en

Operating manual

Machine for Industrial Applications
A 934 C Litronic / A 934 C HD Litronic

from serial number 61971

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Manufacturer:	LIEBHERR Hydraulikbagger GmbH
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Type no.:	1498 / 1499
Conformity:	CE

Address

Liebherr Hydraulikbagger GmbH
Liebherr-Straße 12
D - 88457 Kirchdorf / Iller

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1.1.3 Undercarriage

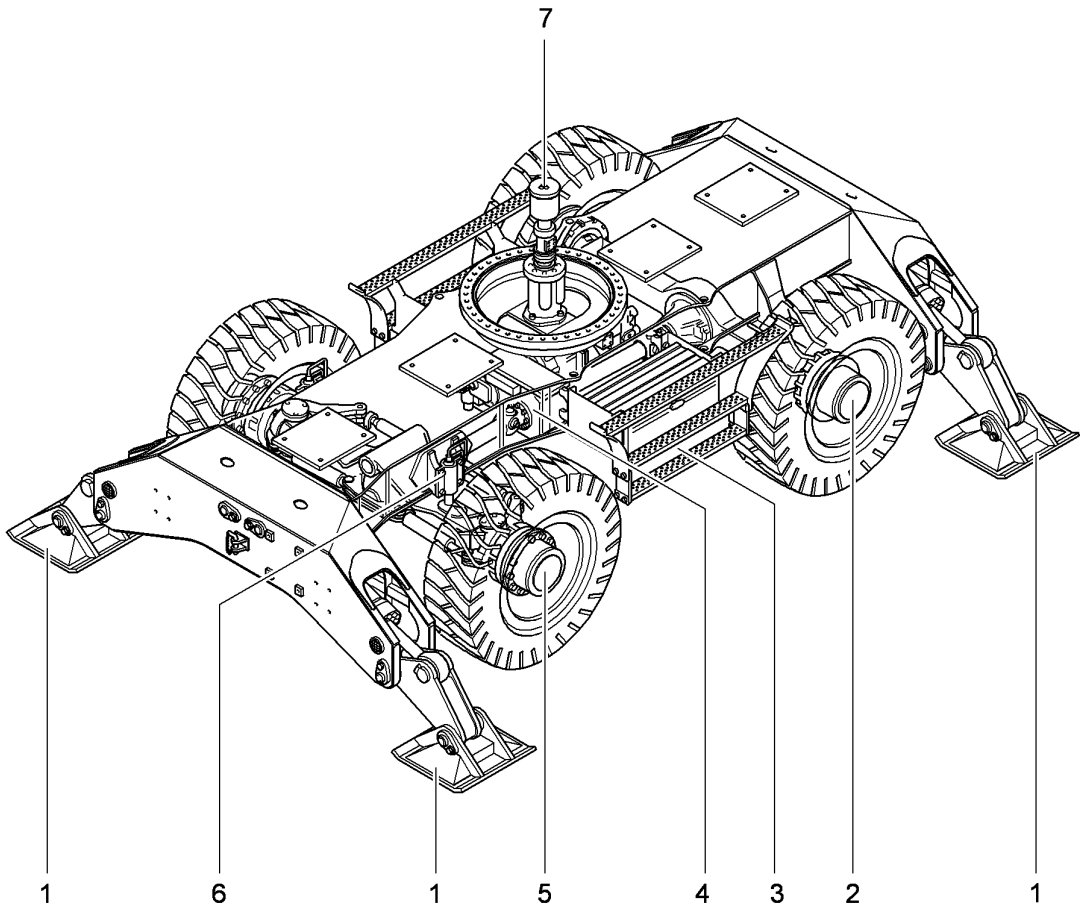

Fig. 1-3 *Undercarriage*

1 Outrigger support
2 Rigid axle
3 Ladder with toolbox
4 Transmission
5 Steering axle
6 Oscillating axle locking device
7 Rotary connection

1.2 Vibration emissions

The operator seat built into the machine by the manufacturer conforms to ISO 7096:2000, EM 6. When replacing the seat, ensure that the new seat also conforms to this standard.

Hand-arm vibration

If the machine is operated according to the manufacturer instructions, the weighted (frequency-rated) effective hand-arm vibration is below 2.5 m/s² according to ISO 5349-1:2001.

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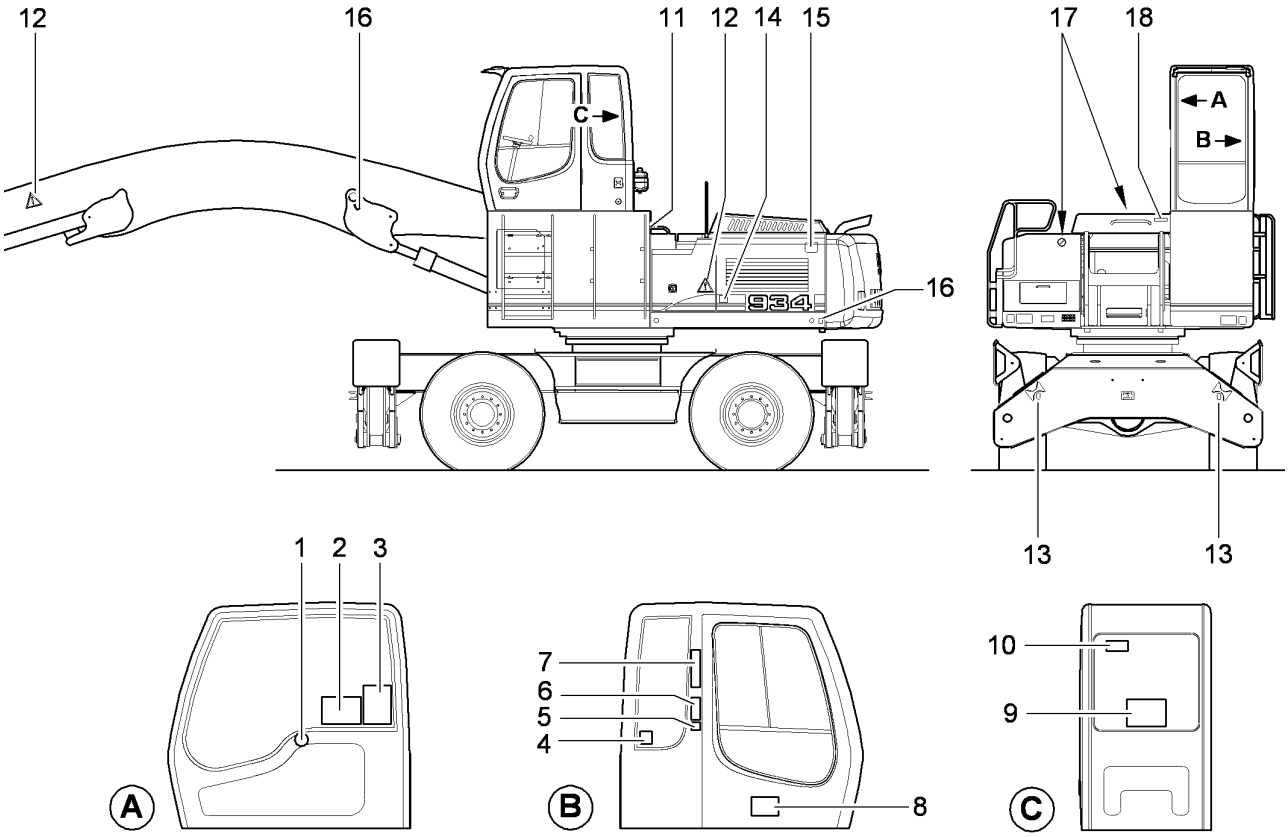
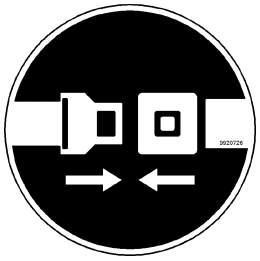


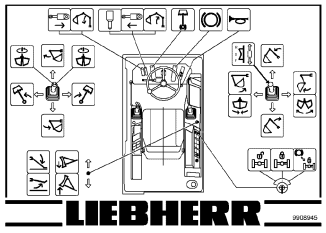
Fig. 2-1 *Position of the signs on the machine*

The signs indicate the following:



1: Safety belt

Before starting the machine, put on the safety belt.



2: Operating symbols

Functions of not specifically labelled operating devices.

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S22 - **Parking light, dipped light**

The switch is assigned several functions that are operated with repeat actuation:

– 1. Parking light and rear light on
– 2. Dipped light and rear light on
– 3. The lighting system is off

S35 - **Servo steering**

The equipment and attachments can only be operated when the servo control is activated.

S36 - **Special function 1 (optional equipment)**

Assignment and activation depend on kit.

S37 - **Special function 2 (optional equipment)**

Assignment and activation depend on kit.

S38 - **Special function 3 (optional equipment)**

Assignment and activation depend on kit.

S39 - **Special function 4 (optional equipment)**

Assignment and activation depend on kit.

S41 - **Beacon (optional equipment)**

Activates the beacon.

S42 - **First gear, gear switching**

The transmission can be operated at two speeds. The first gear is selected with the switch. If the switch is not actuated, the machine is automatically operated in second gear.

S85 - **No function**

S85 - **Grab control**

The grab control improves the control of the equipment during grapple operation. It limits the hydraulic pressure and thus the clamping forces (closing forces) of the grapple. This means that there is more pressure available for other functions.

The grab control is not suitable for loads that can only be held by the grapple when the maximum clamping force is applied.

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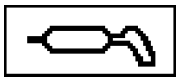
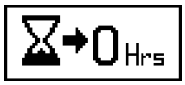
Symbol	Description
	Time
	Electronic stick cylinder shut-down (optional equipment)
	Automatic central lubrication system mode (optional equipment)
	Purge mode Starting diesel engine in PURGE mode



Reset menu for daily operating hours counter

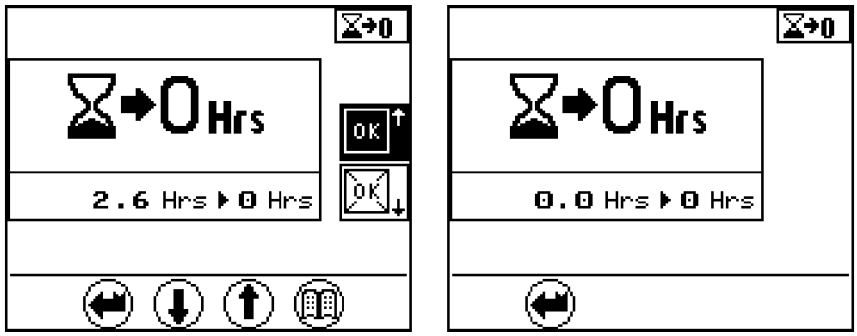


Fig. 3-9 *Resetting the daily operating hours counter*

Use this menu to reset the daily operating hours counter.

- ▶ Press the **UP** button.
  - ↳ Option **OK** is not stricken through and is highlighted in black.
- ▶ Press the **Menu** button.
  - ↳ The operating hours counter is reset.
  - ↳ The **UP** and **DOWN** buttons and the **Menu** symbol are no longer visible.
- ▶ Press the **BACK** button.
  - ↳ The submenu is closed.

Fine adjustment menu for rotating grapple

This menu is available in machines equipped with mini joystick control (optional equipment). On the menu page, the maximum achievable speed of the "rotate grapple" function can be adjusted.

The function is used to rotate grapples or adjust other attachment tools.

Note!
After fine adjustment: Before resuming work, check the response of the machine to the control movements. Familiarise yourself with the operation of the control devices at the modified settings.

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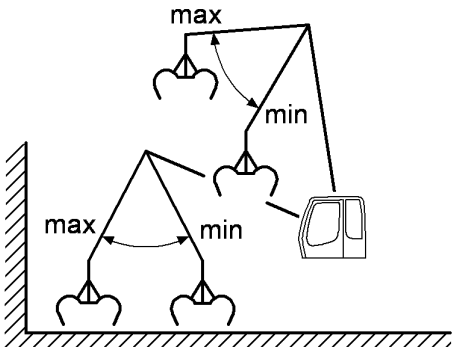

Fig. 3-27 *Shut-down points: Retracting stick (min), extending stick (max)*

Safety distance (distance between the working attachment and the operator's cab or objects in the vicinity of the machine): min. 1.5 m.

Adjust the stick cylinder shut-down function in such a way that there is a sufficient safety distance, even if the working tool is oscillating or if shut-down is delayed.

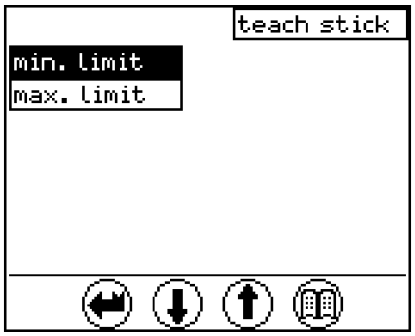

Fig. 3-28 *Menu: Stick cylinder shut-down*

Note!

▶ When adjusting the shut-down points, observe the following:

The control system determines the stick position based on decimal measurements. The menu does therefore not indicate angle values. The stick position is indicated by a value (value) that is not directly related to a real measurement.

The value increases as the stick is extended and decreases as the stick is retracted.

Setting the shut-down point for retraction:

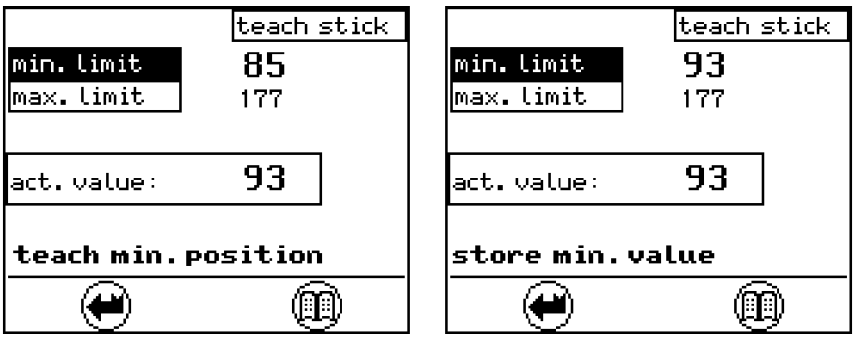

Fig. 3-29 *Menu: Shut-down point for retraction*

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– The brakes and the oscillating axle cannot be released.

By moving the safety lever to its bottom position, the initial switching statues of the brakes and the oscillating axle are re-established, and the pilot control units are enabled.

▶ Before commencing work with the machine while seated on the operator seat, move the safety lever to its bottom position.

3.2.5 Operator seat

Danger!
The adjustment of the operator seat could result in an inadvertent actuation of control elements, moving the machine or the attachment.
This can lead to injury to persons or damage to property.

▶ Do not adjust the operator seat while driving the machine.

▶ Park the machine and apply the parking brake.

▶ Move the safety lever up.

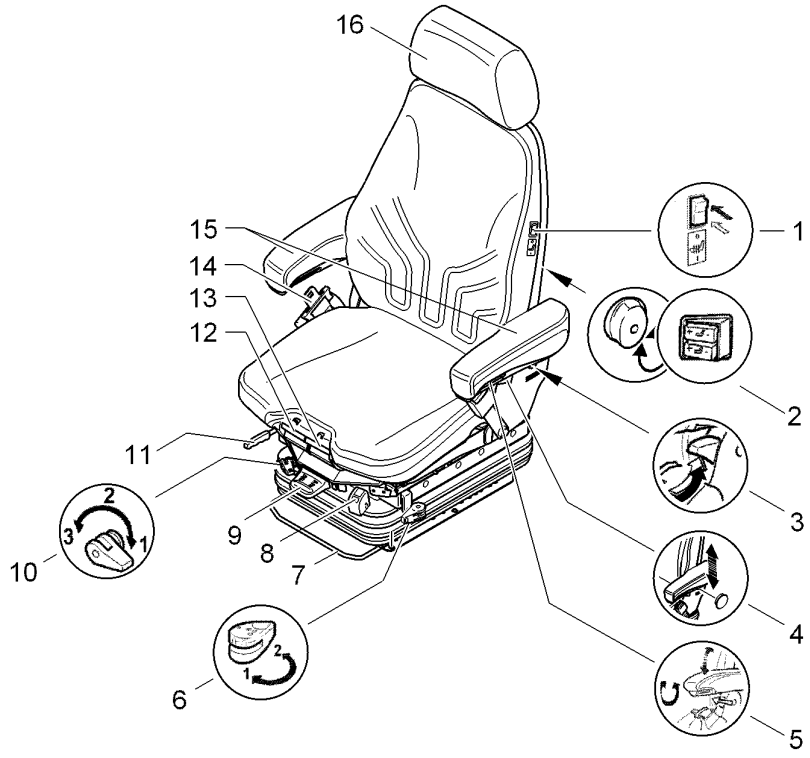

Fig. 3-43 *Operator seat*

1 Operator seat heating
2 Mechanical / pneumatic lumbar support*
3 Backrest adjustment
4 Armrest height adjustment
5 Armrest adjusting wheel
6 Horizontal suspension*

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Display screens

13 - Recirculated air
14 - REHEAT function
15 - Air conditioning (cooling)
16 - Rear wall ventilation flap OPEN
17 - Right control console ventilation flap OPEN
18 - Windscreen ventilation flap OPEN
19 - Legroom ventilation flap OPEN
20 - Automatic operation
21 - Fan speed indicator bar for manual operation
22 - Fan speed symbol for manual operation
23 - Heating operation symbol for manual operation
24 - Heating performance indicator bar for manual operation
25 - Specified value / error code
26 - Temperature unit (°)

A flashing error code **F1-F5** will be displayed if the control unit identifies an error.

Note!

▶ In the event of an error, please contact the LIEBHERR customer service centre.

Note!
To avoid the starter and battery from overloading, only switch on the air-conditioning system after starting the diesel engine.

▶ If the machine is to be used for a lengthy period of time without switching on the air conditioning system, operate the compressor every 2 weeks by pressing REHEAT key **6**.

Switch on the control unit:

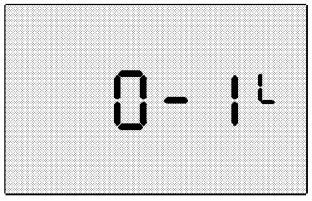

Fig. 3-54 *Control unit self-test*

▶ Switch on the system by pressing key **4**.
↳ The software version will be displayed for approximately 12 seconds while the control unit performs its self-test.

The heating and air conditioning in the cab are in operation. Heating performance and fan speed are automatically controlled when the **AUTO (20)** symbol is displayed.

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Starting engine at ambient temperatures below -18 °C

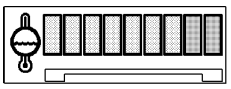
If the machine is to be started at temperatures below -18 °C, we recommend equipping the machine with one or several starter aids available from LIEBHERR (see starting aids).

3.3.2.6 Warm-up phase for diesel engine and hydraulic system

Diesel engine

If the engine coolant is cold (temperature below 20 °C), the speed is automatically set to step 3.

This process is continued until the engine coolant temperature reaches 20 °C, or for maximum 3 minutes.



▶ Slowly increase the engine load until the second green LED (from the left) at the indicator **P2** is on.

Note!
The engine is damaged if it is operated for a prolonged time at idle speed.

▶ Shut down the diesel engine, if the machine is not operated.

Hydraulic system

If the hydraulic oil is cold (temperature below 8 °C), the pump performance is automatically limited.

As soon as the hydraulic oil temperature rises to above 8 °C, the machine can be operated at full power.

3.3.2.7 Power selection (MODE) and speed adjustment

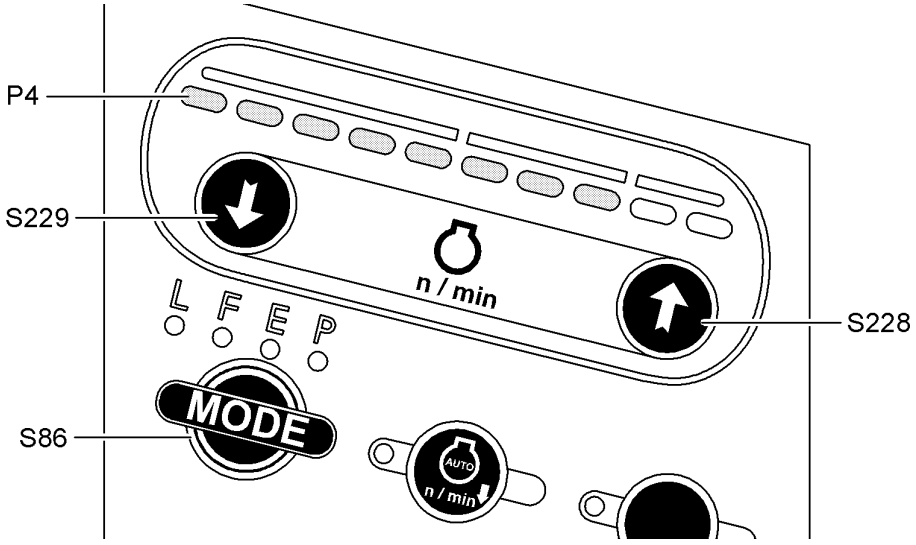


Fig. 3-66 *Speed adjustment and mode functions*

The display **P4** (LED chain) indicates the preselected engine speed. The chain represents 10 speed steps.

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Releasing oscillating axle:

▶ Turn the switch **S75** to position **0**
  ↳ The symbol of the oscillating axle locking device disappears from the screen.
  ↳ The oscillating axle is permanently unlocked.
  ↳ The machine's stability is reduced.

Switching on the automatic oscillating axle locking mechanism:

❑ The servo steering system **S35** must be switched on and remain activated during the operation of the automatic oscillating axle locking mechanism.

▶ Turn the switch **S75** to position **A**
  ↳ The symbol of the automatic oscillating axle locking mechanism is shown on the screen.
  ↳ When the working brake is applied, the oscillating axle is automatically locked in its current position. When the working brake is released, the oscillating axle is unlocked.

Note!
To make best use of the oscillating axle, set it according to the actual task:

▶ Lock the oscillating axle when working with the machine.

▶ Lock the oscillating axle before travelling with an attached load.

▶ Release the oscillating axle before travelling without load and before on-road travel.

Full floating axle lock as a function of the upper carriage position

Danger!
The full floating axle automatically unlocks when it is swung back to the longitudinal axis and if either switch **S75** is in position "**0**" or the brake pedal is not pressed when in position "**A**". The hydraulic excavator could tip over and cause injury.

The full floating axle is locked if the upper carriage is swung out by ca. 30° from the longitudinal axis regardless of the position of switch **S75**. This is independent of whether the front or rear axle is swung out

3.3.10 Support

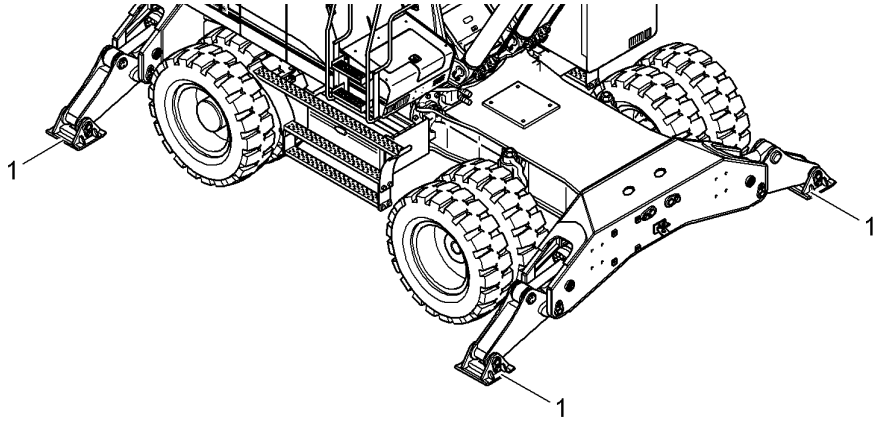

Fig. 3-71 *Support*

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Positioning slewing gear brake (optional equipment):

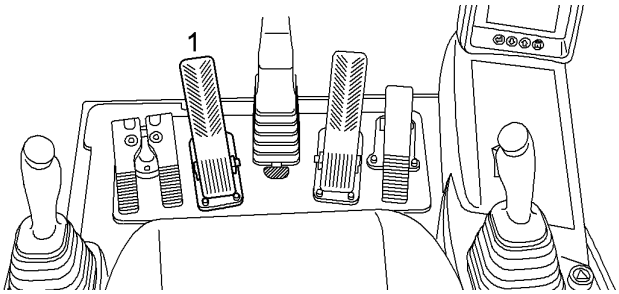

Fig. 3-78 *Positioning slewing gear brake*

The positioning slewing gear brake is used for the progressive and precise slowing down of the uppercarriage.

Note!
Frequent use of the positioning slewing gear brake results in increased wear.

- ▶ Do not use the positioning slewing gear brake as an operating brake, but only for special halting and parking manoeuvres of the slewing gear.
- ▶ The uppercarriage should normally be slowed down hydraulically.

- ▶ Operate the pedal **1**.
  - ↳ The uppercarriage is slowed down in its movement.

3.4.7 Lowering the working attachment when diesel engine is shut off

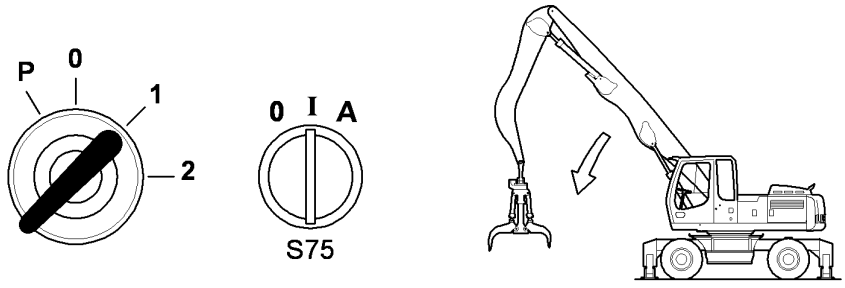

Fig. 3-79 *Lowering attachment when the diesel engine is off*

In the event of an emergency, the attachment can be lowered even if the diesel engine is not running.

- ▶ Turn the ignition key to contact position **1**.
- ▶ Turn the switch **S75** to position **1**
  - ↳ The symbol of the oscillating axle locking device ("locked") is shown on the screen.
  - ↳ The oscillating axle is permanently locked.
- ▶ Operate the joysticks or pedals until the attachment is fully lowered.

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3.4.13.2 Rotating and adjusting

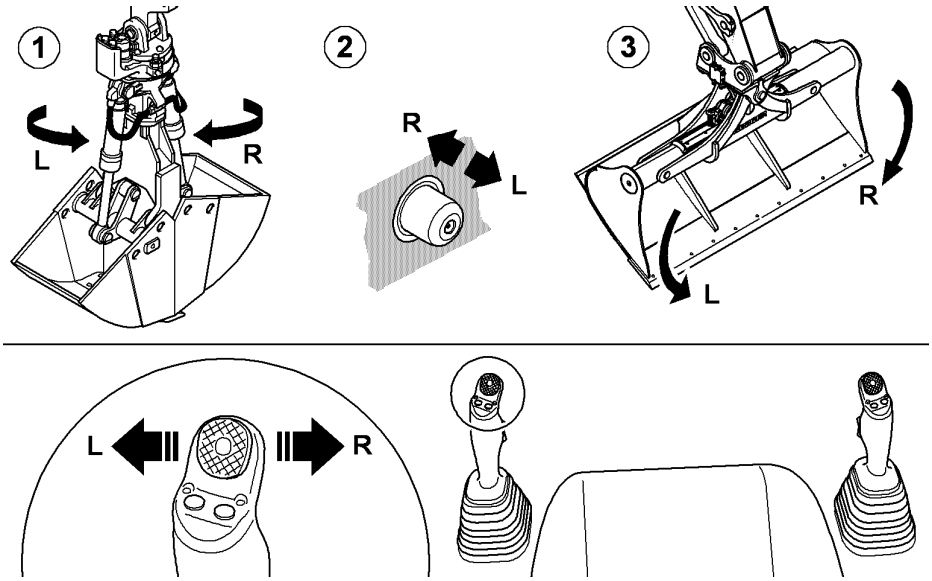

Fig. 3-88 *Rotation and adjustment of attachment tool by means of mini joystick*

1 Rotator (e.g. for rotating grapple)

2 Lock bolts of a hydraulic quick-change adapter system

3 Swivelling ditch cleaning bucket

L/R Direction of movement

The mini joystick on the left joystick is used to rotate or change the attachment tool. The rotating function corresponds to the "rotate grapple" function used for grapples and other attachment tools.

The further the mini joystick is moved in a particular direction, the faster the attachment tool is moved.

In this control mode, it is not necessary to activate the attachment tool with a separate switch. as these functions are automatically activated when the servo control is switched on.

▶ Push mini joystick to the left **L**.
  ↳ The attachment tool turns (swivels) to the left.
  ↳ The lock bolts are extended.

▶ Push the mini joystick to the right **R**.
  ↳ The attachment tool turns (swivels) to the right.
  ↳ The lock bolts are retracted.

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Caution!
The hydraulic lines are under pressure.

- ▶ Before connecting the hydraulic lines, depressurise them using the joystick (switch off diesel engine, turn ignition key to contact position, operate the joystick and press the buttons of the "Rotate grapple" function).

- ▶ Move the safety lever up.
- ▶ Connect the hydraulic hoses **4** and **5** (for the supply of the grab cylinders) to the pipelines.
- ▶ For grapples with hydraulic rotator, also connect the hydraulic hoses **6** and **7** to the pipelines for this auxiliary equipment.
- ▶ Complete all working movements several times without load (opening and closing grapple, moving grapple to the right and left) in order to let any trapped air escape from the hydraulic circuits.

3.5.4.2 Removing grapple

- ▶ Fully open the grabs and place the grapple in a vertical position on level ground.

Caution!
The hydraulic lines are under pressure.

- ▶ Before disconnecting the hydraulic lines, depressurise them using the joystick (switch off diesel engine, turn ignition key to contact position, operate the joystick and press the buttons of the "Rotate grapple" function).

- ▶ Move the safety lever up.
- ▶ Disconnect the hydraulic hoses from the pipelines on the stick.
- ▶ Immediately seal open lines to prevent dirt from entering the system.
- ▶ Prop up the grapple to ensure that it cannot topple over.
- ▶ Unscrew the plate **3** and carefully drive out the bolt **2**. To do this, you might have to start the diesel engine and lift the attachment slightly from the ground.

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Releasing and locking of adapter by means of push buttons (standard equipment):

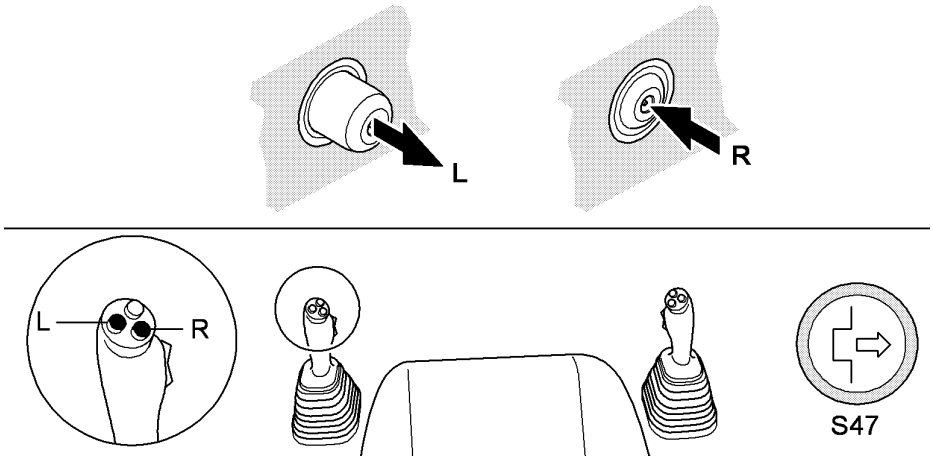

Fig. 3-111 *Releasing and locking of adapter by means of push buttons**

* In machines with optional equipment, the quick-change adapter can be controlled by operating the left or right joystick.

❑ This is only possible, if the **auxiliary function** is activated (switch **19**, LED on).

▶ Press and hold the button **S47**.
  ↳ The quick-change adapter is activated.

▶ Press and hold the button **R**.
  ↳ A buzzer sound is emitted.
  ↳ The lock bolts are retracted.
  ↳ The "quick-change adapter" icon appears on the screen.
  ↳ The quick-change adapter is released.

▶ Press and hold the button **L**.
  ↳ The buzzer is off.
  ↳ The lock bolts are extended.
  ↳ The "quick-change adapter" icon on the screen disappears.
  ↳ The quick-change adapter is locked.

Locking and releasing quick-change adapter with the mini joystick (optional equipment):

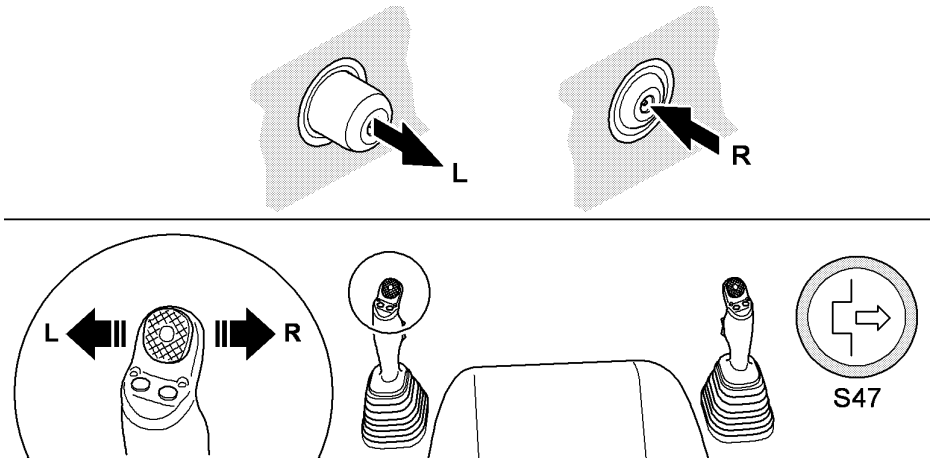

Fig. 3-112 *Locking and releasing quick-change adapter with the mini joystick*

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3.5.9.1 Safety information

- First familiarise yourself with the functions and operation of the quick-change adapter (without attached tools).
- When attaching and removing tools, ensure that no persons are standing in the working area of the attachment.
- During mounting and removing, move the attachment tool only at minimum speed, and only if absolutely necessary.
- Position the attachment tool as little above the ground as is necessary before starting the locking or release procedure, in order to avoid dangerous movements.
- If the buzzer and the "quick-change adapter" icon are on and you are NOT carrying out an intended locking or release procedure, immediately shut down the machine. If these indicating elements are not on when you are carrying out an intended locking or release procedure, immediately stop the procedure.
  This can occur if a lock bolt has inadvertently become dislodged, or if a mechanical, hydraulic or electrical fault occurs. Only resume operation after the defective part has been repaired or replaced.
- Check the attachment tool every day to ensure that it is properly secured. In addition to the above check, carry out a dummy run with the attachment tool: Tilt the attachment tool in and out (without load), lifting it only as far as this is necessary to check proper connection (e.g. pin in bolt eye).
- The lifting capacity of the quick-change adapter or the integrated load lift hook might be greater or smaller than that of the basic machine. Always observe the load capacity values of the machine.
- While attaching or removing attachment tools, ensure that the magnet system (optional equipment) is switched off.

3.5.9.2 Overview

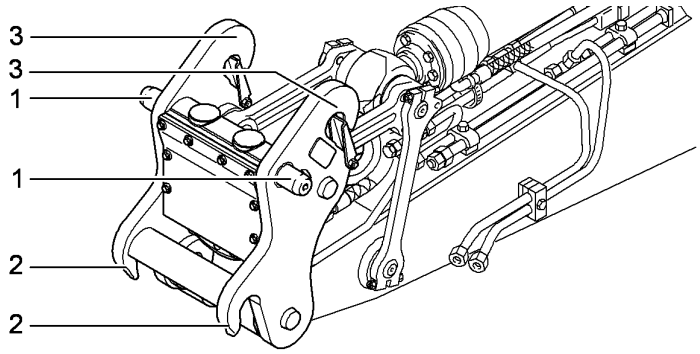

Fig. 3-124 *Hydraulic quick-change adapter*

1 Lock bolt (extended)
2 Mounting hook for attachment tool
3 Load lift hook

3.5.9.3 Operation and function control

To operate the quick-change adapter, you must simultaneously actuate two control elements (two-hand operation). With one hand, activate the quick-change adapter. Use the other hand to control the movement of the lock bolts.

During release, the "quick-change adapter" icon is displayed on the screen. This icon, together with a buzzer warning sound, indicates that the quick-change adapter

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Danger!
Risk of injury!
After the working tool is released, it is fully disconnected from the machine. The working tool might become dislodged and cause serious injury.

- ▶ Approach the quick-change adapter with great care.
- ▶ Position the working tool as little above the ground as is necessary before starting the release procedure, in order to avoid dangerous movements.

- ▶ Screw out locking screw.
- ▶ Release the quick-change adapter.

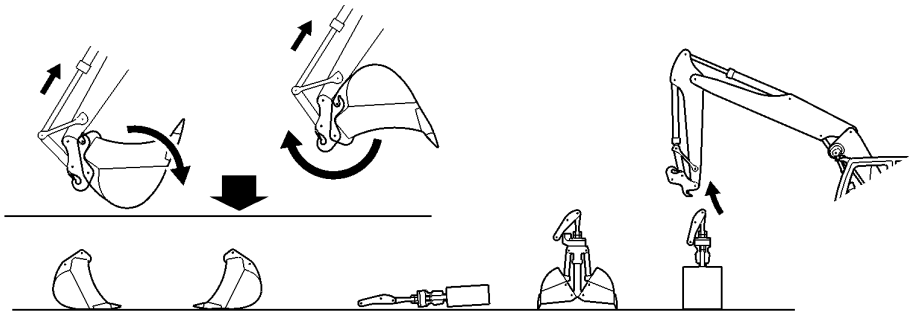

Fig. 3-139 *Placing the working tool on the ground*

- ▶ Slowly retract the bucket tilt cylinder and lower the working tool to the ground.
- ▶ Move the attachment away from the working tool.

3.6 General working methods

3.6.1 Tips for the proper operation of the machine preventing damage and wear

In order to prolong the service life of the machine and to prevent avoidable damage, observe the following instructions:

– Do not use the machine for work where its attachment is used to hammer against a hard material to remove it. Repeated impact of the working attachment against hard materials results in damage to the steel structure and the machine components.
– Under certain circumstances, where a particular type of boom, stick and working tool are combined, there is a risk that the tool collides with the operator's cab. This can result in damage to the operator's cab, and the operator might suffer injury.
– The use of the slewing gear for drilling material is not permitted.
– Do not lift the machine by propping it up with the attachment. If this happens by accident, slowly lower the machine back onto the ground. Do not lower the machine quickly onto the ground, and do not attempt to dampen this movement with the hydraulics, as this can damage the machine.

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3 Block ball valve
a Block ball valve closed
b Block ball valve opened

▶ Close the block ball valves **3** at the two hoist cylinders.

3.8 Transport

3.8.1 Safety instructions

– Insure that the transporting vehicle or truck trailer is rated for the intended machine weight and size.
– Park the machine on a level surface and chock the track chains and/or wheels.
– During transport, remove parts of the attachment that create an over width or length condition, if necessary.
– Clean the undercarriage. The undercarriage must be swept clean, meaning, the chains / wheels must be free of snow, ice and sludge prior to driving onto the transporting vehicle.
– Align the machine precisely with the loading ramp.
– Attach the manual lever for sensitive driving (crawler excavator) to the driving pedals.
– Have another person guide and signal the operator.
– On wheel models equipped with an uppercarriage locking mechanism, the uppercarriage must be secured to the undercarriage with the locking pin after loading onto the trailer.
– Secure the machine and any loose components with tiedowns in accordance with any applicable national regulations.
– Release all pressure lines (as described in this operating manual), remove the ignition key and pull the safety lever up prior to leaving the machine.
– Close all cab and panel doors.
– Verify that no one remains on the machine during the transport.
– Investigate the travel route, specifically in reference to limits for width, height and weight prior to the transport.
– Pay special attention when driving under electrical lines and bridges and when passing through tunnels.
– Use the same care for unloading as for loading.

3.8.2 Transporting the machine on a low loader

3.8.2.1 Preparations

Before driving onto the low loader, make the following arrangements:

▶ Have the wheel chocks ready.

▶ Remove ice, snow and mud from the tires, ramp and loading area before driving up the ramp.

▶ If necessary detach the stick and attachment.

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Error codes combined with symbols / indicator lights				
Error code	**Symbol ***	**Effect**	**Cause**	**What you can do**
E 527		Symbol is displayed, acoustic warning signal	Fuel temperature: safety threshold exceeded	Set the diesel engine to low idle speed and switch it off after 30 seconds. Contact LIEBHERR customer service.
E 528		Symbol is displayed	Water in fuel filter	Remove the water from the fuel filter.
E 530		Diesel engine shuts down; symbol is displayed, acoustic warning signal	Internal error in engine control unit	Attempt restart; if not successful, contact LIEBHERR customer service.
E 532		Symbol is displayed	Fuel pressure: warning threshold exceeded	Check fuel filter, tank; contact LIEBHERR customer service.
E 533		Symbol is displayed	Fuel pressure: safety threshold exceeded	Set the diesel engine to low idle speed and switch it off after 30 seconds. Contact LIEBHERR customer service.
E 534		Symbol is displayed.	Fuel pressure: warning threshold exceeded	Contact LIEBHERR customer service.
E 535		Symbol is displayed	Fuel pressure: safety threshold exceeded	Contact LIEBHERR customer service.
E 536		Symbol is displayed	Fuel pressure Rail 1; warning threshold exceeded	Contact LIEBHERR customer service.
E 537		Symbol is displayed	Fuel pressure Rail 1; safety threshold exceeded	Contact LIEBHERR customer service.
E 538		Symbol is displayed	Fuel pressure Rail 2; warning threshold exceeded	Contact LIEBHERR customer service.
E 539		Symbol is displayed	Fuel pressure Rail 2; safety threshold exceeded	Contact LIEBHERR customer service.
E 597		Engine power reduced; symbol displayed, acoustic warning signal	Intercooling air temperature: warning threshold exceeded	Let machine cool down, e.g. in F mode; check radiator for dirt; contact LIEBHERR customer service.

* screen symbol or indicator light

In machines equipped with a hydraulic quick-change adapter (optional equipment), an additional warning symbol is shown in the **SY** field:

Quick-change adapter symbol

This symbol, together with a buzzer warning sound, indicates that the quick-change adapter is not properly locked.

If the symbol is displayed, immediately halt operation, unless you wish to release the adapter. If the symbol is not displayed while the quick-change adapter is being released, also immediately stop the procedure.

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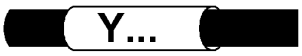
Danger!
In emergency mode, certain safety functions of the control system are disabled. This can lead to accidents or damage to the machine.

- ▶ Use emergency mode only for the intended purpose.
- ▶ Inform all persons involved in the operation and maintenance of the machine that it is in emergency mode.
- ▶ Immediately switch off the emergency mode when it is no longer required.
- ▶ Have the machine repaired as quickly as possible.

4.4.2 Identifying solenoid valve



For the emergency operation of functions, it is under certain circumstances necessary to interfere directly in the control of the machine and to switch solenoid valves manually.

The solenoid valves are numbered. The number (Y...) is found on the connecting cable of the solenoid valve and in the respective figure.

4.4.3 Emergency mode control

In the event of a failure of the control electronics, certain machine components might not work properly.

Depending on the type and extent of the malfunction, it might be possible to re-establish proper operating conditions for the machine components:

The emergency control feature includes three functions:

– Emergency operation of diesel engine
– Emergency speed adjustment
– Emergency operation of control devices

These functions may be combined with each other.

The control panel for emergency control is located in the rear section of the right control console.

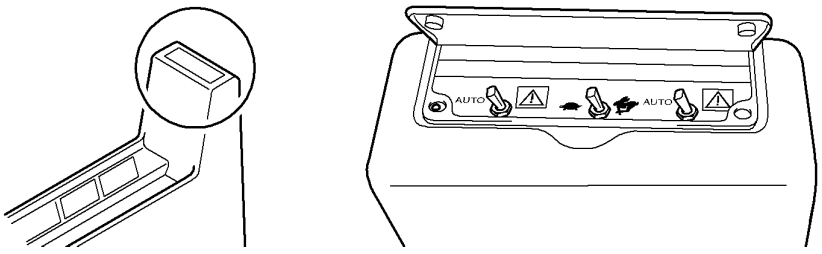


Fig. 4-3 *Control panel in the right control console*

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– When working overhead, use appropriate safe access ladders and working platforms.
  Do not use parts of the machine as climbing devices, if they are not designed for this purpose.
  Wear a harness when working at great heights.
  Keep handles, steps, railings, platforms, and ladders free of dirt, ice and snow.
– When working on the attachment (for example when replacing teeth), make sure the machine is properly supported. Never use metal-on-metal support.
– Never stand underneath a machine that has been raised with the aid of work equipment unless it has been properly and securely supported.
– Always support the machine in such a ways that any shifting weight will not endanger the stability of the machine and avoid metal to metal contact.
– Work on travel gears, brake and steering systems may only be carried out by specially trained expert personnel.
– If the machine must be repaired on an incline, block the track chains with chocks and secure the uppercarriage to the undercarriage with the locking pin.
– Only qualified, specially trained personnel may work on the hydraulic system.
– Do not check for hydraulic leaks with your hand. Use cardboard or similar material to detect leaks. Wear work gloves.
– Do not loosen any lines or bolts before lowering the equipment, turning off the diesel engine and relieving the hydraulic system. After the diesel engine has been turned off, you must move all pilot controls (right handed joystick and pedals) into all directions to reduce the control pressure and the dynamic pressure in the work cycles. Then release the pressure in the tank, as described in this operating manual.

5.1.6 Electrical system

– Check the electrical system regularly.
  All defects, such as loose connections, burnt out fuses and bulbs, burnt or damaged wires or cables must be repaired immediately by an electrician or specially trained personnel.
– Only use original fuses with the correct amperage.
– Only qualified technicians should attempt troubleshooting or repairs on high voltage systems.
– DO NOT work on energized attachments.
– When working on mid and high voltage components, shut off the voltage and connect the supply cable to the ground to discharge any stored energy.
– Check all disconnected parts if they are truly free of current, ground them and short circuit them. Insulate adjacent, current carrying parts.
– Disconnect the battery before working on the electrical system or before carrying out any arc welding work on the machine.

5.1.7 Pressure accumulator

– Pressure accumulators contain stored energy and operate at high pressures. Only specially trained personnel may work on pressure accumulators.
– Do not operate damaged pressure accumulators.
– You must reduce the pressure in the hydraulic system as described in this operating manual prior to working on a hydraulic accumulator.

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5.6.2.3 Lubrication chart

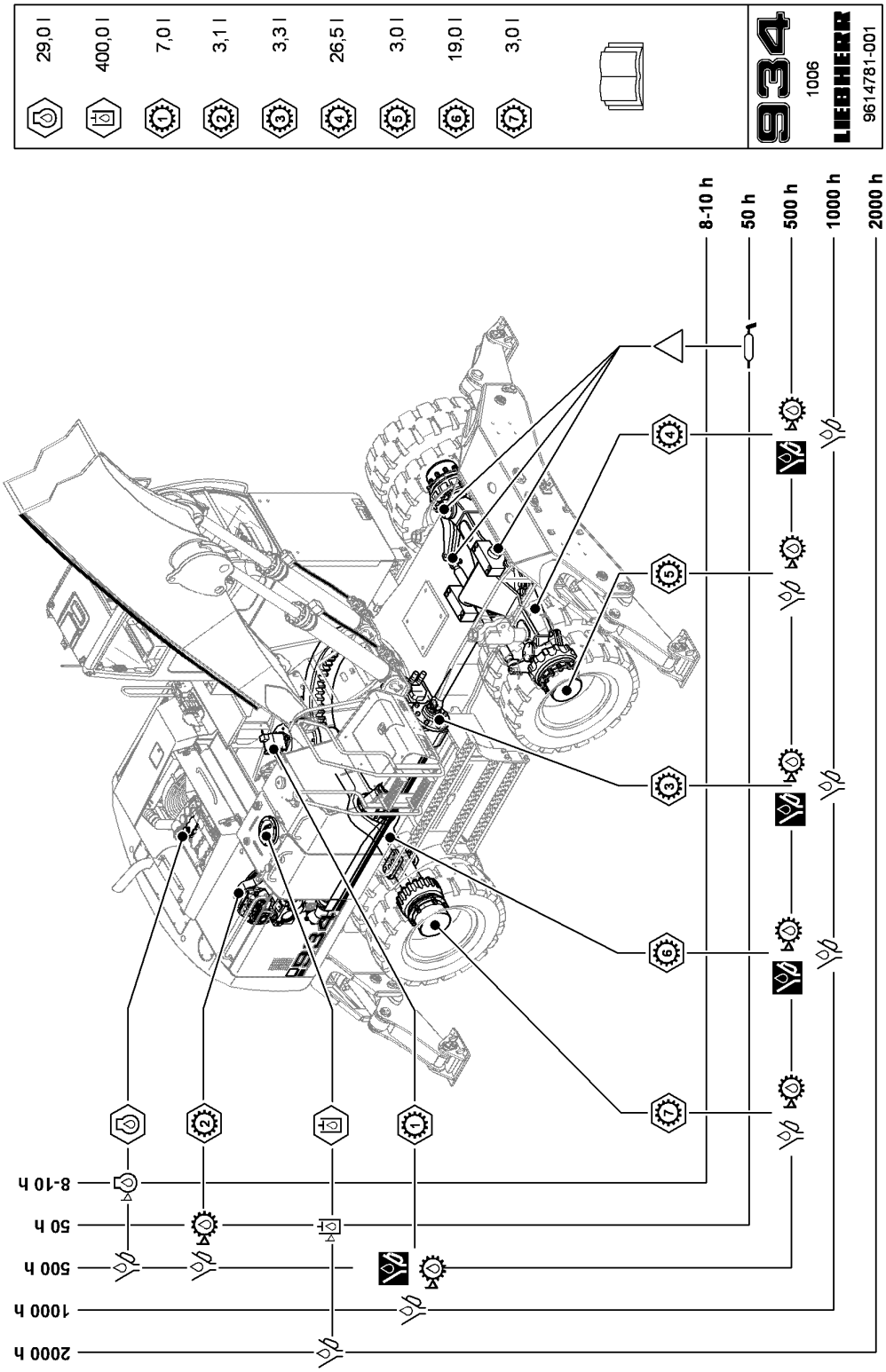

Fig. 5-6 Lubrication chart for type 1006

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For cold starting at lower ambient temperatures, follow the warm-up instruction below: Before starting the engine, warm up the hydraulic oil tank. Then proceed according to the warm-up instruction in **1**.

5.7.4.4 Biodegradable hydraulic oils

Caution!
Do not mix hydraulic oil products!
When mixing different ester-based biodegradable hydraulic oils or mixing such products with mineral oils, aggressive chemical reactions might occur, causing damage to the hydraulic system.

▶ Therefore never mix biodegradable hydraulic oils from different producers, and never mix bio hydraulic oils with mineral oils!

LIEBHERR recommends using the following hydraulic oils in its machines (depending on the temperature range):
Liebherr Hydraulic Plus or **Liebherr Hydraulic Plus Arctic**

These products are polyalphaolefins (HEPR) conforming to CEC-L-33-A-93, and are biodegradable.

When using these hydraulic oils, bypass filtration might be omitted.

If these oils are not available locally, use a fully saturated hydraulic environmental ester synthetic oil (HEES fluid) (before choosing an oil, contact the respective customer service department).

Caution!
The use of synthetic ester-based oils without bypass filter causes damage to the hydraulic system!
If synthetic ester-based oils are to be used, bypass filtration is mandatory, as the water content in the oil must be kept below 1000 ppm (0.1%).

▶ Always use a bypass filter (optional equipment).

For synthetic ester-based oils, we recommend replacing the hydraulic hoses every 4000 operating hours or at least every 4 years.

Do not use vegetable oils, as they do not possess the necessary thermal stability.

The use of polyglycols is not permissible, as they cause damage to paintwork.

When using third-party products, we advise customers to request a certificate from the oil manufacturer, confirming that the product meets the above specifications.

5.7.4.5 Oil change, oil analysis and filter change

Oil change

Note!
LIEBHERR recommends having the oil regularly checked by analysis (see chapter , "Oil analyses" on page 24).

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Replace the filter insert:

- ▶ Carefully clean the crankcase bleeding point and surrounding area.
- ▶ Unscrew and remove the cover cap; if necessary, use a screwdriver.
- ▶ Withdraw the filter cartridge insert and dispose of it in an environmentally acceptable manner.
- ▶ Fit the new filter cartridge insert and push it to the stop position.
- ▶ Fit the cover cap and turn it by hand until you reach the stop position.

5.8.5 Grease the starter tooth ring

The maintenance cover is located behind the flywheel housing on the right side of the engine.

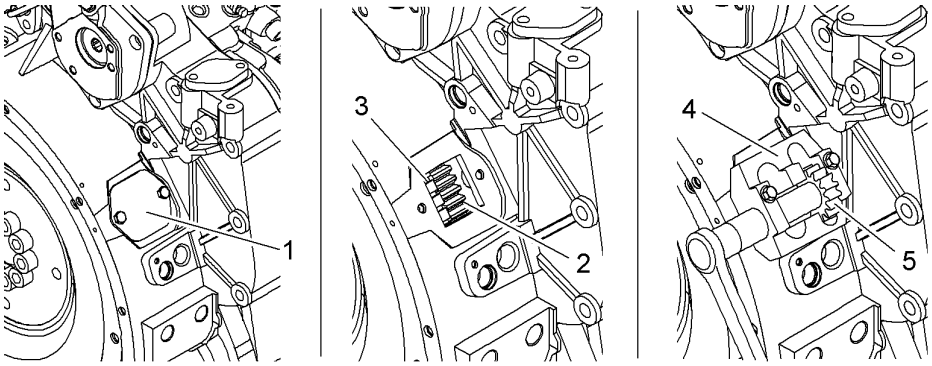

Fig. 5-18 *Grease the starter tooth ring*

1 Maintenance cover
2 Starter tooth ring
3 Sensor tooth ring
4 Turning device
5 Pinion

Note!
When greasing, ensure that sensor tooth ring **3** is kept free of grease.

- ▶ Unscrew maintenance cover **1**.
- ▶ Fit turning device **4** to the flywheel housing.
- ▶ Turn the flywheel with turning device **4** and use pinion **5** on the turning device to transfer grease onto starter tooth ring **2**.
- ▶ Remove turning device **4.**
- ▶ Screw on maintenance cover **1**.

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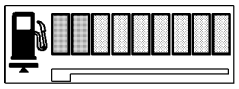
Note!
To minimise condensation in the tank, keep the fuel level as high as possible.



The indicator **P3** indicates the fuel level in the tank.

When the red bars **P3.1** are on, there is very little fuel left in the tank.

▶ If the fuel level is low, refuel before starting work.

5.10.3 Emptying and cleaning fuel tank

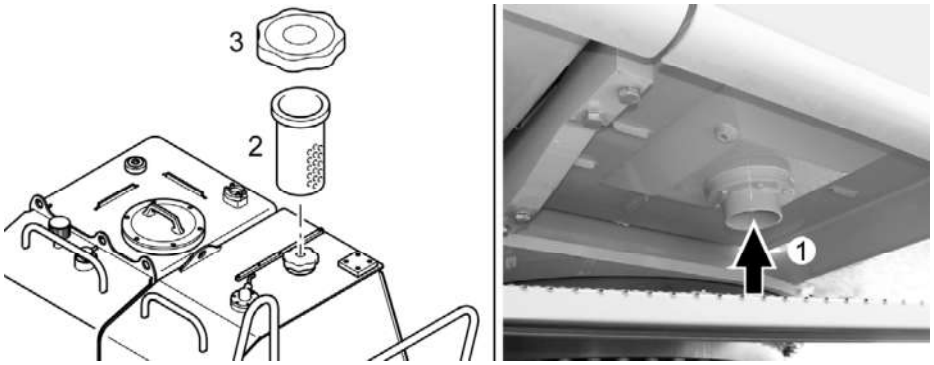


Fig. 5-29 *Fuel tank*

▶ Place a suitable container under the machine.

▶ To drain off the water from the tank, open the drain screw out the drain valve **1** by two full revolutions and let the water flow out until fuel begins to escape.

▶ Screw in the screw.

▶ To empty the tank, remove the tank lid **3** and the drain valve **1** and collect the fuel in a suitable container.

▶ Regularly check the fuel tank and the strainer **2** for dirt.

▶ If required, replace the strainer **2** and/or rinse out the fuel tank.

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recovery cylinder remains pressurised even when the hydraulic system is depressurised.

Danger!
When at operating temperature, the hydraulic oil is hot and might be under pressure.

▶ Avoid skin contact with hot hydraulic oil or parts containing oil.

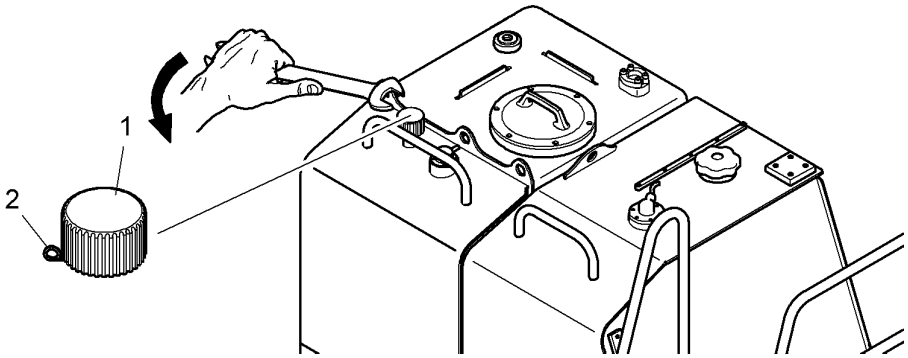

Fig. 5-43 *Hydraulic system pressure, breather filter*

▶ Turn out the breather filter **1** by **maximum** one full turn.
↳ The hydraulic system is gradually being depressurised.

The breather filter **1** can be rotated by hand when the safety pin **2** is inserted. If necessary, use an open end spanner to turn the filter.

5.12.4 Changing the breather filter

❑ The hydraulic system must be depressurised.

▶ Replace the filter **1** with the safety pin **2** (see Fig. 5-43) at each hydraulic oil change.

Note!

▶ In areas with excessive dust, observe the special instructions for filter change.

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Danger!
A defective hydraulic hose can cause accidents and injuries.

- ▶ Replace defective hydraulic hoses (bubbles, moisture, damaged top edge etc.) immediately.
- ▶ Install new hydraulic hoses without torsion.
- ▶ Ensure that the hydraulic hose is not twisted when mounting.

Installed high pressure hoses with SAE connections have a nominal diameter of 16, 20 or 25.

Tighten the mounting screws of SAE fittings with the following tightening torques.

Screw	Grade	Torque
M10	10.9	68 Nm
M12	10.9	117 Nm
M14	10.9	185 Nm

Tab. 5-16 *Tightening torques for SAE fittings*

5.13 Changing the oil on components

5.13.1 General notes

- ❑ The machine must be in level position.
- ▶ Shut down the engine.
- ▶ Wait for a short time until the oil has collected in the oil pan.
- ▶ If possible, drain the oil when it is at operating temperature.

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Maintenance of a/c system:

▶ During the operating period, the following maintenance tasks must be carried out by a technician specialising in a/c systems:

every 500 operating hours:

– Testing of thermostat, blower and pressure switch
– Inspection of the electrical lines
– Testing of the condenser (if necessary: cleaning)
– Testing of a/c compressor
– If necessary, replace the dryer-collector unit.

every 1000 operating hours:

– Inspection of evaporator unit
– Inspection of the electrical lines
– Complete functional test of excess pressure switch
– Check cooling performance

Annually:

– replace the dryer-collector unit.
  For this purpose, the a/c system must be drained, inspected for leakage and refilled. Check the hose lines for chaffing and replace them, if necessary. If required, retighten the hose connections.
– Functional test of the air flaps and the defrost thermostat.

5.17 Automatic lubrication of the machine

5.17.1 Semi-automatic central greasing system

The machine is equipped with a central greasing system.

The superstructure and the equipment do not need manual greasing. The bearing points connected to the greasing system can be greased during operations by starting the greasing process.

The chassis is not connected to the automatic greasing system and must be manually greased.

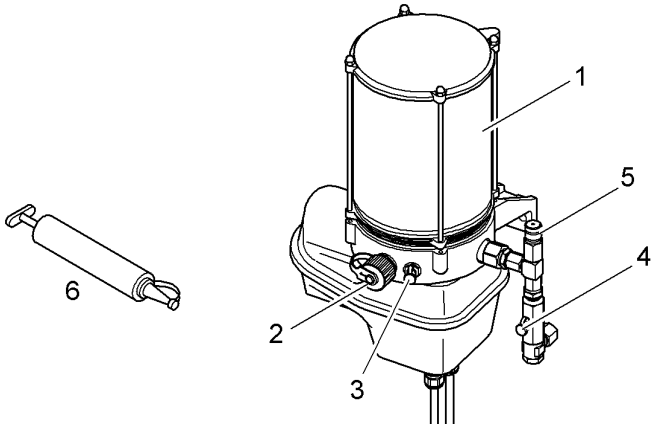

Fig. 5-66 *Central greasing pump, semi-automatic*

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Changing seal ring:

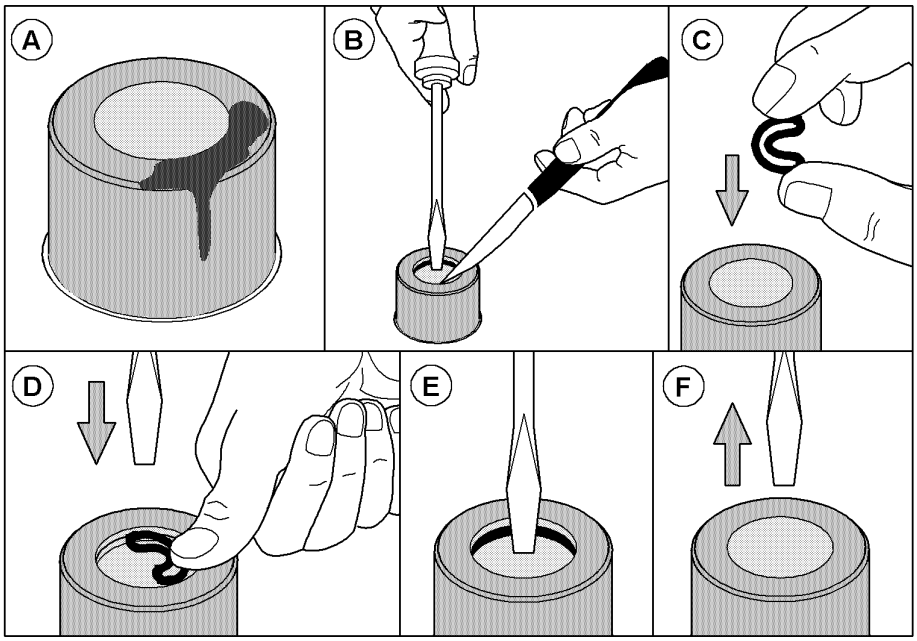

Fig. 5-79 *Changing seal ring*

Caution!
The hydraulic lines are under pressure.

- ▶ Before changing the seal ring, depressurise the system using the joystick (switch off diesel engine, turn ignition key to contact position, operate the joystick).

In the event of leakage at the coupling plugs (**A**), change the seal rings.

- ▶ Hold down the seal washer of the coupling plug with a screwdriver and lever out the defective seal ring using a pointed tool (**B**).
- ▶ Squeeze the new seal ring and place it with its open side facing downwards onto the seal washer (**C**).
- ▶ Push the washer into the groove, place the screwdriver onto the centre of the seal ring and remove your hand (**D**).
- ▶ Let the seal ring expand into the groove (**E**).
- ▶ Remove the screwdriver (**F**).
  ↳ The seal washer must move upwards.
- ▶ If this is not the case, push the seal ring into the groove until the seal washer can move.

5.19.2 LIKUFIX electric coupling

The LIKUFIX hydraulic coupling system is equipped with an additional electric coupling (e.g. for the operation of a magnet system). This coupling must be regularly inspected and cleaned.

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