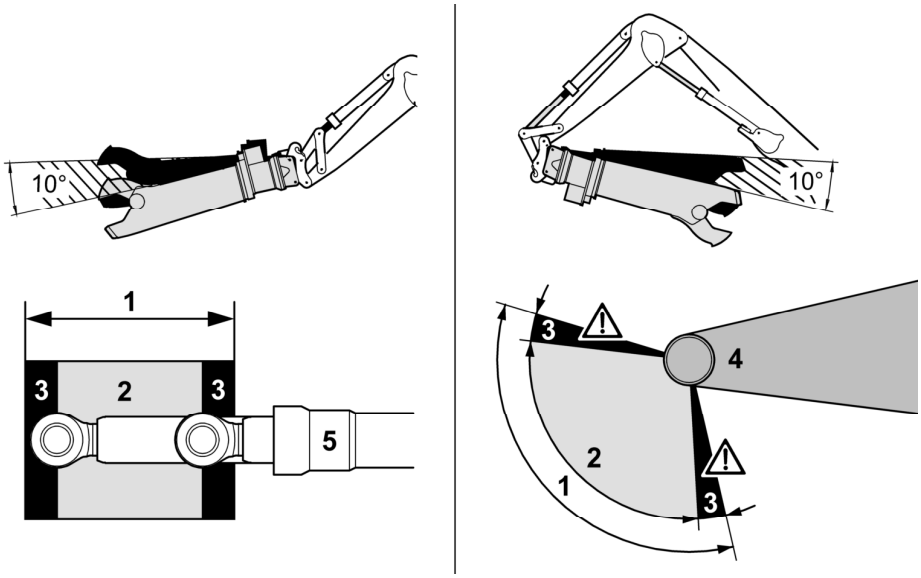

Fig. 588: Permissible working range for hydraulic cylinders

1 Possible slewing range
2 Permissible working range with 10° distance from the limit position
3 Boundary area
4 Boom or stick
5 Hydraulic cylinder

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3.9 Transport

3.9.1 Preparatory activities

Take the following precautions before driving onto the low-loader:

- ▶ Place the chocks ready
- ▶ Clean the snow, ice and dirt off the tyres or the travel gear[20)] , ramp and loading surfaces.

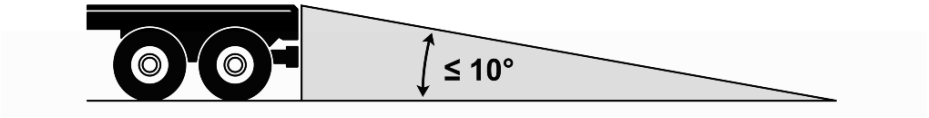

Fig. 592: Loading ramp

- ▶ If required, use a suitable ramp. Inclination angle: **maximum 10°**

3.9.2 Driving machine onto low-loader

DANGER
Machine tipping over!
Danger to life!

- ▶ Work with spotter.

- ▶ Align machine with the loading ramp.
- ▶ Drive slowly onto low-loader.
- ▶ Lower working attachment.

If machine is equipped with wheeled undercarriage:

- ▶ Press *parking brake* key.

- ▶ Shut off diesel engine.
- ▶ Depressurise hydraulic system. (For more information see: 5.10.1 Depressurising hydraulic system, page 286)
- ▶ Move folding console up.

If machine is equipped with energy recuperation cylinder and block type ball valves on hoist cylinders:

- ▶ Close block type ball valves on hoist cylinders.
- ▶ Close and lock doors, covers and hoods on machine.
- ▶ Fold in mirrors.

[20)] Depending on travel gear type

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4 Malfunctions

Machine reports machines through following warnings:
- Warning symbols on the display
- Messages on the display
- Warning sounds in the operator's cab

Rectify malfunction:
- Identify meaning of warning.
- Identify effects and property of malfunction.
- Rectify cause of malfunction.

Contact Liebherr customer service:
- Specify machine type.
- Specify serial number.
- Specify year of manufacture.
- When work is performed on the machine:
  Make sure that the work is performed exclusively by trained staff.

4.1 Service code tables

4.1.1 Warning symbols

Symbol	Meaning	Effect, characteristic	Remedy
	Battery voltage is too high. Alternator is defective.	Electrical system is damaged.	Shut off diesel engine. Contact Liebherr customer service.
	Battery voltage is too low. Alternator is defective. Battery is defective.	Functionality is restricted.	
	Hydraulic oil level is too low. Hydraulic system leaks, oil loss.	Hydraulic system is damaged. Hydraulic output is reduced automatically.	Shut off diesel engine. Fill with hydraulic oil. If symbol is still displayed: Contact Liebherr customer service.
	Prewarning: Hydraulic oil temperature is high.	Hydraulic system is damaged. Hydraulic output is reduced automatically.	Shut off diesel engine. Check hydraulic oil cooler for contamination. Clean if necessary. If symbol is still displayed: Contact Liebherr customer service.
	Hydraulic oil temperature is too great. Hydraulic oil cooler is contaminated. Fan drive of hydraulic oil cooler is defective.		

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4.2.3 Electrical system

Malfunction / error	Cause	Remedy
Charge indicator symbol is displayed after the engine starts.	V-belt is loose.	Tighten v-belt.
	V-belt has torn.	Replace v-belt.
	Alternator is defective.	Contact Liebherr customer service.
Batteries are not charged, or not charged sufficiently.	Batteries are faulty.	Replace batteries.
	Battery connections are loose.	Attach battery connections.
	Battery connections have oxidised.	Clean battery connections.
	Cables are loose.	Connect cables.
	Cables are damaged.	Replace cables.
Malfunction of control elements and display elements has occurred.	Cables are loose or damaged. Control is defective.	Contact Liebherr customer service.
	Fuse is defective.	Replace fuse.
Engine speed cannot be changed.	Sensor-controlled low idle automatic is switched on.	Switch off sensor-controlled low idle automatic or touch joystick.
Sensor controlled low idle automatic is not working. Engine speed does not drop automatically.	Control signal is faulty.	Contact Liebherr customer service.

4.2.4 Heating, ventilation and air conditioning unit

Malfunction / error	Cause	Remedy
Heating does not provide warm air.	Heat supply is interrupted. Control is defective.	Contact Liebherr customer service.
Blower is not working.	No power supply present. Blower motor is defective.	Contact Liebherr customer service.
Blower output is too low.	Filter is contaminated.	Replace filter.
	Air outlets are closed.	Open air outlets.
Air conditioning unit is not cooling.	Air conditioning condenser is contaminated.	Clean air conditioning condenser.
	Temperature sensor, air conditioning compressor or other parts of air conditioning unit are defective.	Contact Liebherr customer service.

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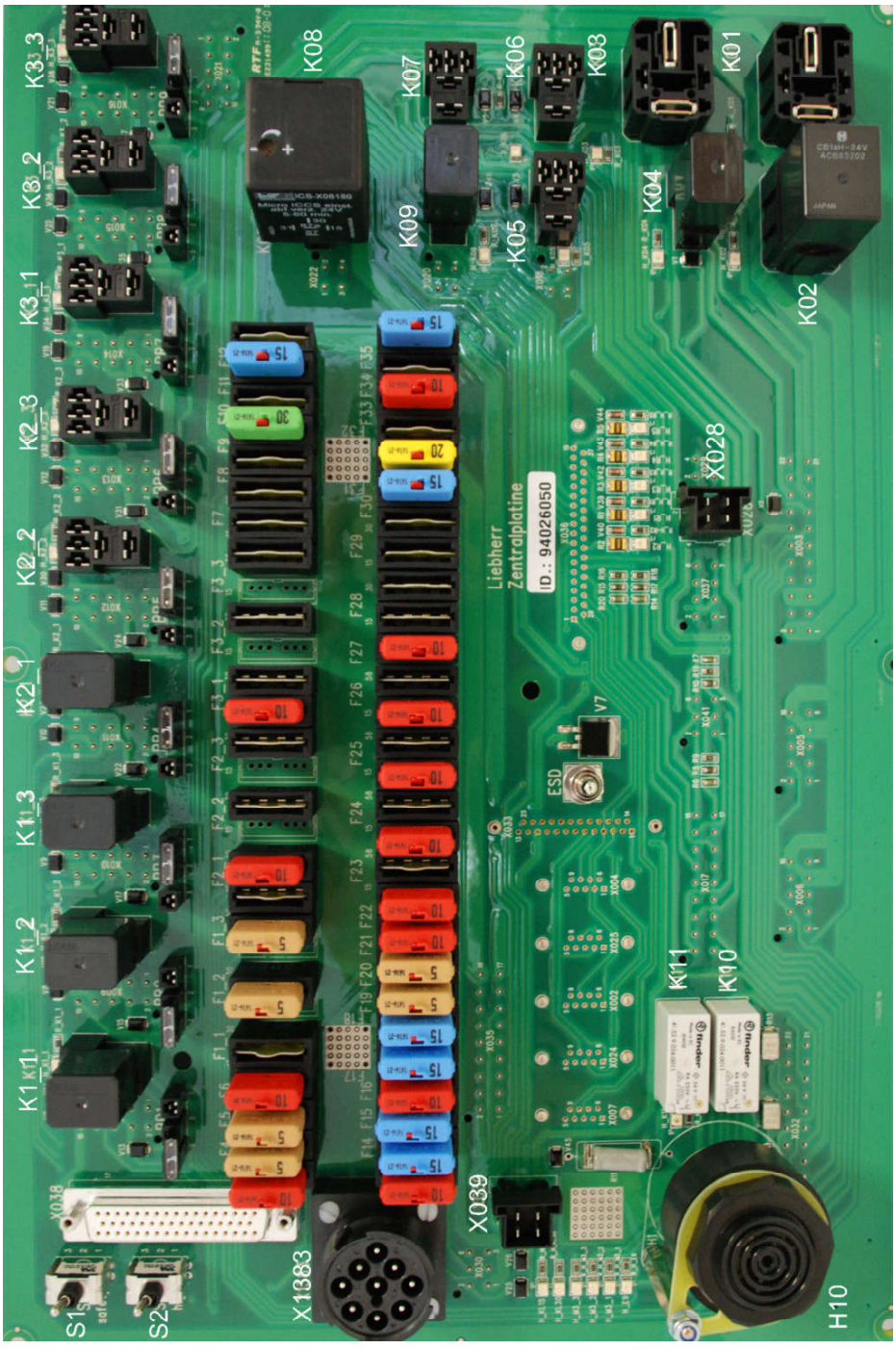

Fig. 680: Main circuit board A161

Fuse	Consumer	Rating [A]
F1_1	Turn indicator	10
F1_2	K1_2, parking light left, reversing light left, licence plate lighting left	5
F1_3	K1_3, parking light right, reversing light right, licence plate lighting right	5

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
						✧		Check cold output after starting air conditioning unit or after repair.		
						✧		Having a refrigeration technician check the function of air flaps, pressure switches and defrost thermostat.		
			❍	❍	❍			Check whether safety belt is available and functioning.		
Lubrication system										
☐		●	❍	❍	❍	✦		Lubrication system: Fill with grease.		304
☐		●	❍	❍	❍			Checking lubrication of bearings (grease collar).		305
☐		●	❍	❍	❍			Pipes, hoses and lubricating points: Check tightness and condition.		306
			☐	❍	❍			Uppercarriage: Check function of entire system, pumps and control (at least once a year).		306
☐	●	●	❍	❍	❍			Undercarriage: Check function of entire system, pumps and control.		306
Slewing gearbox and slewing ring										
				❍	❍			Slewing gear: Check mounting.		
☐		●	❍	❍	❍			Slewing gearbox: Check oil level.		312
				❍	❍			Slewing gearbox: Take oil sample for oil analysis. .		
			☐	❍	❍			Slewing gearbox: Change oil.		
				❍	❍			Slewing gear brake: Check function.		

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5.3.7 Gear oils

Gear oils specified in the table are not suitable for following gearboxes:
- Transmission (For more information see: 5.3.8 Transmission oils, page 255)
- Pump distributor gear (For more information see: 5.3.9 Pump distributor gear oils, page 256)
- Automatic transmission

Liebherr recommendation

Ambient temperature	Description
-30 to 50 °C	Liebherr Gear Basic 90 LS
-35 to 50 °C	Liebherr Gear Plus 20W-40
-30 to 50 °C	Liebherr Gear Hypoid 90 EP
-25 to 50 °C	Liebherr Hypoid 85W-140 EP
-40 to 50 °C	Liebherr Syntogear Plus 75W-90

Tab. 82: Liebherr recommendation

Minimum quality requirements

Specification
API: GL-5
MIL-L: 2105 D or E, PRF-2105 D or E

Tab. 83: Minimum quality requirements

Adhere to device specifications according to ZF approvals.

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

5.3.8 Transmission oils

Liebherr recommendation

Description
Liebherr Motoroil 5W-30
Liebherr Motoroil 5W-30 low ash
Liebherr Motoroil 10W-40
Liebherr Motoroil 10W-40 low ash

Tab. 84: Liebherr recommendation

Minimum quality requirements

Specification
LH-00–ENG3A

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NOTICE
Incorrect cleaning with high pressure water or steam cleaning!
Damage to electrical systems, cables and wire harnesses.

- ▶ Clean electrical systems, cables and wire harnesses with low pressure.
- ▶ Observe instructions of high pressure cleaner manufacturer.

NOTICE
Incorrect cleaning with high pressure water or steam cleaning!
Damage to paint.

- ▶ Do not clean machine with a high pressure cleaner for two months after first putting it into service (or after respraying).
- ▶ Observe instructions of high pressure cleaner manufacturer.

Cleaning outside of machine

Before cleaning

Before cleaning with water or a high-pressure cleaner, perform following activities in order to avoid water penetration.

- ▶ Turn ignition button to position **0**.
- ▶ Lubricate all bearings, pin connections and slewing ring, using central lubrication system, if available.
- ▶ Clean away oil, fuel or care products off connections and fittings.

If sensitive parts behind openings have to be protected from penetrating water:
- ▶ Cover or mask off openings.

Parts particularly at risk are:
- Electric motors
- Electric components
- Switch cabinets
- Plug connections
- Transmitters
- Air filters

Cleaning

- ▶ Use lint-free cleaning cloths.
- ▶ Do not clean machine with aggressive cleaning agents or flammable liquids.
- ▶ Soften up dirt with water.
- ▶ Rinse off softened dirt with water.

If fire warning and extinguishing system is fitted:
- ▶ Make sure that there is no possibility of the temperature sensors coming into contact with hot liquids during cleaning of the engine compartment.

After cleaning

- ▶ Check all fuel lines, engine oil lines and hydraulic lines (leaks, loose connections, chafe marks and damage).
- ▶ Immediately rectify any defects that are detected.

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- ▶ Clean sealing surface in filter housing **1** with damp cloth.
- ▶ Check insides of bowl **2** and filter housing **1** and for damage.
- ▶ Check sealing surface in the filter housing **1** for damage.
- ▶ Clean sealing surfaces on bowl **2** and filter housing **1** with damp cloth.
- ▶ Check sealing surfaces for damage.
- ▶ Insert main filter cartridge **5**.
- ▶ Make sure that main filter cartridge **5** is tight and has a firm seat.
- ▶ Set bowl **2** on filter housing **1**.

NOTICE
Incorrectly mounted bowl!
Leaking filter system, damaged clamps.

- ▶ Make sure that bowl is in contact with the filter housing all around the circumference.
- ▶ Tighten clamps without too much force.

- ▶ Close clamps **4**.

5.8.8 Air filter and air lines: Checking tightness and condition

Use on diesel engine	Tightening torque: New hose	Tightening torque: Used hose
Air side	9^{+1} Nm	7 Nm

Tab. 95: Tightening torque of the hose clamps with spring plate package

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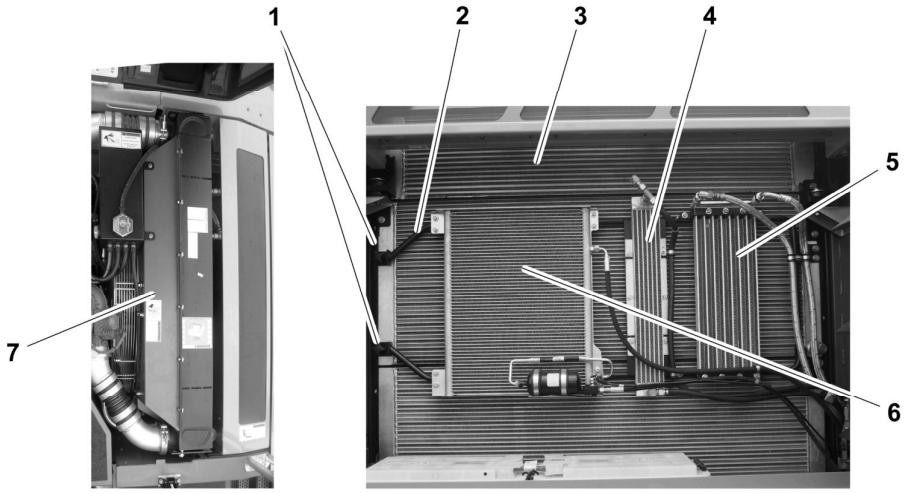

Fig. 731: Radiator fan from above and cooling system

1 Star knob screw
2 Swivel frame
3 Combination cooling unit
4 Energy recuperation cylinder cooler
5 Fuel cooler
6 Air conditioning condenser
7 Radiator fan

The combination cooling unit consists of the following coolers:
– Engine cooling
– Hydraulic oil cooler
– Intercooling air cooling circuit
– Gear oil cooler

The machine is equipped with the following additional cooling units:
– Air conditioning condenser
– Fuel cooler
– Energy recuperation cylinder cooler

For optimal cooling, cooling units must be kept clean.

Make sure the following preconditions are met:
❑ Diesel engine is off.
❑ Diesel engine has cooled down.

▶ Loosen star knob screws **1** on swivel frame **2**.

▶ Swing swivel frame **2** out.

▶ Check combination cooling unit **3**, fuel cooler **4**, energy recuperation cylinder cooler **5** and radiator fan **7** for contamination and clean if necessary.

▶ Clean cooling fins with compressed air if necessary (from inside outward).

▶ Swing swivel frame **2** back.

▶ Screw star knob screws **1** into swivel frame **2** and tighten.

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▶ Lubricate steering cylinder grease fitting **4** with hand grease gun until clean grease emerges from bearings.

▶ Put plug onto grease fitting.

Lubricating oscillating axle with central lubricating point (option)

All lubricating points of oscillating axle **5** are supplied with grease through central lubrication point.

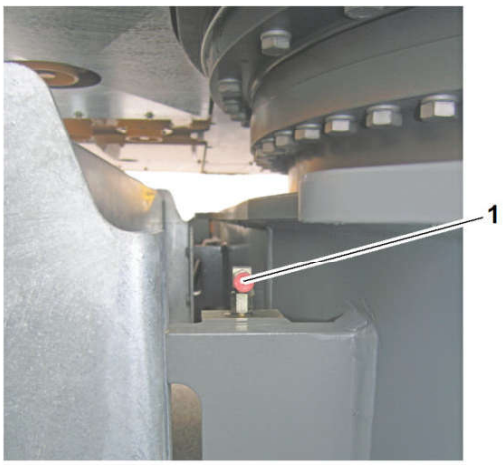

Fig. 739: Oscillating axle central lubricating point

1 Oscillating axle central lubricating point

▶ Remove plug from grease fitting.

▶ Lubricate grease fitting of oscillating axle central lubricating point **1** with hand grease gun until clean grease comes out at bearings.

▶ Put plug onto grease fitting.

5.12.2 Tyres: Checking tyre pressure

Make sure the following preconditions are met:
❑ Machine is parked on level and firm ground.
❑ Machine is secured with chocks to prevent it from rolling away.

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Undercarriage (option)

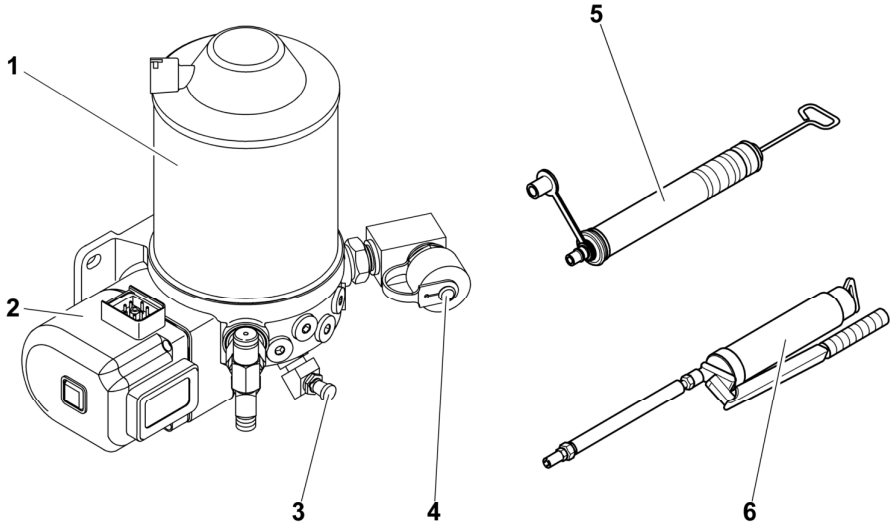

Fig. 751: Filling grease container

1	Grease container	**4**	Filling pump adapter
2	Lubricating pump	**5**	Filling pump
3	Grease nipple	**6**	Grease gun

NOTICE
Incorrect filling of grease container!
Machine damage.

▶ Exclusively fill grease container through adapter or grease fitting.

▶ Insert grease cartridge in filling pump **5**.

▶ Connect filling pump **5** to filling pump adapter **4**.

▶ Press contents of grease cartridge into grease container **1**.

If no filling pump **5** is available:

▶ Fill grease container **1** with grease gun **6** via grease nipple **3**.

5.15.2 Checking lubrication of bearings (grease collar)

▶ Check all connected lubricating points for sufficient lubricant distribution.

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