en

Operating instructions

Hydraulic excavator / Material handler
R 914 B Litronic

from serial number 11229

Document identification

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Product identification

Manufacturer: LIEBHERR France SAS
Type: R 914 Litronic
Type no.: 960 / 961 / 962 / 963 / 964 / 965 / 966 / 1019 / 1061
Conformity: CE

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LFR/en/Edition: 5 / 2006

1.1.3 Undercarriage

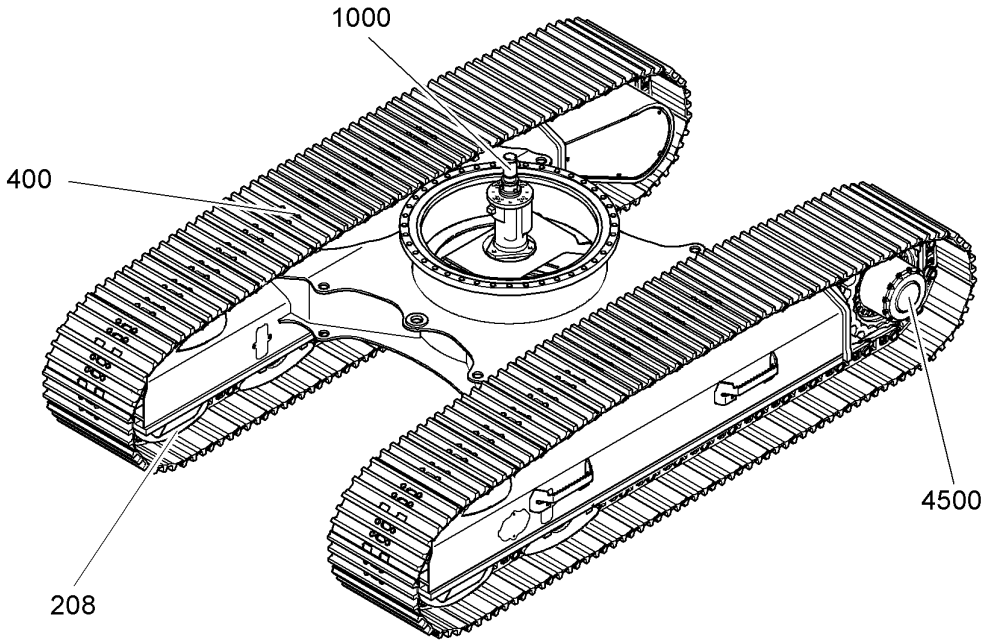


Fig. 1-3 *Undercarriage*

208	Idler	**1000**	Rotary connection
400	Track	**4500**	Travel gear and sprocket

1.2 Technical data

This should be taken from the accompanying technical description.

LFR/en/Edition: 5 / 2006

Comfort

All service points on the upper deck are easy accessible and allow a quick and comfortable execution of all maintenance work. The operator station is designed according to the latest ergonomic know-how and provides excellent visibility to the entire work area. This helps to maintain concentration and productivity over a long workday.

Standard maintenance advantage

Easy accessibility
All service points are easy accessible and the R 914 B features a central lubrication point as standard feature. The daily preventive maintenance can be completed in a short period of time.

Maintenance friendly track components
Top rollers, track rollers and track link pins are lubricated for lifetime. The grease cylinder of the idler tensioner is sealed against dirt.

Workplace with a comfortable atmosphere

Operator station
The generously large windows provide excellent visibility to the work- as well as surrounding area.

Comfortable operator seat
Design and layout of seat, console and display are perfectly coordinated in a total concept.

Comfortable operation
The clearly arranged indicator display with all-important parameters of the machine's condition is within easy view of the operator.

Effective modes for top performance

4 Modes
Four fixed working modes for output discharge facilitate an effective and efficient operation.

Eco-Mode
For high output at big fuel savings.

Power-Mode
For heavy-duty digging-and loading performance under severe conditions.

Lift-Mode
For precise handling of heavy loads.

Fine-Mode
For fine control at precision work.

Easy entrance

- Access steps on both sides allow comfortable access to all service points
- Handrails are ergonomically correct positioned for safe access

Liebherr operator station

- Optimized visibility with large, wide windows
- Operator seat individually adjustable and cushioned
- Air conditioner standard equipment

Lift Capacities

with Straight Gooseneck Boom 6,00 m

Stick 1,80 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0
9,0	HD-S 2000 HD-SL 2250 HD-SL 2400					
7,5	HD-S 2000 HD-SL 2250 HD-SL 2400		7,3 (7,4#) 7,4# (7,4#) 7,4# (7,4#)			
6,0	HD-S 2000 HD-SL 2250 HD-SL 2400		7,0 (7,8#) 7,7# (7,7#) 7,7# (7,7#)	4,4 (6,5#) 4,9 (6,5#) 5,3 (6,5#)		
4,5	HD-S 2000 HD-SL 2250 HD-SL 2400		6,4 (8,8#) 7,3 (8,8#) 7,9 (8,8#)	4,2 (6,9#) 4,7 (6,9#) 5,1 (6,9#)	2,9 (5,2) 3,3 (5,6) 3,5 (5,7)	
3,0	HD-S 2000 HD-SL 2250 HD-SL 2400		5,7 (10,1#) 6,5 (10,1#) 7,1 (10,1#)	3,9 (7,1) 4,4 (7,4#) 4,7 (7,4#)	2,8 (5,0) 3,1 (5,5) 3,4 (5,5)	
1,5	HD-S 2000 HD-SL 2250 HD-SL 2400		5,2 (10,5) 6,0 (10,6#) 6,6 (10,6#)	3,6 (6,8) 4,1 (7,5) 4,5 (7,5)	2,6 (4,9) 3,0 (5,3) 3,3 (5,4)	
0	HD-S 2000 HD-SL 2250 HD-SL 2400		5,1 (10,0#) 5,9 (10,0#) 6,4 (10,0#)	3,5 (6,6) 4,0 (7,3) 4,3 (7,3)	2,6 (4,8) 2,9 (5,3) 3,2 (5,3)	
-1,5	HD-S 2000 HD-SL 2250 HD-SL 2400	9,3# (9,3#) 9,3# (9,3#) 9,3# (9,3#)	5,1 (8,7#) 5,9 (8,8#) 6,5 (8,8#)	3,4 (6,6) 3,9 (6,8#) 4,3 (6,8#)		
-3,0	HD-S 2000 HD-SL 2250 HD-SL 2400		5,3 (6,7#) 6,1 (6,8#) 6,7 (6,8#)	3,6 (5,2#) 4,1 (5,2#) 4,4 (5,2#)		
-4,5	HD-S 2000 HD-SL 2250 HD-SL 2400					
-6,0	HD-S 2000 HD-SL 2250 HD-SL 2400					

Stick 2,40 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0
9,0	HD-S 2000 HD-SL 2250 HD-SL 2400					
7,5	HD-S 2000 HD-SL 2250 HD-SL 2400			4,6 (4,9#) 4,9# (4,9#) 4,9# (4,9#)		
6,0	HD-S 2000 HD-SL 2250 HD-SL 2400			4,5 (6,1#) 5,1 (6,1#) 5,4 (6,1#)	3,0 (3,5#) 3,4 (3,5#) 3,5# (3,5#)	
4,5	HD-S 2000 HD-SL 2250 HD-SL 2400	11,9# (11,9#) 11,8# (11,8#) 11,8# (11,8#)	6,7 (8,2#) 7,6 (8,2#) 8,1 (8,2#)	4,3 (6,6#) 4,8 (6,6#) 5,2 (6,6#)	3,0 (5,2) 3,3 (5,6#) 3,6 (5,6#)	
3,0	HD-S 2000 HD-SL 2250 HD-SL 2400		6,0 (9,6#) 6,8 (9,6#) 7,4 (9,6#)	4,0 (7,2#) 4,5 (7,2#) 4,8 (7,2#)	2,8 (5,1) 3,2 (5,5) 3,4 (5,6)	
1,5	HD-S 2000 HD-SL 2250 HD-SL 2400		5,4 (10,5#) 6,2 (10,5#) 6,7 (10,5#)	3,7 (6,8) 4,2 (7,5) 4,5 (7,6)	2,7 (4,9) 3,0 (5,4) 3,3 (5,4)	
0	HD-S 2000 HD-SL 2250 HD-SL 2400	4,8# (4,8#) 4,8# (4,8#) 4,8# (4,8#)	5,1 (10,4#) 5,9 (10,4#) 6,5 (10,4#)	3,5 (6,6) 4,0 (7,3) 4,3 (7,3)	2,6 (4,8) 2,9 (5,2) 3,2 (5,3)	
-1,5	HD-S 2000 HD-SL 2250 HD-SL 2400	9,3# (9,3#) 9,2# (9,2#) 9,2# (9,2#)	5,1 (9,4#) 5,9 (9,4#) 6,4 (9,4#)	3,4 (6,6) 3,9 (7,2#) 4,2 (7,2#)	2,5 (4,8) 2,9 (5,2) 3,1 (5,2)	
-3,0	HD-S 2000 HD-SL 2250 HD-SL 2400	9,3# (9,3#) 9,4# (9,4#) 9,4# (9,4#)	5,2 (7,7#) 6,0 (7,7#) 6,5 (7,7#)	3,5 (5,9#) 4,0 (6,0#) 4,3 (6,0#)		
-4,5	HD-S 2000 HD-SL 2250 HD-SL 2400					
-6,0	HD-S 2000 HD-SL 2250 HD-SL 2400					

Stick 3,00 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0
9,0	HD-S 2000 HD-SL 2250 HD-SL 2400					
7,5	HD-S 2000 HD-SL 2250 HD-SL 2400			4,7 (4,8#) 4,7# (4,7#) 4,7# (4,7#)		
6,0	HD-S 2000 HD-SL 2250 HD-SL 2400			4,6 (5,5#) 5,2 (5,5#) 5,5# (5,5#)	3,1 (4,4#) 3,5 (4,4#) 3,8 (4,4#)	
4,5	HD-S 2000 HD-SL 2250 HD-SL 2400		6,9 (7,5#) 7,5# (7,5#) 7,5# (7,5#)	4,4 (6,1#) 4,9 (6,1#) 5,3 (6,1#)	3,0 (5,3) 3,4 (5,3#) 3,6 (5,3#)	
3,0	HD-S 2000 HD-SL 2250 HD-SL 2400	11,2 (13,0#) 13,1 (13,4#) 13,4# (13,4#)	6,2 (9,0#) 7,0 (9,0#) 7,6 (9,0#)	4,0 (6,8#) 4,6 (6,8#) 4,9 (6,8#)	2,8 (5,1) 3,2 (5,6) 3,5 (5,6)	2,1 (3,4#) 2,3 (3,4#) 2,5 (3,4#)
1,5	HD-S 2000 HD-SL 2250 HD-SL 2400		5,5 (10,2#) 6,3 (10,2#) 6,9 (10,2#)	3,7 (6,9) 4,2 (7,4#) 4,6 (7,4#)	2,7 (4,9) 3,0 (5,4) 3,3 (5,4)	2,0 (3,7) 2,3 (4,0#) 2,5 (4,0#)
0	HD-S 2000 HD-SL 2250 HD-SL 2400	5,6# (5,6#) 5,6# (5,6#) 5,6# (5,6#)	5,1 (10,4) 5,9 (10,5#) 6,5 (10,5#)	3,5 (6,6) 4,0 (7,3) 4,3 (7,3)	2,5 (4,8) 2,9 (5,2) 3,1 (5,2)	1,9 (3,5#) 2,2 (3,5#) 2,4 (3,5#)
-1,5	HD-S 2000 HD-SL 2250 HD-SL 2400	8,4# (8,4#) 8,4# (8,4#) 8,4# (8,4#)	5,0 (9,9#) 5,8 (9,9#) 6,4 (9,9#)	3,3 (6,5) 3,8 (7,2) 4,2 (7,2)	2,5 (4,7) 2,8 (5,1) 3,1 (5,2)	
-3,0	HD-S 2000 HD-SL 2250 HD-SL 2400	9,6 (11,2#) 11,2# (11,2#) 11,2# (11,2#)	5,1 (8,5#) 5,9 (8,5#) 6,4 (8,5#)	3,4 (6,5#) 3,9 (6,5#) 4,2 (6,5#)	2,5 (4,7) 2,8 (4,8#) 3,1 (4,8#)	
-4,5	HD-S 2000 HD-SL 2250 HD-SL 2400		5,3 (6,2#) 6,1 (6,2#) 6,2# (6,2#)	3,5 (4,6#) 4,0 (4,6#) 4,4 (4,6#)		
-6,0	HD-S 2000 HD-SL 2250 HD-SL 2400					

Stick 3,70 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0
9,0	HD-S 2000 HD-SL 2250 HD-SL 2400					
7,5	HD-S 2000 HD-SL 2250 HD-SL 2400			3,5# (3,5#) 3,5# (3,5#)	3,2# (3,2#)	
6,0	HD-S 2000 HD-SL 2250 HD-SL 2400			4,4# (4,4#)	3,2 (4,1#) 3,2# (3,2#) 3,2# (3,2#)	
4,5	HD-S 2000 HD-SL 2250 HD-SL 2400			4,5 (5,2#) 4,4# (4,4#) 4,4# (4,4#)	3,1 (4,8#) 3,6 (4,1#) 3,9 (4,1#)	2,2 (3,3#)
3,0	HD-S 2000 HD-SL 2250 HD-SL 2400	12,3# (12,3#)	6,5 (8,1#)	4,2 (6,3#) 5,1 (5,2#) 5,2# (5,2#)	2,9 (5,2) 3,5 (4,8#) 3,7 (4,8#)	2,1 (3,8) 2,5 (3,3#) 2,7 (3,3#)
1,5	HD-S 2000 HD-SL 2250 HD-SL 2400	7,2# (7,2#) 12,2# (12,2#) 12,2# (12,2#)	5,7 (9,6#) 7,4 (8,1#) 8,0 (8,1#)	3,8 (7,0) 4,7 (6,3#) 5,1 (6,3#)	2,7 (5,0) 3,3 (5,3#) 3,5 (5,3#)	2,0 (3,7) 2,4 (4,1#) 2,6 (4,1#)
0	HD-S 2000 HD-SL 2250 HD-SL 2400	6,2# (6,2#) 7,3# (7,3#) 7,3# (7,3#)	5,2 (10,4#) 6,6 (9,6#) 7,1 (9,6#)	3,5 (6,7) 4,3 (7,1#) 4,7 (7,1#)	2,5 (4,8) 3,1 (5,4) 3,3 (5,4)	1,9 (3,6) 2,3 (4,1) 2,5 (4,1)
-1,5	HD-S 2000 HD-SL 2250 HD-SL 2400	7,8# (7,8#) 6,2# (6,2#) 6,2# (6,2#)	5,0 (10,2#) 6,0 (10,4#) 6,6 (10,4#)	3,3 (6,5) 4,0 (7,4) 4,4 (7,4)	2,4 (4,6) 2,9 (5,2) 3,1 (5,2)	1,8 (3,6) 2,2 (4,0) 2,4 (4,0)
-3,0	HD-S 2000 HD-SL 2250 HD-SL 2400	9,4 (10,5#) 7,8# (7,8#) 7,8# (7,8#)	5,0 (9,3#) 5,8 (10,2#) 6,3 (10,2#)	3,3 (6,4) 3,8 (7,2) 4,2 (7,2)	2,4 (4,6) 2,8 (5,1) 3,0 (5,1)	2,1 (3,9) 2,3 (3,9)
-4,5	HD-S 2000 HD-SL 2250 HD-SL 2400	9,7 (9,9#) 10,4# (10,4#) 10,4# (10,4#)	5,1 (7,4#) 5,8 (9,3#) 6,3 (9,3#)	3,4 (5,6#) 3,8 (6,9#) 4,1 (6,9#)	2,5 (3,8#) 2,8 (5,1) 3,0 (5,1)	
-6,0	HD-S 2000 HD-SL 2250 HD-SL 2400					

The lift capacities on the load hook of the Liebherr quick change adapter 48 without attachment are stated in metric tonnes (t), and can be lifted 360° on firm, level supporting surface. Values quoted in brackets are valid for the undercarriage when in longitudinal position. Capacities are valid for 600 mm wide triple grouser pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via #). Maximum load for the quick change adapter's load hook is 12 t. Without quick change adapter the lift capacities will increase by 245 kg, without bucket cylinder, link and lever they increase by an additional 340 kg. Lifting capacity of the excavator is limited by machine stability, hydraulic capacity and maximum permissible load of the load hook.
When lifting loads, the hydraulic excavator must be equipped with automatic check valve on its hoist cylinders and overload warning device according to European Standard, EN 474-5.

2.4 Signs on the machine

2.4.1 Introduction

The machine displays several types of signs:

– **Safety plates** provide warnings relating to dangers of accidents which could result in serious injury or death.
– **Information plates** indicate specific points relating to the operation, maintenance and characteristics of the machine.
– **Nameplates** are attached to components for which the machine number must be provided when ordering spare parts.

Danger!
Non-observance of **safety plates** can result in serious injury or death.

▶ Check warning plates regularly to ensure that they are complete and clearly legible.

▶ Replace missing or illegible safety plates immediately.

3.1.2 Arrangement of joystick

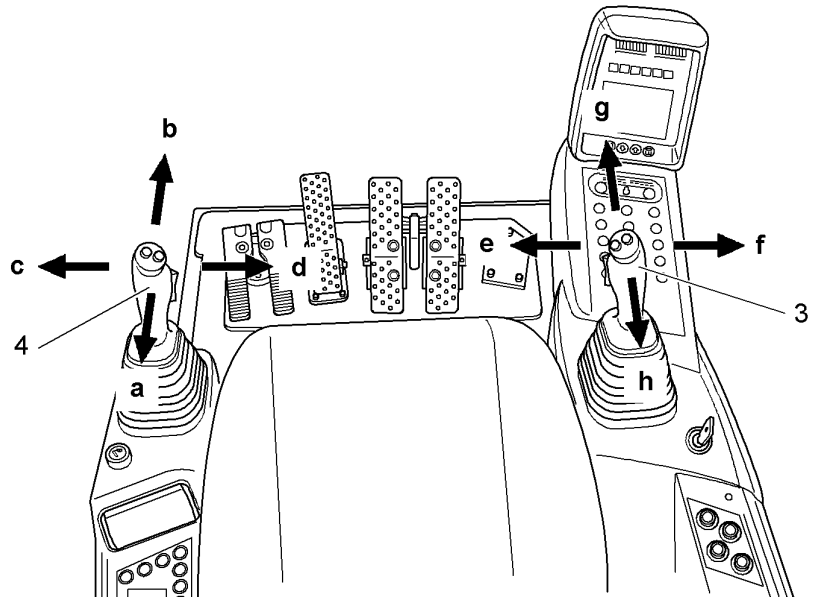


Fig. 3-4 *Joystick, right (**3**) and left (**4**)*

Standard control

The left joystick (**4**) controls the stick and slewing movements.

– Direction of movement **a** and **b**: Stick is drawn in or out.
– Direction of movement **c** and **d**: Upper carriage is rotated to the left or to the right.

The right joystick (**3**) controls the boom or bucket and grab movements.

– Direction of movement **e** and **f**: Bucket will be tilted up or down, grab will close or open.
– Direction of movement **g** and **h**: Boom will be raised or lowered.

Note !
From delivery, the machine is equipped with the standard control system correponding to the norm ISO. Nevertheless, the machine can be equipped with a commutation circuit allowing the use of a special control system (for example LIEBHERR control system).

TI field

The machine operating hours and the daily operating hours counter are displayed bottom right in this field.

The ® symbol indicates that a quantity limitation is active for the pumps (siehe "Status of hydraulic pumps and electrical inputs and outputs menu" auf Seite 23).

TI field (optional equipment Tool Control)

The machine operating hours and the daily operating hours counter are displayed bottom right in this field. During the start-up phase, the operator will be alerted about a possible up-coming service interval, by a graphic symbol displayed instead of the machine hour-meter.

The symbol ® is displayed when an external flow limitation (function "set option") is activated (siehe "Status of hydraulic pumps and electrical inputs and outputs menu" auf Seite 23).

The symbol "●" appears when no external flow limitation is activated. But an internal flow limitation (travel, swing,...) may be actived.

After having selected a tool (siehe Kap. , "Menu "Tool Control" Setting choice for work equipment (optional equipment)" auf Seite 20), the name of the tool is displayed (for example HM200)

Menu navigation in the event of an error display

If an error is recognized as “new” in the SY field, the user is returned to the main screen. The relevant error display is activated.

Depending on the error (level of urgency), the buzzer will sound either continuously or in short consecutive bursts. This symbol will be displayed in the INF field.

Danger!
If the error displayed is not rectified immediately, this could lead to persons sustaining injury or the machine being damaged.

- ▶ Rectify / have the error rectified immediately.
- ▶ To switch off the buzzer, press the **Back** button.
  ↳ The error will be acknowledged and stored.

Warning symbols in the SY field

Each of the symbols which follow will be assigned an error code in the form “E 5xx”. Each error which occurs will be stored via the relevant error code.

E 502–Coolant low

This symbol appears if the coolant level drops below the water sensor level.

The buzzer sounds simultaneously.

- ▶ Bring the engine to a low idle immediately.
- ▶ Switch the engine off as quickly as possible.
- ▶ Localise the leak and carry out repairs.

The technical data menu, page 4, provides information on:

– The excavator type, including type and serial number (type, series)
– The design condition of the control which is currently built in (ver)
– The rated speed and the number of teeth on the starter crown (nom)
– The current operating voltage (volt)

▶ Press the **Menu** button again.
↳ Page 1 is displayed.

To exit the menu:

▶ Press the **Back** button.
↳ The submenu will be aborted.

i-I/O

Status of hydraulic pumps and electrical inputs and outputs menu

Pages 1 to 3 provide information on the operating position of the hydraulic pumps.

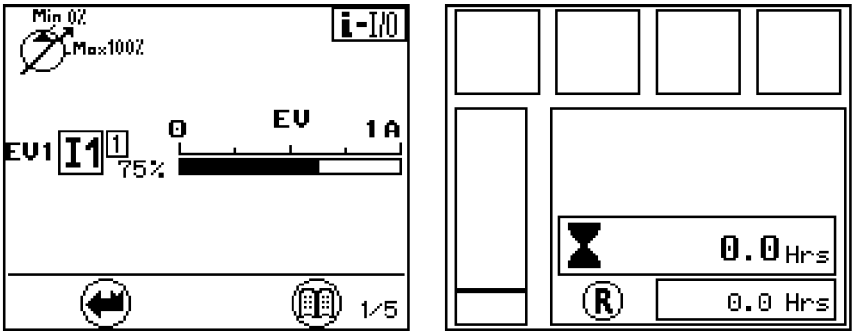


Fig. 3-22 *Quantity limitation menu*

Page 1 shows the following for the work hydraulics:

– Whether a quantity limitation signal is active for the pump: if yes, the symbol **R** will be displayed in the TI field on the main screen.
Here, for example, Option 1 quantity limitation for attachments is active, which limits the oil flow to the consumer to 75 %.
When several quantity limitations are activated at the same time, the one with the smallest value is decisive for the hydraulic pump.
– A bar chart containing the current value, which represents the current work speed of the pump.

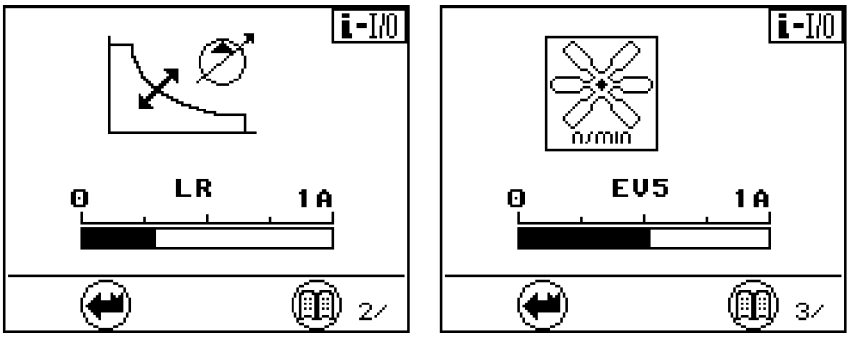


Fig. 3-23 *LR magnet and fan speed current values menu*

▶ Press the **Menu** button again.
↳ Page 2 is displayed.

The current power of the LR magnet (current value for power setting) is displayed on

3.2.5 Safety lever

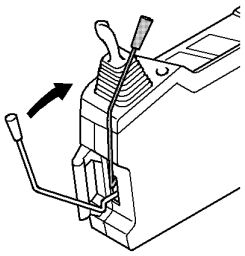


Fig. 3-34 *Safety lever*

For safety purposes, the left control panel is provided with a safety lever.

Caution!
The safety lever must always be pushed up into its highest position (see arrow) when entering or exiting the cab.

When the safety lever is pushed up, the pilot control circuit is disconnected. This means that:

– No work movements can be carried out when pilot control devices, e g. the joystick or foot pedals, are operated.
– The slewing gear brake is locked (LED in switch **S17** illuminates).
– It is not possible to release the slewing gear brake using switch **S17**.

When the safety lever is pushed (push up / push down) to its lowest position, the slewing gear brake and the LED in switch **S17** will return to their original states and the pilot control devices will be active.

▶ Before the operator starts working, he must push the safety lever down into its lowest position while seated in the operator's seat.

▶ Press the switch.
  ↳ Additional headlights are switched on.
  ↳ LED in switch illuminates.

▶ Press switch again.
  ↳ Additional headlights are switched off.
  ↳ LED in the switch goes out.

Rotating beacon (optional extras)

Pressing switch **S41** switches on the rotating beacon when the ignition is on.

▶ Press switch.
  ↳ Rotating beacon flashes.
  ↳ LED in switch illuminates.

▶ Press switch again.
  ↳ Rotating beacon is switched off.
  ↳ LED in the switch goes out.

Roof headlights, rear (optional extras)

Pressing switch **S275** on the right control panel switches on the roof headlights at the rear on the cab.

▶ Press switch.
  ↳ Rear headlights on roof cab are switched on.
  ↳ LED in switch illuminates.

▶ Press switch again.
  ↳ Rear headlights on roof cab are switched off.
  ↳ LED in the switch goes out.

3.2.14 Heater and air conditioner

Overview

The cab is fitted with a heater and air conditioner as standard equipment wich can be used for heating, cooling off, and also as a feh ventilation.

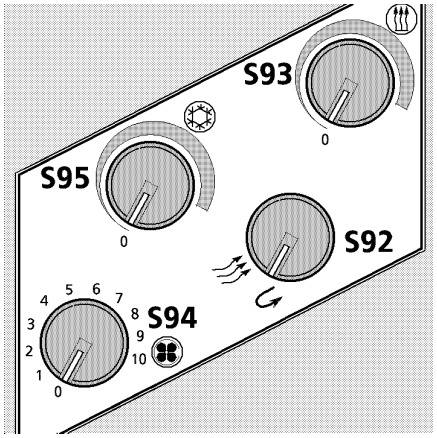


Fig. 3-49 *Overview of the heater - air conditioner command*

S92 On - Off of fresh air admission **S94** Ventilation regulation

– **L**: LIFT mode (speed level 5 – sensitive lifting of loads)
– **F**: FINE mode (speed level 10 – skimming work)
– **E**: ECO mode (speed level 8 – economical work)
– **P**: POWER mode (speed level 10)

Using the arrow keys to adjust speed

To increase the speed:

▶ Press switch **S228**.
  ↳ Speed will be increased by one level.
  ↳ A second LED to the right illuminates in the **P4** display.

To reduce the speed:

▶ Press switch **S229**.
  ↳ Speed will be decreased by one level.
  ↳ A second LED from the right goes out in display **P4**.

A flashing LED above switch **S86** identifies an intermediate stage of the mode selected.

The currently active mode will be displayed under the letter on the LED. The mode selected will be saved when the engine is switched off and will be displayed by a flashing LED above switch **S86** the next time the engine is started.

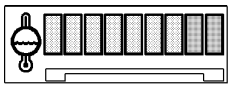
The speed preselected after the diesel engine has been started will either be at level 1 (low idle on the diesel engine) or at level 3, if a warm-up phase is required for the diesel engine.

▶ Press the mode switch **S86**.
  ↳ The mode selected will be used, with the corresponding speed and power.
  ↳ The appropriate LED will illuminate permanently.

In mode **E** (maximum torque) and **P**, the diesel engine works at maximum power. In mode **L** and **F**, the hydraulic power is reduced.

Warm-up phase for diesel engine and hydraulic circuit

Diesel engine



With cold engine coolant (temperature below 20 °C), the speed is automatically set at level 3.

This procedure lasts until the coolant has reached 20 °C, but for a maximum of 3 minutes.

▶ Increase the engine strain slowly until the second green LED (from left) illuminates on display unit **P2**.

Note!
ILow idling for an extended period of time damages the engine.

▶ Switch off the diesel engine if the machine is not being used.

Hydraulic oil

The pump power is automatically limited when the hydraulic oil is cold (temperature below 8 °C).

As soon the hydraulic oil temperature rises above 8 °C, the machine can attain full power.

Controlling the drive unit manually

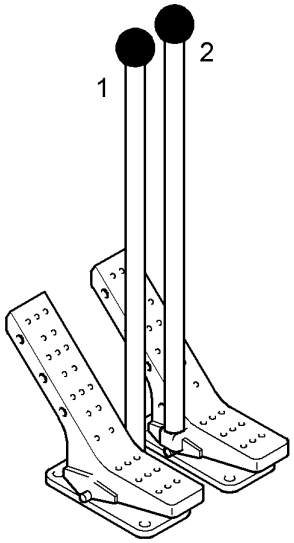


Fig. 3-65 *Manual drive unit control*

❑ Particularly careful driving is required here.

▶ Insert the hand levers (**1** and **2**) available in the tool kit into the pedals for the drive units.
  ↳ The drive units can be operated manually.

Note!
When driving the machine onto or off a low loader, the drive unit must be controlled manually for safety reasons.

Controlling the speed

The driving speed is influenced by switch **S21**. The travel motors can be operated in two different positions:

– **Normal drive** (position 1):
  Maximum tensile force of both drive units at moderate speed.
– **Fast drive** (position 2):
  Reduced tensile force of both drive units at maximum speed.

▶ Press switch **S21**.
  ↳ Transfer from normal drive to fast drive is activated.
  ↳ LED 1 in the switch illuminates.

While driving, the machine will automatically switch from normal drive to fast drive as the ground conditions permit. After transferring to fast drive, LED 2 illuminates. If the ground conditions become more difficult again, the system will automatically switch from fast drive to normal drive. LED 1 illuminates.

▶ Press switch **S21**.
  ↳ Transfer from normal drive to fast drive is deactivated.
  ↳ LED 1 in the switch goes out.

When switch **S21** is switched off, the travel motors remain continually in position 1.

Note!
The red control light in the button S17 lights up each time the brake is applied.
If this light does not go out when the rocker switch S57 is tilted up, the button S17 must first be pushed to pre-select the semi-automatic mode.

Caution!
The brake only applies when the uppercarriage is near standstill and if no swing motion is actuated via the joystick!
In order to stop the uppercarriage when working on a slope, tilt the switch S57 down and reduce the uppercarriage speed by braking with joystick 4.
Move the joystick 4 back to «0» position only when the uppercarriage is quite immobile, the brake will apply.

Ermergency stop of the uppercarriage swing motion

The swing brake can be applied independently of the uppercarriage RPM by switching the button S17 from position «semi-automatic» into position «applied».

Caution
Perform this braking via button S17 only in emergency cases, since it causes fast abrasion of the brake discs.

To check the mechanical swing gear brake:

- ❑ Upper carriage must be stationary.
- ▶ Press switch **S17**.
  - ↳ Swing gear brake is engaged.
  - ↳ LED in switch illuminates.
- ▶ Push the left joystick **4** to the right and then to the left as far as the stop.
  - ↳ Upper carriage may not rotate.
  - ↳ Slewing gear brake function is OK.

Positioning swing brake (optional extras)

The positioning swing brake is used for progressive and sensitive braking of the upper carriage.

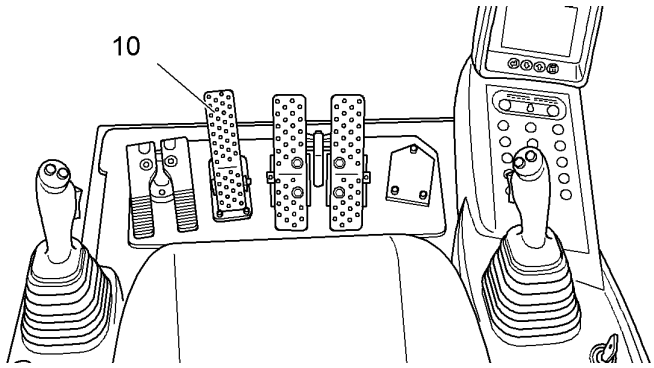


Fig. 3-69 *Positioning swing brake*

boom adjustment or for a side adjustable gooseneck boom.

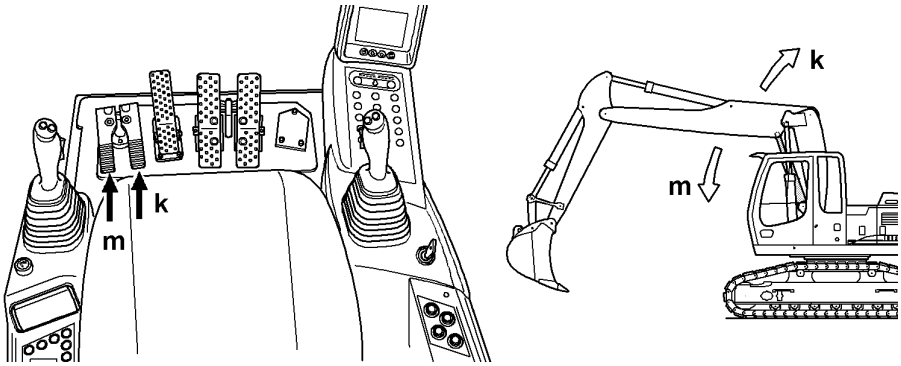


Fig. 3-82 *Add-on kit AHS 1*

To operate the boom adjustment cylinder:

- ▶ Push down foot pedal **k**.
  - ↳ Boom adjustment cylinder will be extended, ie. the equipment moves up.
- ▶ Push down foot pedal **m**.
  - ↳ Boom adjustment cylinder will be drawn in, ie. the equipment moves down.

Add-on kit AHS 11 (Tool Control)

Using add-on kit AHS 11, only **one** additional load can be operated, i e. one work tool (eg. hydraulic hammer) can be operated for the gooseneck boom.

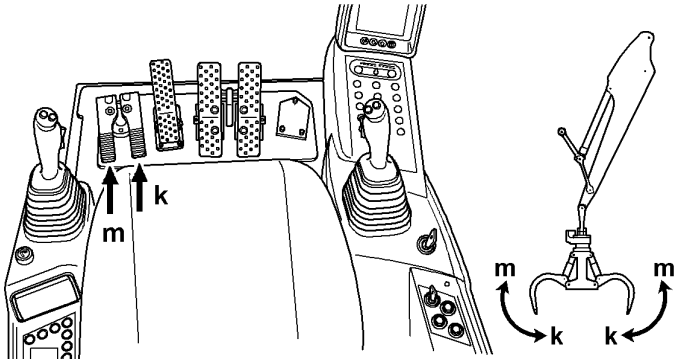


Fig. 3-83 *Add-on kit AHS 11*

To operate a work tool :

- ▶ Choose the predefined pressure and flow limitations assigned to the work tool in the operator's menu (see chapter "Tool Control")

Example: Hydraulic hammer

- ▶ Push down foot pedal **k**.
  - ↳ Hydraulic hammer is activated.

Example: Scrap cutter

- ▶ Turn the key switch to the **Cylinder** position.
- ▶ Push down foot pedal **k**.
  - ↳ Cylinder will be extended, i e. the scrap cutter will close.
- ▶ Push down foot pedal **m**.
  - ↳ Cylinder will be drawn in, i e. the scrap cutter will open.

3.4.17 Transferring controls PCSA - J.Deere (optional extra)

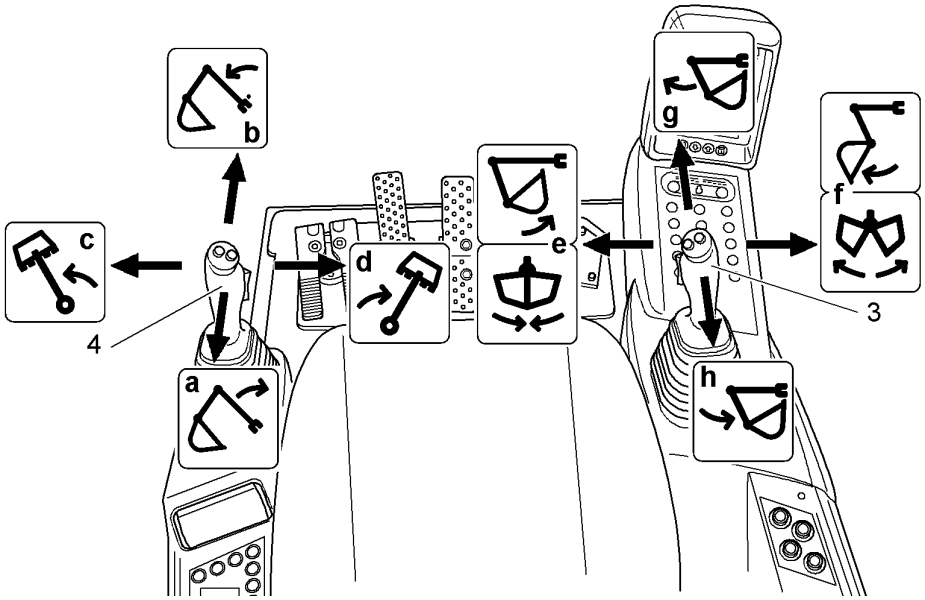


Fig. 3-94 *Transferring controls PCSA - J.Deere*

On request, the machine can be equipped with the “Transfer controls” kit. This enables the operator to transfer the functions of the right joystick (**3**) directions of movement **g** and **h** and the left joystick (**4**) directions of movement **a** and **b**.

Control is transferred using key switch **S247** on the right control panel.

▶ Turn the key switch **S247** to position 1.
  ↳ Telltale light **H292** on the right control panel illuminates.
  ↳ The control functions are transferred.

The right joystick (**4**) controls the boom or slewing movements.

– Direction of movement **a** and **b**: Boom will be raised or lowered
– Direction of movement **c** and **d**: Upper carriage is rotated to the left or to the right.

The left joystick (**3**) controls the stanchion or bucket and grab movements.

– Direction of movement **e** and **f** : Bucket will be tilted up or down, grab will close or open.
– Direction of movement **g** and **h** : Stanchion is drawn in or out.

Caution!
The machine is dispatched as standard with **normal control**.
On request, the machine can be equipped with a control system that deviates from the norm (eg. with LIEBHERR control). The additional operating instructions for this control system apply in this case.

Test and adjustment of the overload warning device.

Adjusting high position (Point A)

- ▶ Remove the cap on test point **6**.
- ▶ mount a pressure gauge **7** (0-400 bar) so the gauge is visible from the cab.
- ▶ Move the boom up all the way.
  if necessary, adjust bracket **8** via eccentric **10** until roller **4** is exactly on the mark for point A on cam plate **2**.
- ▶ Press push button **S18**.
- ▶ open the shut off valve **5** (Position **A**).
- ▶ extend the boom all the way.
  ↳ the pressure set on point A on cam plate **2** is build up
  ↳ the warning device is actuated.

If the warning device does not turn on :

- ▶ Remove side cap.
- ▶ Turn screw $\mathbf{S_A}$ clockwise
  ↳ increase shifting point of pressure switch **1**.
- ▶ Turn screw $\mathbf{S_A}$ counter clockwise
  ↳ lower shifting point of pressure switch **1**

Note!

A lower shifting point is permissible.

- ▶ remove measuring systems, mount caps.
- ▶ check all moving parts of the overload warning device for easy movement.

Adjusting low position (Point B)

- ▶ Remove the cap on test point **6**.
- ▶ mount a pressure gauge **7** (0-400 bar) so the gauge is visible from the cab.
- ▶ Close shutt off valve **5**
- ▶ Mount fitting **11** between pressure gauge **7** and fitting **9**.
- ▶ Lower the boom until point B on the cam plate is reached.
- ▶ Build up pressure as set on point B, as follows
  either with a separate hand pump
  or via a mini test hose, connected to a pressure test point of the main control valve block for high pressure. The pressure is increased through this hose as soon as any movement is selected.
  ↳ the overload warning device is actuated.

If this is not the case :

- ▶ take off the upper cap.
- ▶ Turn screw $\mathbf{S_B}$ clockwise
  ↳ increase shifting point of pressure switch **1**.
- ▶ Turn screw $\mathbf{S_B}$ counter clockwise.

3.5.6 Attaching and dismounting the grab on stick

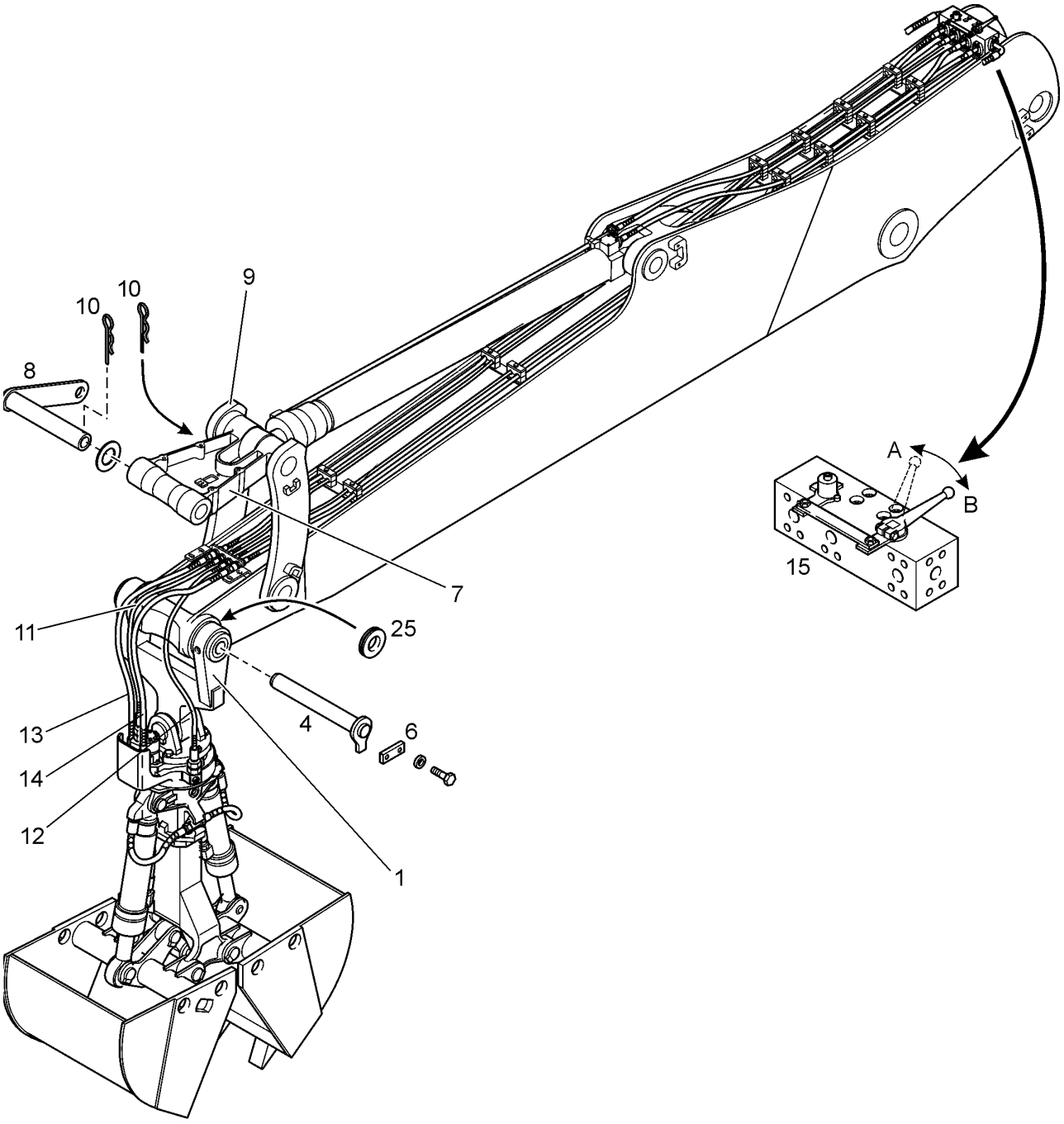


Fig. 3-106 *Attaching and dismounting the grab on the stick*

1	Grab mounting	**11**	Hose
4	Pin	**12**	Hose
6	Locking plate	**13**	Hose
7	Connecting link	**14**	Hose
8	Carrier bracket	**15**	Valve block
9	Reversing lever	**25**	Pin bearing sealing
10	Cotter pin		

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Detaching a work tool

To move the equipment into position:

Caution!
Hydraulic lines are pressurized!

- ▶ Remove the pressure using the joystick before removing the hydraulic lines (switch off the diesel engine, turn the ignition key into the contact position, operate the joystick).

- ▶ Disconnect hydraulic lines or electrical lines, if necessary (eg. when dismounting a grab).
- ▶ Extend the shovel tilting cylinder fully.

To unlock the quick-change adapter:

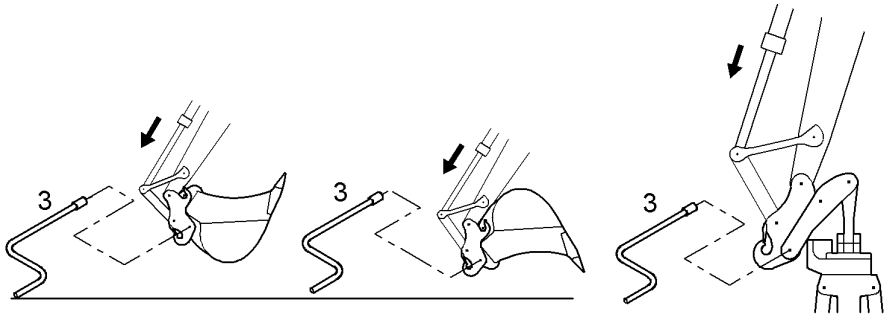

Fig. 3-113 *Unlocking the quick-change adapter*

Danger!
Risk of injury.
Once unlocked, there is no fixed connection between the adapter and the work tool. The work tool could work itself out independently.

- ▶ Ensure that the work equipment cannot be moved by others when this action is being carried out.
- ▶ Always keep the work tool as close to the ground as possible when unlocking to avoid creating conditions which may lead to danger.

- ▶ Approach the quick-change adapter from the side and unscrew the locking screw **2** using the crank **3** from the locking pin **1**.
- ▶ Insert the crank **3** in the locking pin **1** and turn to the left (anti-clockwise), until both locking pins **1** are inserted as far at the stop.

- ▶ Connect or separate the hydraulic coupling slowly as with any change of work tool.
- ▶ When attaching the quick-change adapter, tilt until the coupling disks are connected as a result of the self weight of the work tool.
- ▶ Remove the locking pins.
- ▶ If the disks do not connect as a result of self weight, foreign matter (such as stones) may be the cause. In this case, clean all coupling parts to prevent damage occurring when connecting.
- ▶ Oil quantity and pressure must be adapted to suit the work device concerned.
- ▶ When the work is completed, and particularly before transportation, put the protective coverings **1** and **2** back on.

Attaching LIKUFIX work tools to a quick-change adapter without LIKUFIX

It is possible to attach a work tool with a LIKUFIX hydraulic coupling to a machine with a quick-change adapter (mechanical or hydraulic) at any time.

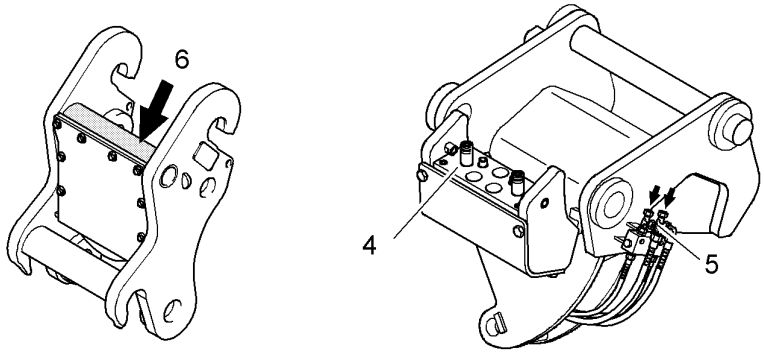

Fig. 3-125 *LIKUFIX work tool on quick-change adapter without LIKUFIX*

Caution!
The LIKUFIX hydraulic coupling could be damaged.

- ▶ Do not use a quick-change adapter with a reinforcement kit since the reinforced steel part **6** could damage the LIKUFIX hydraulic coupling on the work tool.
- ▶ In this case, ensure that you have the quick-change adapter reworked at the LIEBHERR customer service centre.

For attachment without LIKUFIX hydraulic coupling, LIEBHERR work tools usually have an alternative connection option.

Example:

On the ditcher bucket, hydraulic lines are either connected using LIKUFIX **4** or using an auxiliary hydraulic connection **5**.

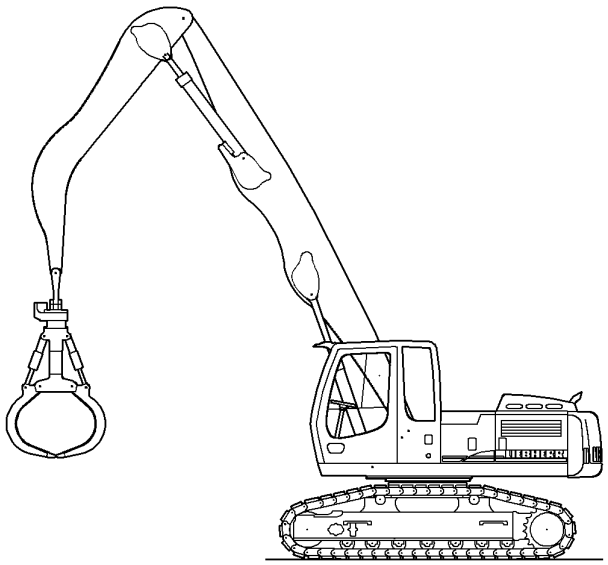

Fig. 3-139 *Transporting a load*

▶ Transport the load close to the chassis, but with sufficient safety distance to the cab (swinging grab!) and as close to the ground as possible.

Caution!
Particularly when loading wood, it can be necessary when working with a grab to move with the working equipment raised and the load taken up. This will shift the centre of gravity of the machine upwards. The way the machine drives will be negatively affected because of this.

▶ Please note the safety information “Use for loading work” at the beginning of these operating instructions.

3.6.9 Skimming

Skimming work can either be carried out using the bucket or with a skimming shield (optional extra).

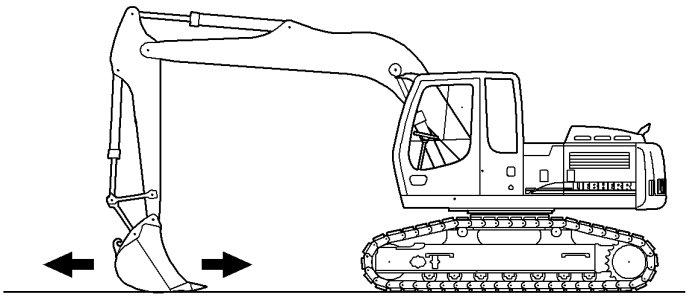

Fig. 3-140 *Skimming*

❑ The machine must be in the working position.

❑ The support should be raised.

4.1.7 Other errors

Error code	Effect	Cause	Measure / remedy
E 437	Travel use cannot be recorded	Short circuit + 24 V	consult LIEBHERR customer service.
E 440		Short circuit to earth or cable break	
E 442	Automatic idling on left joystick does not function, ie. the engine remains at low speed.	Short circuit + 24 V	Deactivate automatic idling **S20**, consult LIEBHERR customer service.
E 443		Short circuit to earth or cable break	
E 445	Automatic idling on right joystick does not function, ie. the engine remains at low speed.	Short circuit + 24 V	Deactivate automatic idling **S20**, consult LIEBHERR customer service.
E 446		Short circuit to earth or cable break	
E 454	Rotation use cannot be recorded.	Short circuit + 24 V	consult LIEBHERR customer service.
E 455		Short circuit to earth or cable break	
E 456	Incorrect fuel gauge.	Short circuit + 24 V	Deactivate automatic idling **S20**, consult LIEBHERR customer service.
E 458		Short circuit to earth or cable break	

4.1.8 Error due to warning symbols in SY field

These error codes will not be displayed in the EC field of the operator's menu. They can only be read off the S-Exxx menu list.

Error code	Effect	Cause	Measure / remedy
E 501	H2 telltale light iluuminates	Diesel engine pressure too low	See telltale light description.
E 502	Symbol appears	Coolant level low	See symbol description
E 503	Symbol appears	Coolant overheating	See symbol description
E 504	Symbol appears	Hydraulic oil level low	See symbol description
E 505	Symbol appears	Hydraulic oil overheating	See symbol description
E 506	Symbol appears	Transfer box oil temperature too high	See symbol description
E 511	Symbol appears	Overvoltage	See symbol description

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5 Maintenance

5.1 Servicing the machine safely

5.1.1 General safety instructions

- Maintenance and repair work may only be carried out by specially trained personnel.
- Observe statutory timetables or intervals given in the operating instructions for repeat tests / inspections. It is imperative that a suitably equipped workshop is available in order to carry out maintenance work.
- The inspection and maintenance schedule given at the end of these operating instructions defines precisely who is required / permitted to carry out what work. Jobs listed as daily / weekly work may be carried out by the machine's driver or maintenance personnel when they have received appropriate instruction.
  The remaining work may only be carried out by specialist personnel with appropriate training.
- Replacement parts must correspond to the technical requirements determined by the manufacturer. Original replacement parts are always guaranteed to meet these criteria.
- Wear safe work clothes when carrying out maintenance work. Protective glasses and gloves are required in addition to a hardhat and safety shoes for some work.
- Do not permit unauthorised persons to approach the machine during maintenance work.
- Cordon off a wide maintenance area if required.
- Inform operational personnel before starting to carry out any special work and repair work. Designate persons in charge of supervision.
- In the absence of any other information in the operating instructions, carry out all maintenance work on the machine on level, firm ground with the working equipment set aside and the engine switched off.
- Pull out the ignition key and shut off the main battery switch.
- Always tighten any loose screw connections during maintenance and repair work.
- If safety devices have to be dismantled during set-up, maintenance and repair work, they must be immediately reinstalled and checked at the end of the work.
- When carrying out repair work, particularly when working under the machine, hang a “Do not start” warning sign in a clearly visible position on the starting lock. Pull out the start key and shut off the main battery switch.
- Operate combustion motors and fuel operated heaters only in well ventilated areas. Before operating these units, check ventilation.
- In addition, always follow applicable local regulations.

5.1.2 Cleaning

- Clean oil, fuel or care products off the machine before starting maintenance or repair work and pay particular attention to connections and screw fittings.
  Do not use aggressive cleaning products and use lint-free cleaning cloths.
- Do not use aggressive cleaning products or steam jet devices to clean the machine for the first two months after initial set-up of the machine (or after repainting).

5.3.3 Lubricant chart

Designation	Medium	Symbol	Classification	Viscosity	CI *	Quantity (litres)**
Diesel engine	Engine oil		API-CG-4, CF-4, ACEA E2-96, E3-96, E4-98, CCMC D4, D5	SAE 5W40 SAE 10W30 SAE 10W40 SAE 15W30 SAE 15W40	EO 0540 EO 1030 EO 1040 EO 1540	(SN9817) 18,5 (SN9818) 23
Hydraulic tank	Engine oil		API-CD, CD + SF ACEA E1, E3 CCMC D4, D5 Mercedes Benz 226 und 227 227.5, 228.1 und 228.3	SAE 10W SAE 10W-30 SAE 10W-40 SAE 15W-40 SAE 20W-20 SAE 30W	EO 10 EO 1030 EO 1040 EO 1540 EO 20 EO 30	300 into tank 440 total
Slewing gear transmission (as stop and parking brake)	Transmission oil		API-GL-5 MIL-L 2105 B, Cor D	SAE 90	GO 90	5,5
Slewing gear transmission (as positioning slewing brake pedal)	Transmission oil		API-GL-5 MIL-L 2104 C or D MIL-L 2105 B	SAE90 LS	GO 90 LS	5,5
Travelling gear transmission	Transmission oil		API-GL-5 MIL-L 2105 B, C or D	SAE 90	GO 90	2x5
Tracks and corresponding gearing of slewing ring, equipment mounting	Lubricating grease		High pressure grease KP2k or EP2	Consistency 2 NLGI classification	MPG-A	-
Hinges, joints, locks	Engine oil	-	-	-	-	-
Rubber seal on doors and trim panels	Silicon spray or talc	-	-	-	-	-

Tab. 5-3 *Lubricant chart*

*CI = regulation lubricant for construction machines and vehicles according to the national German construction industry federation (see brochures in Bauverlag GmbH – Wiesbaden and Berlin, Notes on lubrication and operating materials charts).

Correct the mixing ratio

❑ Required top up quantity has been determined.

▶ Drain the same amount of coolant as required for the top up.

▶ Top up with the required amount of anti-corrosion/anti-freeze.

▶ Adjust the coolant level with the previously drained coolant.

Anti-corrosion products

In **exceptional circumstances** and **at temperatures which are continually above freezing**, e g. in tropical areas, where there is clearly **no anti-corrosion / anti-freeze fluid available**, a mixture of **water and water soluble anti-corrosion fluid** may be used as **coolant**.

Note!
Completely drain the coolant when changing from anti-corrosion / anti-freeze fluids to anti-corrosion products or vice-versa.

Using DCA 4 without anti-corrosion / anti-freeze fluid

Check and (if necessary) correct the DCA 4 concentration level during maintenance.

Note!
- The coolant must be changed **annually**.
- The DCA 4 concentration must be between **0.6** and **1.06** units per litre.
- It is recommended that testing kit CC 2602 M by Fleetguard is used.

Using other water soluble anti-corrosion fluids

IWhen using Caltex / Chevron Texaco /Havoline / Total, check and (if necessary) correct the mixing ratio as part of the regular maintenance.

Note!
- The coolant must be changed **annually**.
- The mixture ratio must consist of **7.5 %** anti-corrosion fluid and **92.5 %** water.
- It is recommended that refractometer type Gefo 2710 is used for testing.

Use a refractometer to check the mixing ratio

Fig. 5-10 *Refractometer Gefo 2710*

Refractometer:

- Adjustment screw for setting the 0-line (water line)
- Adjust the focus by turning the eyepiece

closed.

– Bleed the coolant circuit when refilled.
– Coolant flow in the coolant circuit can only take place with the ignition key in the contact position.

Draining the coolant

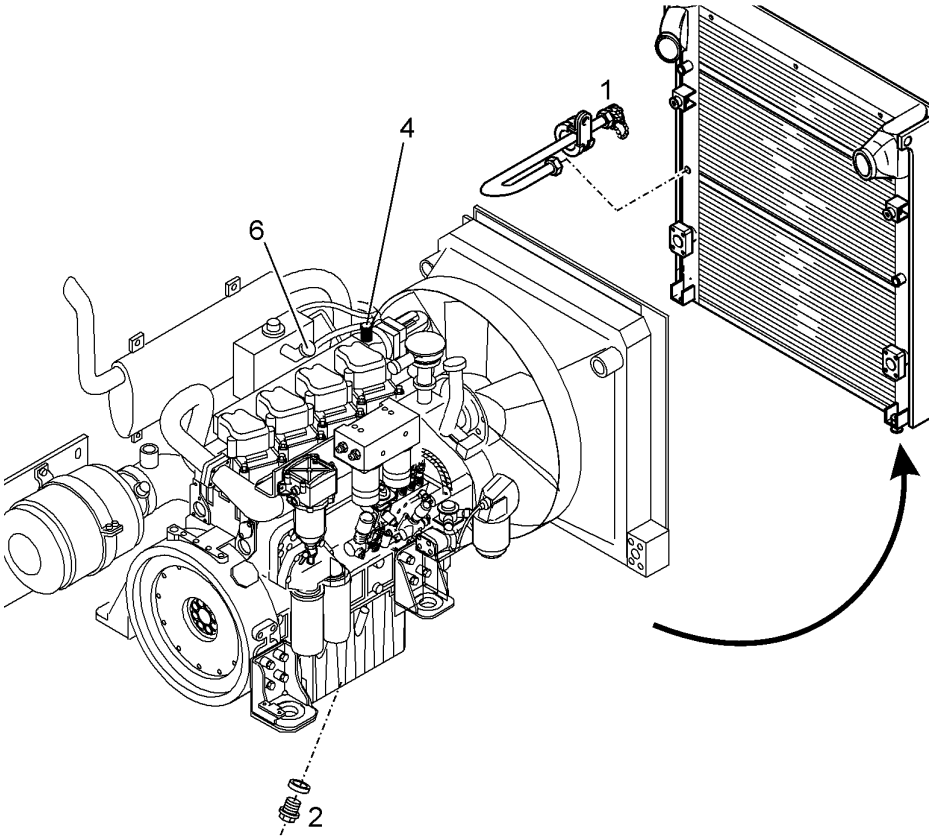

Fig. 5-19 *Draining the coolant*

To drain the coolant at the cooler:

▶ Open sealing cap **6** and drain valve **1** on the coolant cooler.

▶ Screw the drain hose supplied to the drain valve.

▶ Allow the coolant to drain into a suitable container.

To drain the coolant at the diesel engine:

▶ Unscrew the drain valve **2** on the engine's oil cooler plate.

▶ Allow the coolant to drain into a suitable container.

- ▶ Insert the main filter cartridge**3** and ensure that it is sealed and positioned correctly.
- ▶ Close the filter housing **2** with cover **1**.

5.8.3 Monitoring the filtered air line

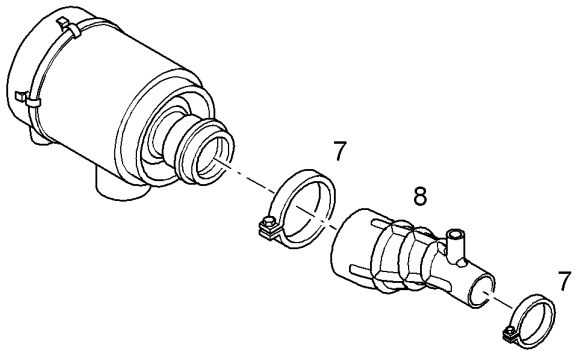

Fig. 5-31 *Monitoring the filtered air line*

- ▶ Monitor the filtered air line between the filter outlet and the engine intake pipe **8** for damage and leaks each time the filter element is replaced.
- ▶ If necessary, retighten the tensioning clamp screws **7**.

5.8.4 Bleeding the hydraulic cylinders

A cylinder must be bled after having changed the cylinder or after having worked on the cylinder (Sealing change,...) or after having worked on the cylinder hydraulic circuit (Hose change, ...).

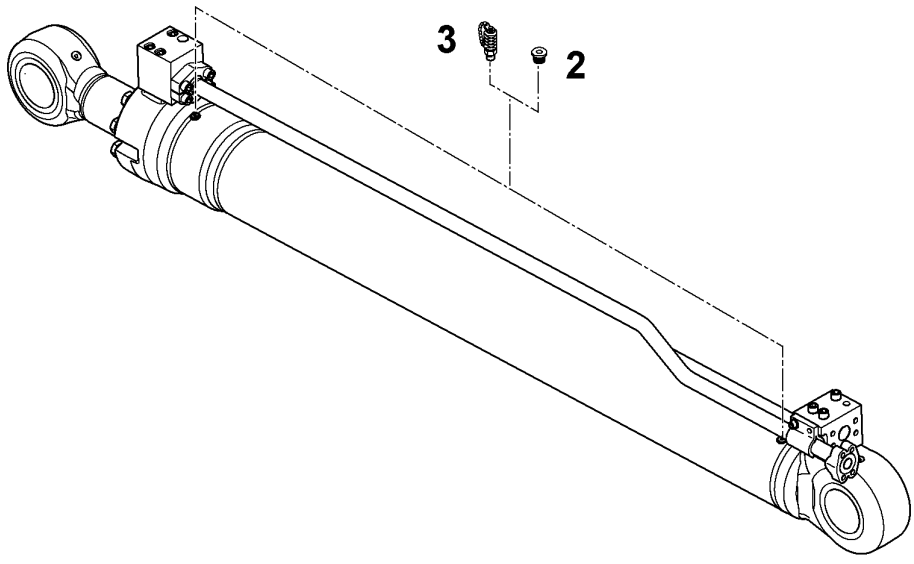

Fig. 5-32 *Hydraulic cylinder*

2 Locking screw for bleeding **3** Test point

5.10.3 Retensioning the crawler

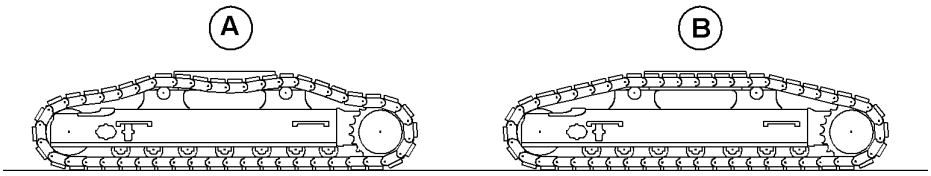

Fig. 5-43 *Crawler when insufficiently (**A**) and correctly (**B**) tensioned.*

With normal wear on the running gear, it is necessary to check the crawler tension regularly and retension the crawler if necessary.

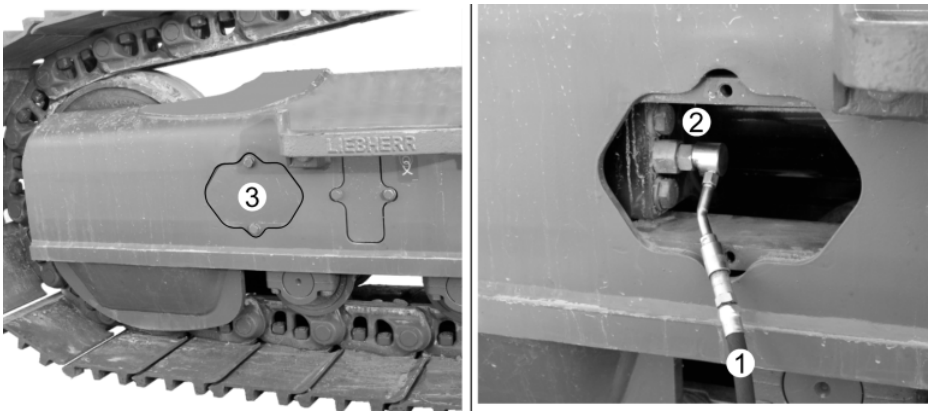

Fig. 5-44 *Retensioning the crawler*

- ▶ Remove the cover **3** on the longitudinal beam of the chassis.
- ▶ Screw high pressure hose **1** onto the manual grease gun.
- ▶ Through the opening, connect the high pressure hose **1** with the lubricating nipple **2** of the grease tension jack.
- ▶ Inject grease until the crawler is sufficiently tensioned.
- ▶ Monitoring the crawler tension

5.10.4 Releasing the crawler tension

Danger!
Risk of injury due to sudden dropping of the crawler and spraying grease.

- ▶ When releasing the tension on the crawler, keep your head away from the track roller frame.

- ▶ Carefully unscrew lubricating nipple **2** (siehe Fig. 5-44) by several thread pitches until the grease oozes out of the nipple's annular groove.
- ▶ Tighten lubricating nipple **2** as soon as the desired crawler tension is attained.
- ▶ After the adjustment procedure, drive the machine forwards and backwards and monitor the crawler tension once again.

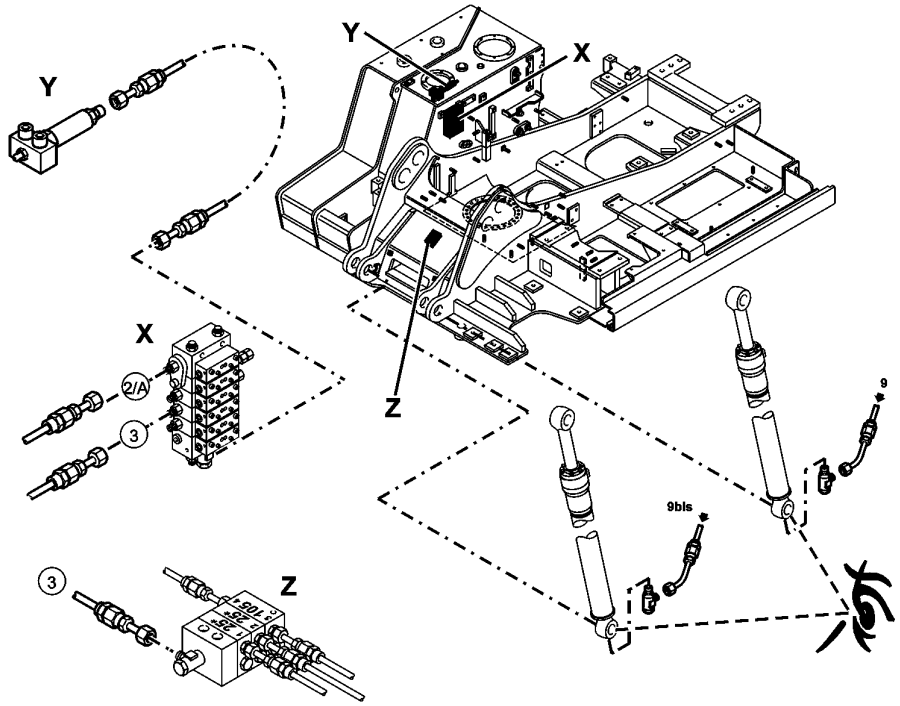

Fig. 5-56 *Centralised lubrication system*

The central lubricating nipple **Y** is located on the side of the fuel tank.

▶ Press in on the central lubricating nipple **Y** using the manual grease gun provided in the toolbox to lubricate until clean grease runs out the bearing points **9** and **9bis**.

In normal use, each oiling point must be greased weekly.

When the machine is working hard, eg. in material that causes wear, underwater or on multiple shifts, greasing must be carried out on a daily / per shift basis.

Grease quality: see lubrication chart

5.14.3 LIKUFIX (optional extra)

Cleaning LIKUFIX

The LIKUFIX hydraulic coupling system is mostly maintenance-free.

It is recommended that the system is cleaned at regular intervals and sprayed with lubricating varnish (see Workshop manual). This will prevent dirt adhering and icing up.

If the system is kept properly clean, the seals are very durable.

Replacing the sealing ring

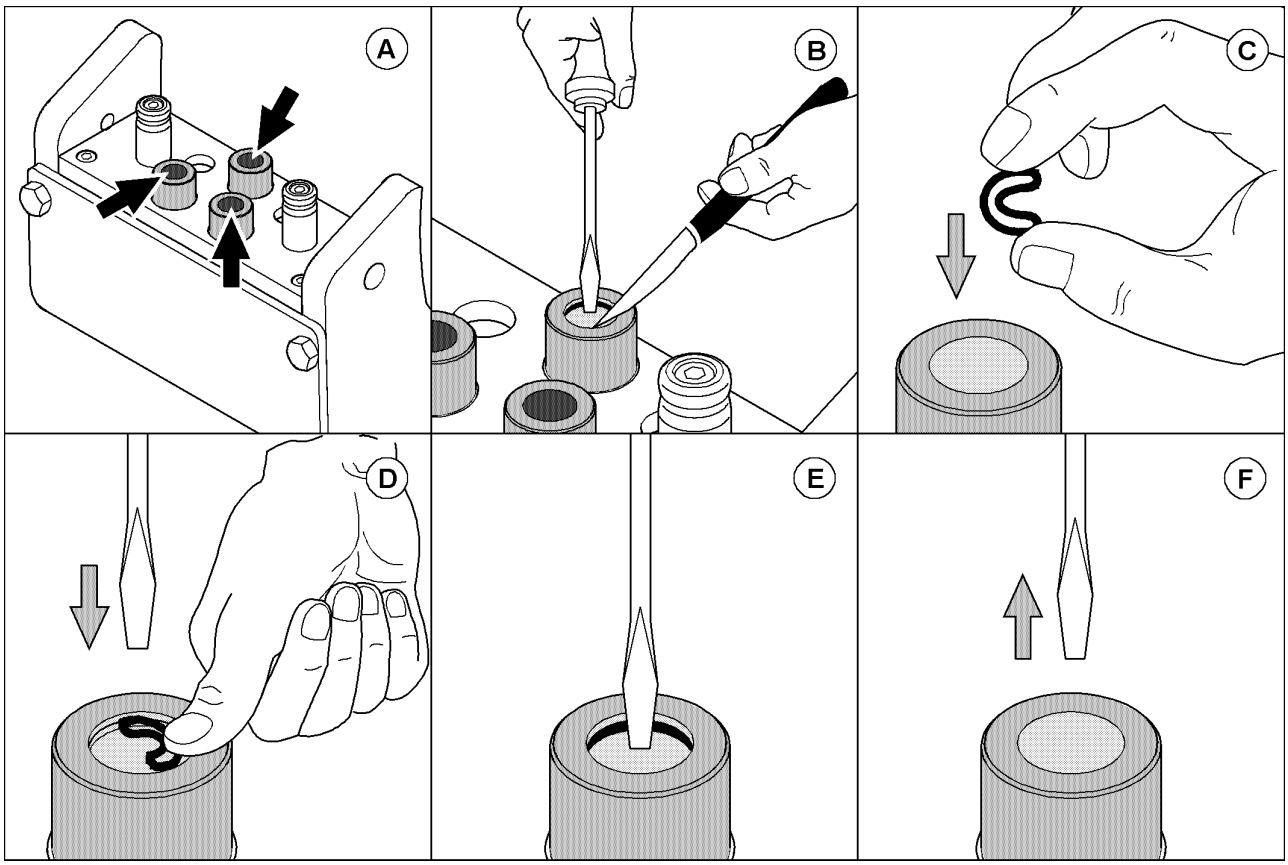

Fig. 5-67 *Replacing the sealing ring*

If leaks occur at the coupler plugs (**A** , see arrows), the sealing rings should be replaced.

- ▶ Use a screwdriver to push down the sealing washer and lever out the defective sealing ring using a pointed object (**B**).
- ▶ Press the new sealing ring together and place it on the sealing washer with the open side down (**C**).
- ▶ Press down the washer as far as the groove, place the screwdriver in the middle of the sealing ring and move your hand away (**D**).
- ▶ Allow the sealing ring to jump into the groove (**E**).
- ▶ Remove the screwdriver (**F**).
  ↳ The sealing washer must move upwards. If necessary, press the sealingring