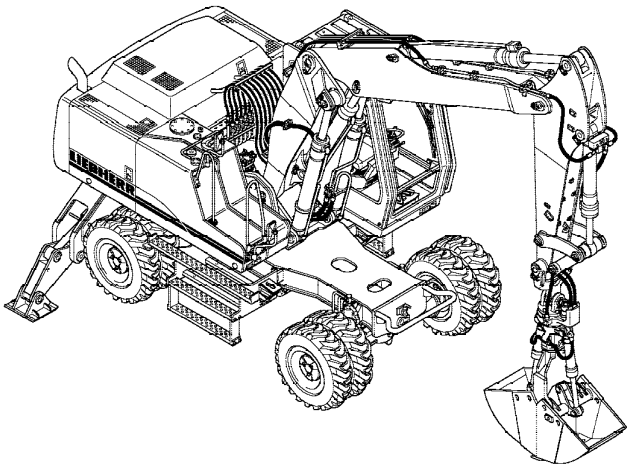
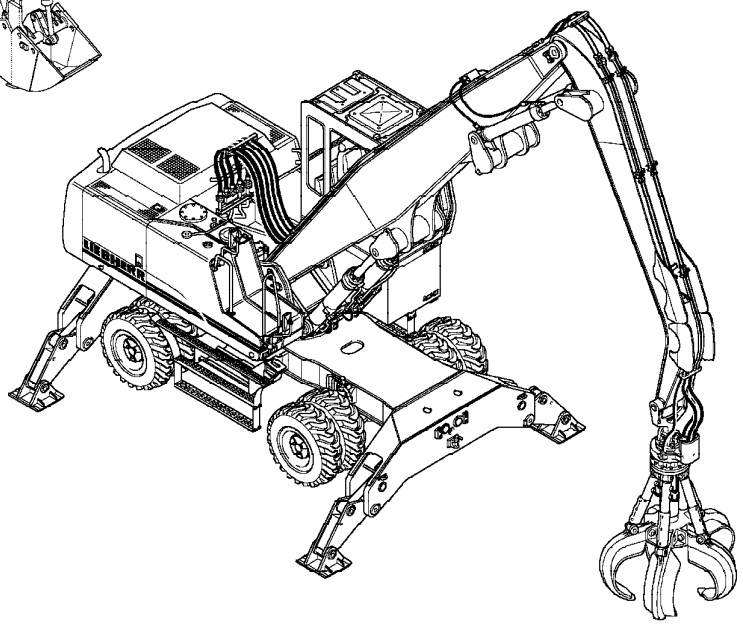
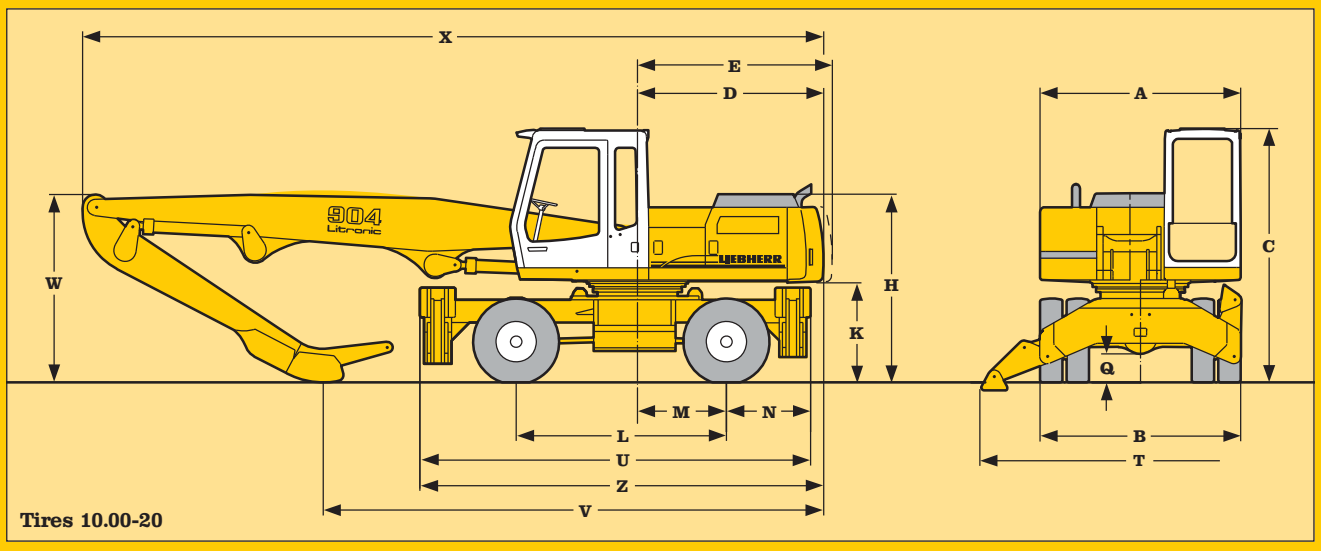
Operation and Maintenance Manual

A 904 Litronic

from Serial No. on 8264







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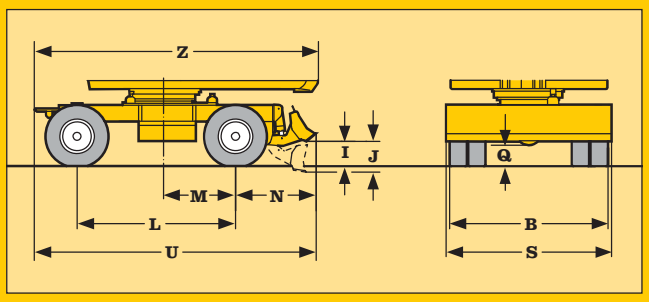
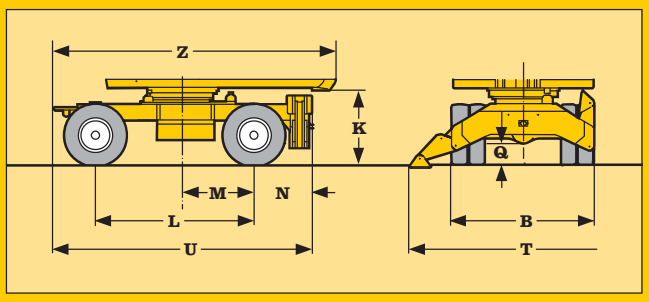
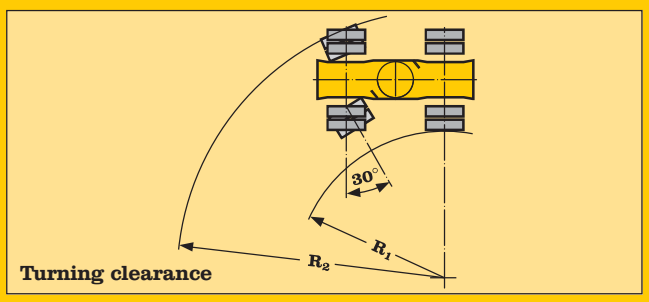






Turning clearance

	A 904 EW with prop up blade	A 904 EW with 2 point outriggers	A 904 with 4 point outriggers
	mm	mm	mm
A	2500	2500	2500
B	2660	2660	2480
C	3140	3140	3140
D	2345	2345	2345
E	2450	2450	2450
H	2360	2360	2360
I	515	–	–
J	645	–	–
K	1235	1235	1235
L	2600	2600	2600
M	1100	1100	1100
N	1265	1040	1040
Q	350	350	350
R1	4030	4030	4030
R2	7050	7050	7050
S	2750	–	–
T	–	3700	3965
U	4600	4380	4830
Z	4500	4500	5435

E = tail radius

	In-dustr. stick	with industr. type straight boom 6,50 m and prop up blade	and 2 pt. outr.	and 4 pt. outr.	with industr. type gooseneck boom 6,00 m and prop up blade	and 2 pt. outr.	and 4 pt. outr.
	m	mm	mm	mm	mm	mm	mm
V	4,00	6235	6235	6235	5900	5900	5900
	5,00	5435	5435	5435	5150	5150	5150
W	4,00	2450	2450	2450	3150	3150	3150
	5,00	3300	3300	3300	3550	3550	3550
X	4,00	9335	9335	9335	8750	8750	8750
	5,00	9235	9235	9235	9100	9100	9100

Dimensions are with attachment over steering axle

Dimensions are with attachment over digging axle for better transport dimensions

Dimensions

2. SAFETY INFORMATION

Working with an excavator can be dangerous, it could result in injury or death if proper precautions are not taken! **WE URGE YOU TO READ THIS MANUAL CAREFULLY!** This safety information is provided to operators and maintenance mechanics to ensure the safe operation and maintenance of the excavator. It is essential that you read and familiarize yourself with this information, which explains safety requirements and precautions and specific hazards of which you should be aware. This also applies to any personnel which might be working on the machine only occasionally, such as during set up or maintenance.

It is essential that you read and familiarize yourself with this information, which explains safety requirements and precautions and specific hazards of which you should be aware.

- Careful adherence to these safety guidelines will permit safe operation and maintenance and potentially prevent personal injury to yourself and others, and possible damage to the excavator.
- Important safety notes such as **DANGER, CAUTION** or **NOTE** are used throughout this manual to emphasize important or critical instructions.
  In this manual, **DANGER, CAUTION** or **NOTE** are defined as follows :

DANGER

Denotes an extreme intrinsic hazard which could result in a high probability of death or serious injury if proper precautions are not taken.

CAUTION

Denotes a reminder of safety practices or directs attention to unsafe practices if proper precautions are not taken.

NOTE

NOTE describes operation and maintenance procedures which should be followed to keep your excavator operation and to insure long machine life and/ or to facilitate certain procedures.

In addition to these instructions you must follow the safety regulations applicable to your work environment and job site and any federal, state and local safety requirements (A model excavators must also follow local and federal highway regulations).

For EC countries, guidelines 89 / 655 / EWG contain the minimum safety guidelines for the user.

DESTINED USE

The hydraulic excavator equipped with standard backhoe, grapple or bucket attachment may only be used to loosen, pick up, move, load and dump soil, gravel, rock or other material, whereas the transport of material is not to be carried out by the hydraulic excavator . With travel operation of the excavator whilst carrying a load, the technical safety descriptions must be observed (see section "Note on working safety").

Special guidelines are applicable for machines used for lifting applications and special safety devices must be installed (see chapter 7)

Any other use above and beyond the applications described above, such as demolition work, material handling, etc. requires special attachments and safety devices. These attachments (e.g. Tree grapple, hydraulic hammer , concrete cutter etc.) can only be installed and used on approval of the basic machine manufacturers.

Transporting personnel is not considered destined use and is therefore prohibited. The manufacturer is not responsible for any resulting damage. Any risk must be carried by the user himself.

Observing and adhering to all regulations and inspection and maintenance guidelines given in this operation and maintenance manual is considered part of destined use.

- If any work is required on any parts which carry current, use a second person to turn off the main battery switch, if necessary. Rope the work area off with a red and white safety rope or chain, and set up warning signs. Use only insulated tools.
- When working on medium and high voltage components, shut off the voltage and connect the supply cable to the ground and ground the components, such as the condensor, with a grounding rod.
- Check all disconnected parts if they are truly free of current, ground them and close them off quickly. Insulate any close-by, current carrying parts.

HYDRAULIC LINES AND HOSES

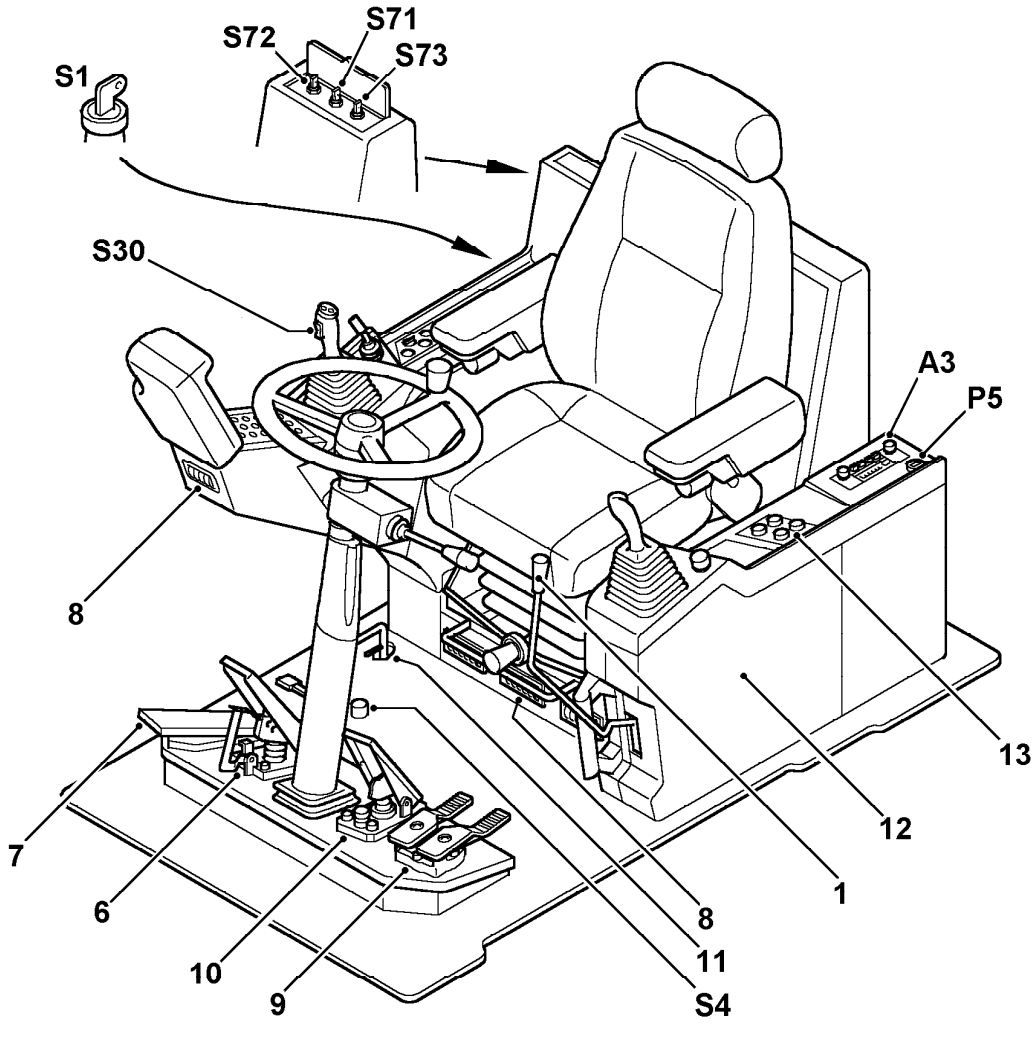
- Hydraulic lines and hoses may never be repaired!
- All hoses, lines and fittings must be checked regularly, but at least 1 x per year for leaks and any externally visible damage! Any damaged sections must be replaced immediately! Excaping oil can cause injuries and fires!
- Even if hoses and lines are stored and used properly, they undergo a natural aging process. For that reason, their service lift is limited.
  Improper storage, mechanical damage and improper use are the most frequent causes of hose faulires.

  The service life of a hose may not exceed six years, including a storage period of not more than 2 years (always check the manufacturer's date on the hoses).

  Using hoses and lines close to the limit ranges of permitted use can shorten the service life (for example at high temperatures, frequent working cycles, extremely high impulse frequencies, multi shift or around the clock operations).
- Hoses and lines must be replaced if any of the following points are found during an inspection:
  - Damage on the external layer into the inner layer (such as chaffings, cuts and rips);
  - Brittleness of the outer layer (crack formation of the hose material);
  - Changes in shape, which differ from the natural shape of the hose or line, when under pressure or when not under pressure, or in bends or curves, such as separation of layers, blister or bubble formation;
  - Leaks;
  - Non observance of installation requirements;
  - Damage or deformation of hose fittings, which might reduce the strength of the fitting or the connection between hose and fitting;
  - Any movement of hose away from the fitting;
  - Corrosion on fittings, which might reduce the function or the strength of the fitting;
  - Storage or service life has been exceeded.

  When replacing hoses or lines, always use original replacement parts.
- Route or install the hoses and lines properly. Do not mix up the connections!

3. CONTROLS AND INDICATORS IN THE CAB



1 ..... Safety lever
Servo control

6 ..... Service brake

7 ..... Travel pedal

8 ..... Vent for heater

9 ..... Control - special equipment*

10 ..... Swing brake*

11 ..... Uppercarriage lock

12 ..... Fuse box

13 ..... Heater and Air Conditioning

A3 ..... Radio*

P5 ..... Counter for Operating Hours

S1 ..... Ignition

S4 ..... Horn

S30 .... Pre-Selector Switch
Travel Direction

S71 .... Switch Engine throttle
control / Manu

S72 .... Switch
Engine speed + / -

S73 .... Switch
Emergency operation

*Optional equipment

E 503

COOLANT OVERHEATING

This symbol appears simultaneously with the **P2** display - Cooling water temperature, see page 3.6.

E 504

HYDRAULIC OIL LEVEL LOW

This symbol appears if the oil level in the hydraulic tank falls below the minimum level.
The low oil level in the hydraulic tank is announced acoustically at the same time via the buzzer.
Shut the engine off, find the leak and repair it.
Only refill hydraulic oil via the return filter

E 505

HYDRAULIC OIL OVERHEATING

This symbol appears if the hydraulic oil temperature exceeds 98°C in the tank.
Shut off the engine, localise the malfunction and repair it (cooler dirty, etc.)

E 511

EXCESS VOLTAGE

This symbol appears if the operating voltage exceeds 30 volts for at least 0.5 seconds.

QUICK-CHANGE ADAPTER (additional equipment)

This symbol appears during the unlocking procedure or when the pins are being retracted (without display of an error code).

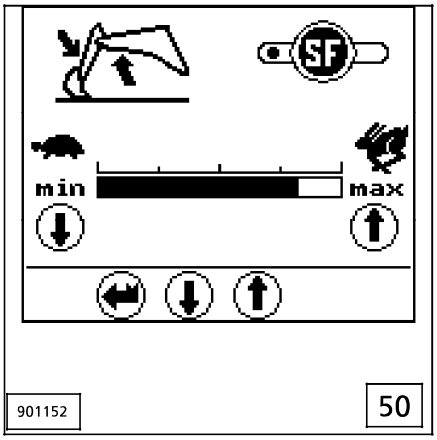
MENU 

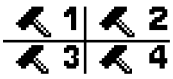
ASSIGNMENT OF FLOW REDUCTION TO KEY SF

Adjusting the operating speed of the hydraulic excavator attachment occurs via this monitor (fig. 50).

Use the "Up" and "Down" keys for adjustment. During adjustment, flow reduction is activated continuously.

After exiting the menu, the pre-selected adjustment is activated via switch S354 (indicator lamp is on) or it is deactivated (indicator lamp is off).
Flow can be reduced to 50%.



MENU 

ASSIGNMENT OF FLOW REDUCTION OPTIONS TO THE EXTERNAL INPUT PORT I1 (attachment input port; e.g. activating the hammer pedal)

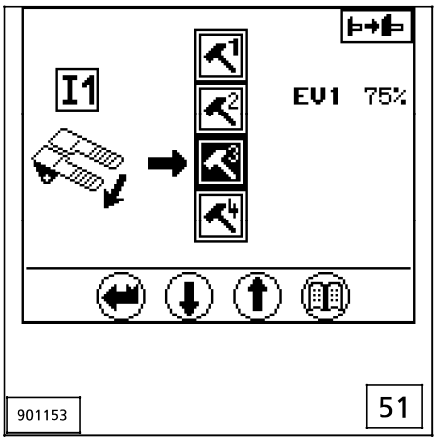
Pre-defined flow reduction is assigned in this menu.

The arrow opposite the symbol indicates the present adjustment.

In the example figure 51, flow 3 is activated, i.e. the fixed ideal pump value (75%) is determined to be the maximum value.

If another flow (1 – 4) needs to be assigned (e.g. when the attachments are changed), another selection must be made via the "Up" and "Down" keys.

The new flow is confirmed by pressing the "MENU" key.



MENU 

CONFIRMING THE SERVICE INTERVAL

This monitor functions as a data monitor and as a confirmation function for a service interval performed.

The operating hour of the next service interval (in the example fig. 52 = "500 hrs") and the present operating hour ("174 hrs") are displayed on this monitor.

A service interval that is to be performed can only be confirmed 50 hours before the service interval coming up (fig. 53).

When this time period is reached, the query appears on the monitor if the maintenance work performed should be confirmed.

Confirmation via the "~~OK~~" key interrupts this menu, "OK" confirms the service performed, i.e., the present operating hour is saved as the last service interval performed.

NOTES ON THE OPERATION OF THE HEATER AND THE AIR CONDITIONING

- The best heating and cooling effects are attained with recirculated operation. Put rotary switch **S92** in the " ⟲ " position.

- For maximum comfort, we recommend using the following vents:
  - When heating, vent foot area **8a** and front window **8b** (fig. 22)
  - When air conditioning, vent on the cab's back wall **1** (fig. 23) and front window **8b** (fig. 22).

- When air conditioning it is wise to return the switch regulator **S93** for the heater to "0" position (energy-saving).

- To target the operator's cab for defrosting, the air conditioning can also be activated during heater operation.

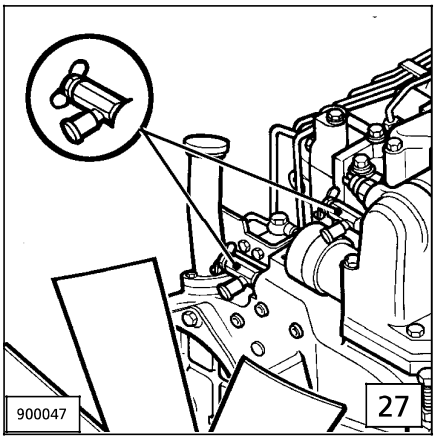
  In such a case, only turn the air conditioning on until the windshields are no longer misty.

NOTE

- The air conditioning should only be activated after the diesel engine has been started in order to avoid overloading the starter and the battery.

- If the excavator is employed over a long period of time without using the air conditioning it is recommended to operate the compressor once every 14 days via rotary switch **S95**. Otherwise the seals could be damaged by the engine's vibrations whenever the compressor is not operated for a long period of time.

- If the heater stays shut off for a long period of time (e.g in the summer), it is preferable to close the water taps (fig. 27) on the diesel engine.



NOTE

For additional information on the operator cab's heater, please refer to the operating and maintenance manual of the manufacturer.

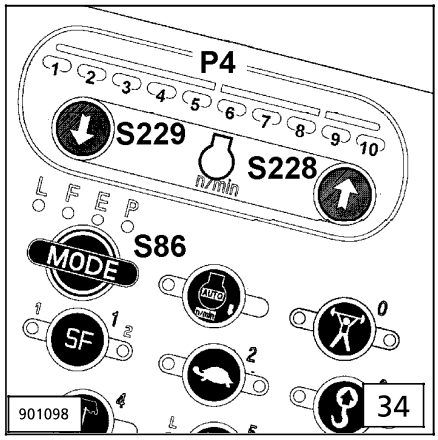
NOTES AFTER STARTING THE ENGINE

DANGER

- **Only run the engine in enclosed spaces if there is sufficient ventilation. Open doors and windows to provide the correct fresh air supply.**

NOTE

- **Raise the engine and the hydraulic oil to operating temperature. If the oil temperature is low, control reponse is slow.**
- **Move the excavator carefully into open space and then check that the travel and swing brakes function properly.**
- **Check the control of the attachments for proper functioning.**



SHUTTING OFF THE ENGINE

NOTE

Avoid shutting off the engine when it is running at maximum load.

- First adjust the engine RPMs to the lowest idle position via the arrow key **S229** ↓ (fig. 34).
- Keep the engine running in the lowest idle position for about 2-3 minutes without any stress to equalize temperature.
- Then switch the ignition key to the -0- position to shut off the engine. Remove the ignition key.

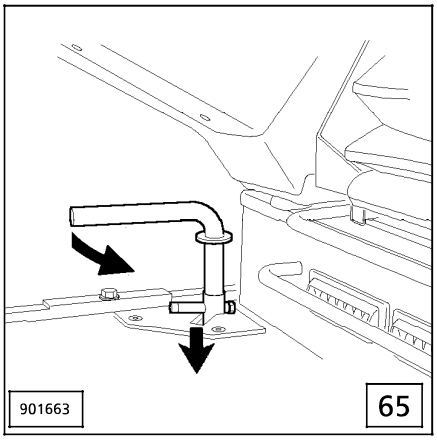
NOTE

Do not operate the ignition as long as the engine is running. Ignition and alternator's ring gear could be damaged.

UPPER CARRIAGE LOCK

When travelling on roads, transporting, taking out of operation as well as during maintenance and repair work, and before leaving the excavator, the upper carriage must be locked to the under carriage.

Swing upper carriage over one of the locking bores in under carriage and lock with pin (picture 65).



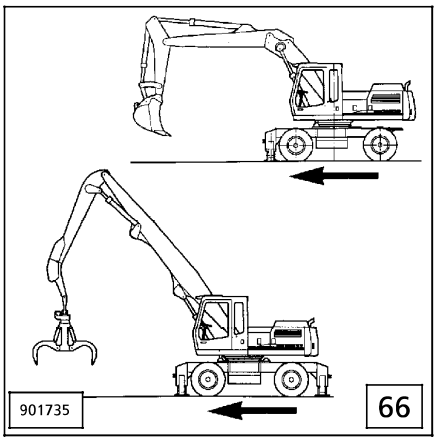
DANGER

Do not operate slewing gear when the upper carriage is locked to the under carriage with locking pin.

USING THE ATTACHMENT

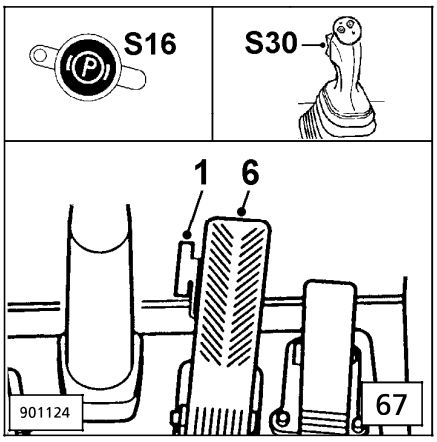
WORKING POSITION

- Excavator work must always be carried out over the rigid axle (picture 66).
- Lock the oscillating axle during all excavator work. Preferably via actuating switch **S75** in position **"1"** (see also page 4.16 chapter "oscillating axle lock").



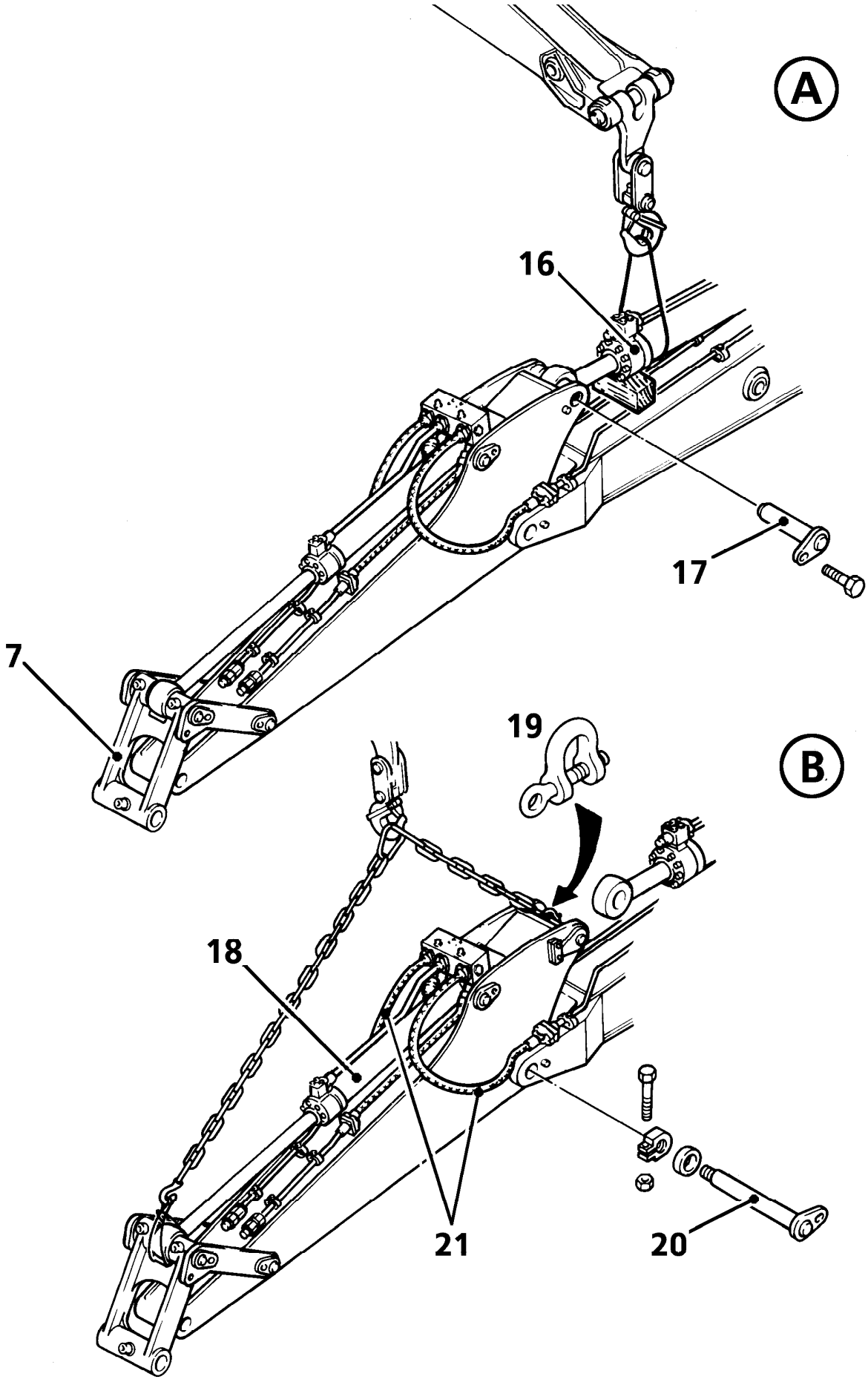
DANGER

- For this task, brake pedal 6 must be actuated completely until pawl 1 locks; parking brake **S16** must not be locked ! (Buzzer sounds as warning))
- Preselect-switch **Pos. 23** for forward/reverse travel direction **must** be in position **-0-**.



MACHINE TRANSPORTING SAFETY

- Use only suitable transporting and lifting devices with sufficient lifting capacity.
- Park the excavator on firm and level ground and block the chains or wheels.
- If necessary, remove part of the attachments during transport.
- When loading the excavator on a flatbed trailer or railroad car, be sure that the loading ramp incline is less than 30° and covered with wooden planks to prevent skidding.
- Remove all snow, mud and ice from track components before moving up the ramp.
- Before loading, secure the uppercarriage to the undercarriage with the lock pin .
- Align the excavator with the loading ramp.
- Attach the manual control levers to the foot pedals for sensitive control.
- Have another person guide and signal the operator.
- Have blocks or wedges ready to block the excavator, if necessary, to prevent it from rolling backwards.
- Retract the attachment as far as possible and lower the attachment as close as possible to the loading surface and carefully drive up the ramp and onto the flatbed trailer.
- When the excavator is on the trailer, release the uppercarriage lock pin, turn the uppercarriage back and lower the attachment. If the backhoe attachment is attached, tilt the stick and bucket in and relock the uppercarriage.
- Carefully secure the uppercarrige and other parts with chains, wedges and blocks to prevent slipping .
- Release the hydraulic pressure, remove the ignition key, raise the safety lever, close and lock the cab and secure all other doors and leave the excavator.
- Close all cab doors, covers and other doors of the excavator.
- Carefully check out the transport route. Make sure that width, height and weight allowances are within the permitted limits.
- Check that there is sufficient clearance underneath all bridges, underpasses, utility lines and in tunnels.
- During the unloading procedure, proceed with the same care and caution as during the loading procedure. Remove all chains and wedges. Start the engine as outlined in the Operation and Maintenance Manual. Carefully drive off the loading platform. Keep the attachment as close as possible to ground level. Have another person guide and signal to the operator.


A
16
17
7
B
19
18
21
20
900057

HYDRAULIC OIL

Hydraulic oil specifications

1. **Mineral oils**

   The following prescribed engine oils comply with the following specifications and guidelines:

   For single grade oils: API - CD / CCMC - D4 / ACEA - E1

   Mercedes-Benz guidelines - page nos. 226.0 and 227.0

   For multi grade oils: API - CD + SF / CCMC - D5 / ACEA - E3

   Mercedes-Benz guidelines - page nos. 227.5, 228.1 and 228.3

2. **Environmentally-friendly hydraulic fluids**

   LIEBHERR recommended "environmentally-friendly hydraulic fluids" are limited to hydraulic fluids with synthetic Ester base with a viscosity in accordance with ISO VG 46.

   Initial filling can be carried out at the factory at the request of the customer. Use of other environmentally-friendly fluids must be pre-approved by **LIEBHERR** .
   Do not use plant-based oils due to their unfavourable temperature resistance.

NOTE **Environmentally-friendly hydraulic fluids must be checked at regular intervals:**

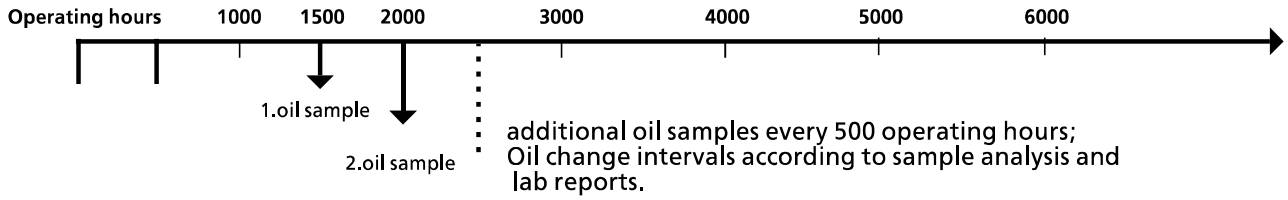
At least every 500 operating hours during normal operation;
At least every 250 operating hours during operation in extremely dusty conditions.

LIEBHERR recommend oil analysis to be carried out by the company "WEAR-CHECK". Thus, oil change intervals as prescribed by the Maintenance and Inspection Chart no longer apply.

It is imperative when mixing different environmentally-friendly hydraulic oils of varying brands or with mineral oils, that they first undergo analysis. See also information regarding After-Sales-Service.

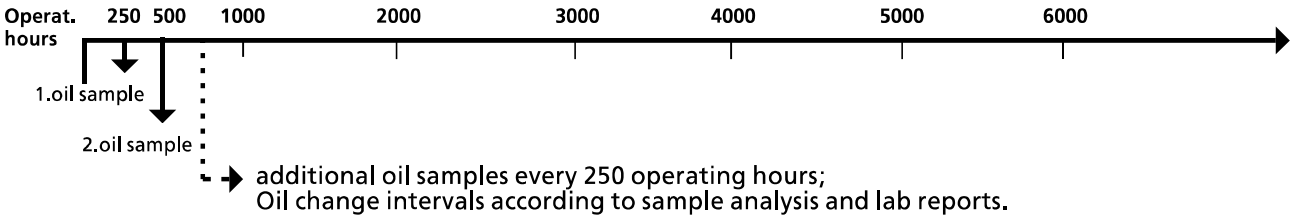
Monitoring hydraulic oils - Change according to Oil Sample Analysis and Lab Reports

HYDRAULIC EXCAVATOR DURING NORMAL OPERATION



Change intervals for hydraulic oil return filter (20/5 µm):
First change at 500 operating hours, and then every 1000 operating hours.

HYDRAULIC EXCAVATORS OPERATING IN DUSTY CONDITIONS



Change intervals for hydraulic oil return filter (10 µm):
First change at 500 operating hours, and then every 500 operating hours.

NOTE

Liebherr recommends that the oil in hydraulic excavators be changed at intervals in accordance with Wear-Check analysis reports. See also Customer Service and Product Information.

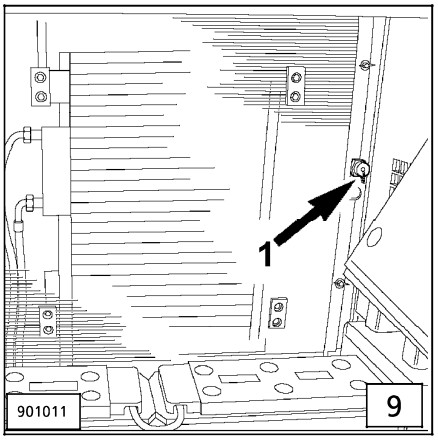
TO BLEED THE COOLANT

Open sealing cover **6** (fig. 6) and drain plug **1** on the water cooler (fig. 9), screw on drain hose to drain plug and allow coolant to drain into a suitable container

Remove the bleed screw **2** on the oil cooler plate of the engine (fig.10).

CAUTION

To completely bleed the engine (when not operated for a long time, etc.), also bleed the coolant from the water pump **3** (fig.11).



TO ADD COOLANT AND TO BLEED THE COOLANT SYSTEM

Close the drainage screws, **1** on the water cooler (fig. 9) and **2** on the engine (fig.10).

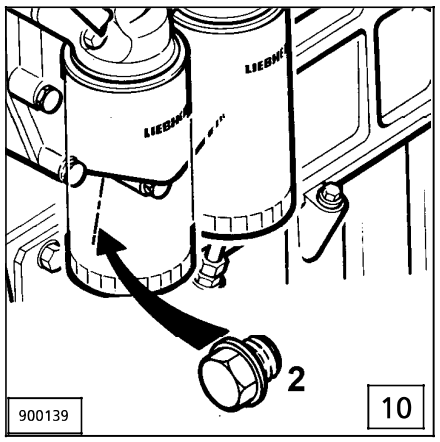
Completely open the taps for the heating system (fig. 8) and the regulator valve on the heater.

Fill up the water to the mark on the filler neck via the expansion tank (fig. 6).

Let the engine run in a stressed condition for about 20 mins.. If necessary, partly cover up the coolant system in such a way that the opening temperature of the thermostats will be exceeded. The overheating display may not light up and/or the water temperature gauge on the control monitor must stay below the red zone.

Let the engine run in low idle for about a minute (remove the cooling system covers for this procedure).

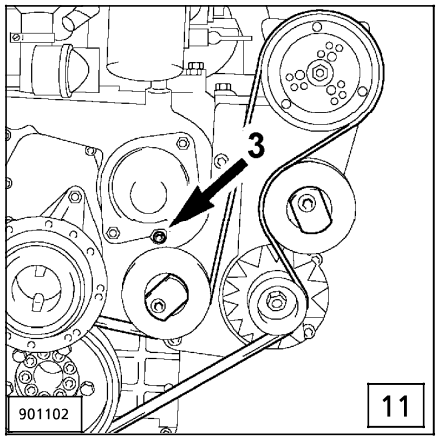
Check the coolant level in the expansion tank and if necessary fill it up.



CAUTION

Whenever the temperature or level gauges for the coolanr level light up, put the engine into low idle immediately and shut it off.

Check the coolant level, and if necessary, fill it up.



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  When replacing hoses or lines, always use Original replacement parts.
- Route or install the hoses and lines proberly. Do not mix up the connections!

RETURN FILTER (fig. 29, pos. 1 and fig. 32):

The return filter's magnetic rod **3** should be cleaned according to the determined intervals (see maintenance chart) or the fibreglass filter cartridge **6** should be replaced.

NOTE

When operating in conditions of major dust contamination, observe the special instructions for filter change, see page 5.8.

Cleaning the magnetic rod,
Replacing the filter element (fig 32)

Lossen the screws **4** on the filter cover and remove cover **1** and magnetic rod **3**.
Carefully clean the dirt from the magnetic rod.

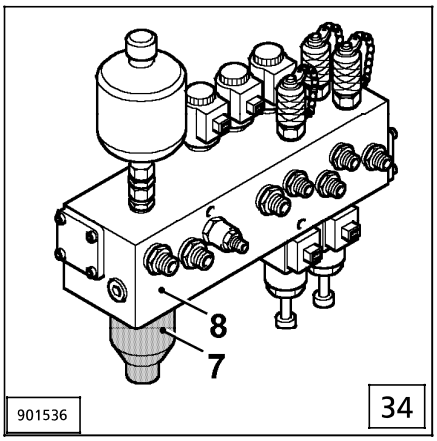
Remove the used filter cartridge **6** and insert a new element .

CAUTION

Make sure the bottom of the filter cartridge is seated on the filter bottom.

Replace cover **1** carefully, making sure it is centered. Be sure that the O-ring **5** is not damaged.
Retighten cover **1** via the screws **4**.

Each time the filter cartridge **6** of the return filter is replaced, the pressure filter 7, integrated into the servo unit **8** should be cleaned (fig. 34).



SERVO FILTER (rear side of hydraulic tank)
(figs. 34 and 36)

Cleaning the pressure filter

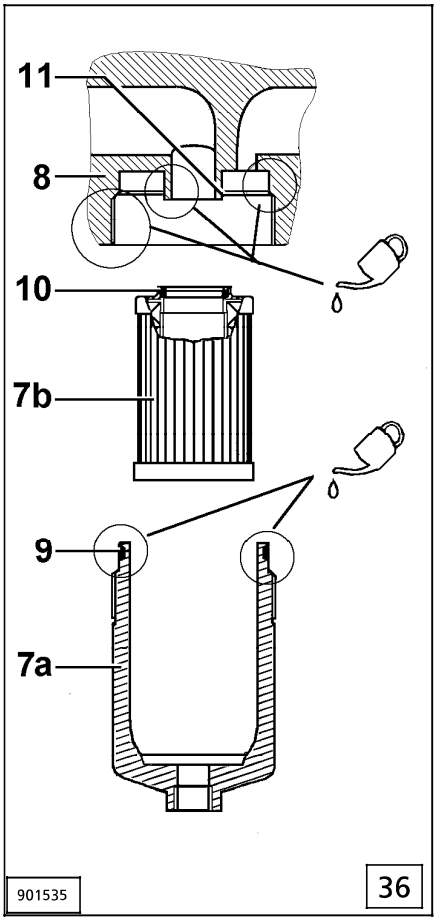
Unscrew the filter can **7a**, remove the filter element **7b** and clean the filter can **7a**.

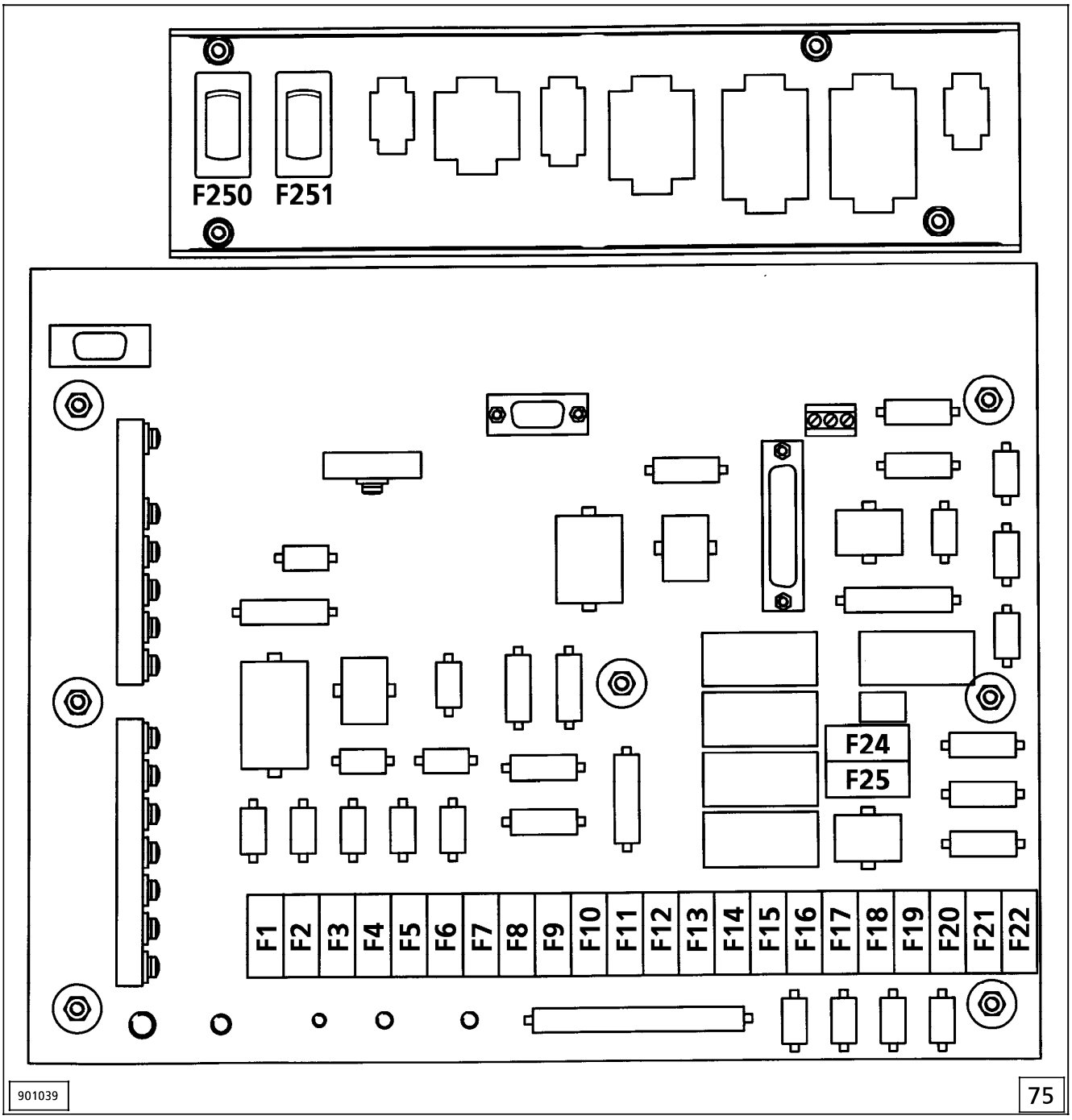
Installing a new element.

Oil threads and sealing surfaces on the filter can **7a** and the servo unit **8**, as well as the O-rings **9** and **10** with hydraulic fluid.

Carefuly push up the filter element **7b** onto the mounting pivots **11.**

Srew in the filter can **7a** until hand-tight and then turn it back a quarter turn.

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7. ADDITIONAL EQUIPMENT

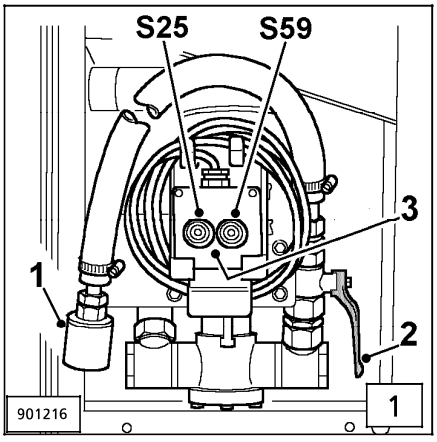
The components and equipment described in this chapter are added attachments that deviate from standard equipment.

It is therefore possible that the functions described in the operator's manual are expanded by the functions in this chapter.

Despite any installation of added attachments, chapters 1 to 6 of this operation and maintenance manual remain valid.

ELECTRIC REFUELLING PUMP

(Fig. 1)



The electric refuelling pump fills fuel into the hydraulic excavator's fuel tank.

It is under the cover on the face of the hydraulic and fuel tank. The control element (3) can be removed.

When refuelling and routing the hoses, proceed as follows:

1) Insert the free end of the suction hose (1) into a fuel tank.

2) Open the stopcock (2).

3) To pump fuel into the tank of the hydraulic excavator, switch on the refuelling pump via switch **S25** (green). The pump switches off automatically as soon as the maximum fuel level has been attained.

   The refuelling pump can be switched off at any time via switch **S59** (red).

NOTE

Make sure that the fuel level does not fall below the suction height of the suction hose. Always avoid any dry running of the pump.

4) Close the stopcock (2).

5) Before routing any hoses make sure there is no more fuel in the suction hose (1).
   Wind up the suction hose (1) and stow it away.

5) Close the cover.