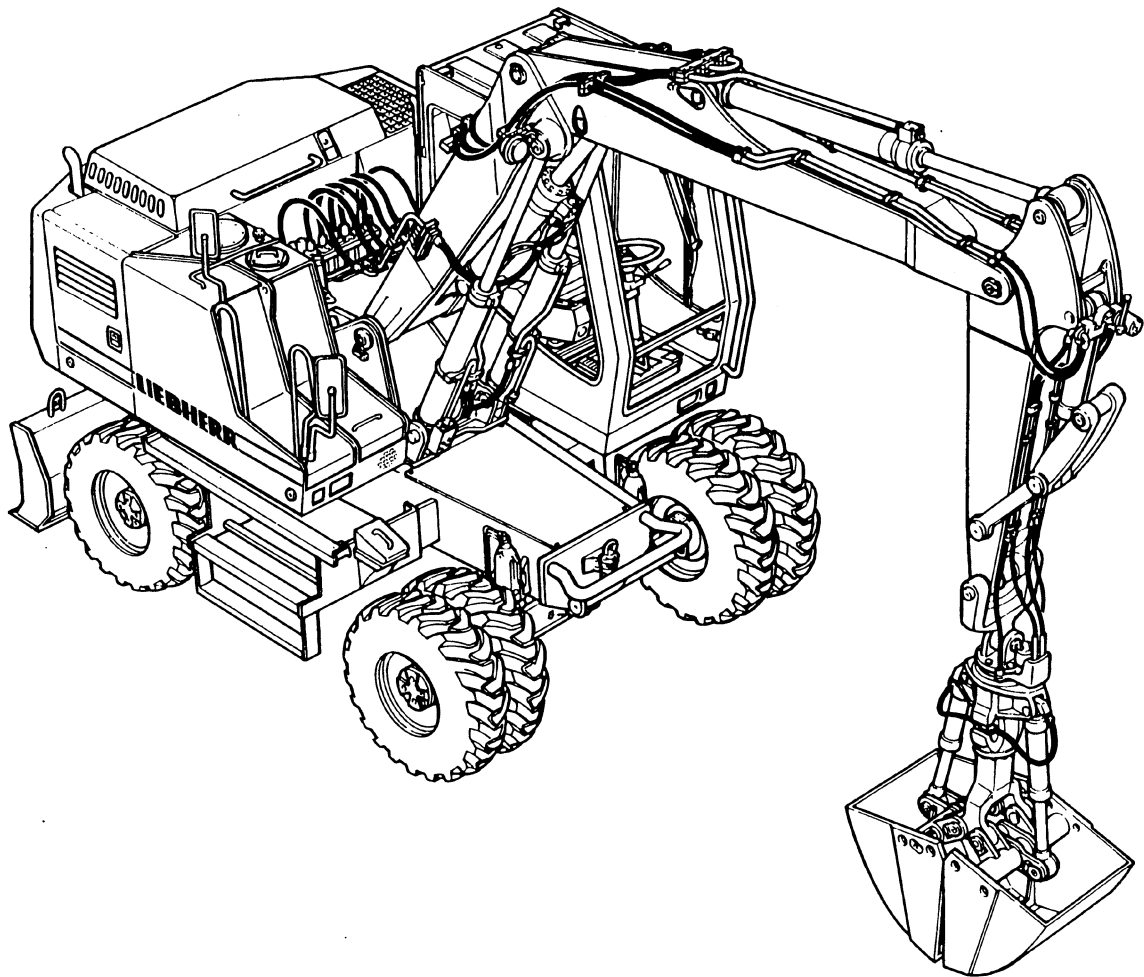


Operation and Maintenance Manual

A 900

Litronic

from Serial No. on 4001



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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 :



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



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 users.

DESTINED USE

The excavator with the standard backhoe, grapple or bucket attachment may only be used to loosen, pick up, move, load and dump soil, gravel, rock, or other material and to load trucks, barges, conveyor belts, or rock crushing systems.

Special guidelines are applicable for machines used for lifting applications and special safety devices must be installed.

Any other use above and beyond the applications described above, such as breaking out rock or demolishing buildings, pounding in posts etc. requires special attachments and safety devices.

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

Destined use is considered part of observing and adhering to all regulations and inspection and maintenance guidelines given in this Operation and Maintenance Manual.

3. CONTROLS AND INSTRUMENTATION

THE OPERATOR'S SEAT

ADJUSTMENT

Before adjusting the seat, tilt up the safety lever 1 (fig. 1) to relieve the servo pressure.

Horizontal seat adjustment :

To move the seat forward/ backwards without moving the two joysticks, pull the lever 1 (fig. 2) up and slide seat to desired position.

To move the seat forward/backward with the joysticks, pull the lever 2 (fig. 2) up.

Seat suspension adjustment :

The suspension should match the operator's weight. To adjust the suspension, turn the adjustment ring at the knob 5 (fig. 3).

Seat cushion tilt and height adjustment :

The seat cushion can be brought in the desired position by moving the lever 4 (fig. 3).

- Pull up the lever to raise or lower the front part of the cushion seat.
- Push down the lever to raise or lower the rear part of the cushion seat.

Backrest tilt adjustment :

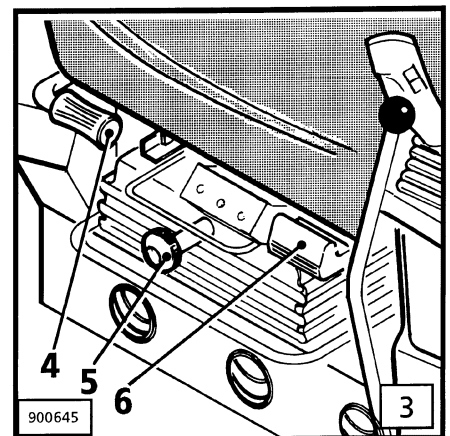
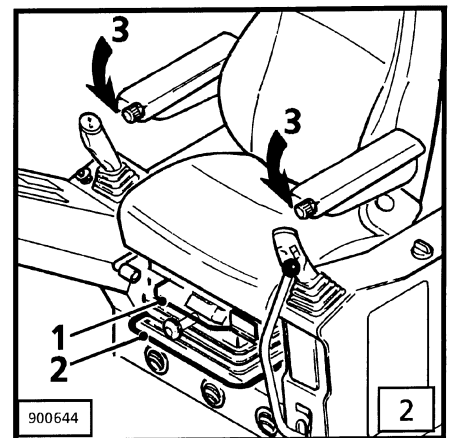
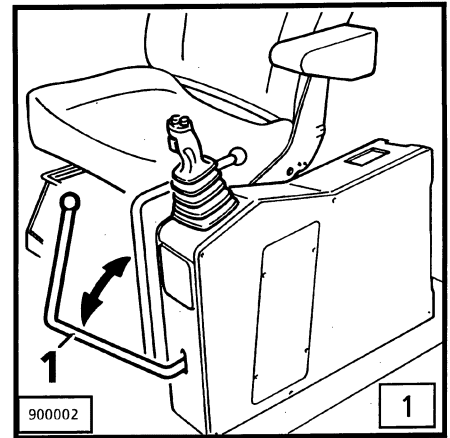
To adjust the backrest, pull the lever 6 (fig. 3) up and move the backrest to the desired position.

Armrests adjustment :

The height of the armrests can be adjusted for optimum operator comfort, by turning the knob 3 (fig. 2) .

OSCILLATION ATTENUATION

When operating an ISO 7096 approved driver's seat during authorized application of the earthmoving machinery, the rated accelerated vibrations a_{zw} (measured by ISO 2631 part 1) are assured to meet the protection requirements for whole body vibrations.



ENTERING OR LEAVING THE CAB

Always use the steps, rails and handles provided to enter and leave the machine !



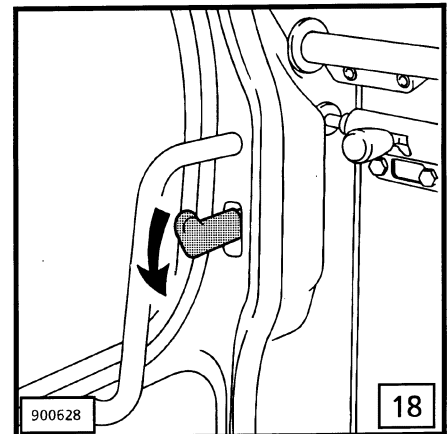
NEVER JUMP OFF THE MACHINE !

CAB DOOR - LOCK

The cab door is held closed by the door lock (fig. 18).

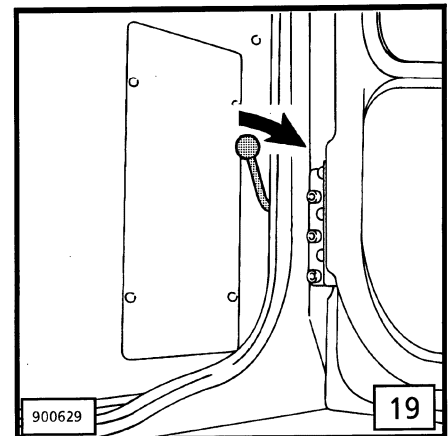
To open the cab door:

- Pull the lever on the door lock downward.



To unlock the fully opened cab door:

- Push the lever inside on the cab door to the front (fig. 19).

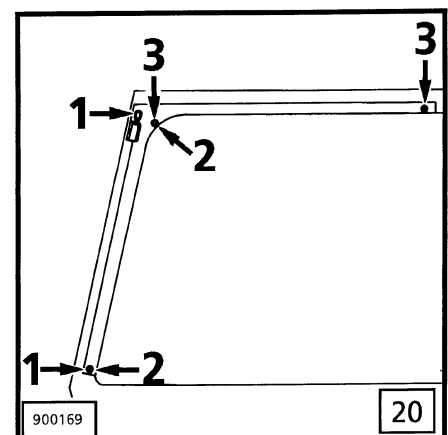


FRONT WINDOW

(Move the sun visor). Push the locking bracket in. Push the front window slightly in to notch it in position and push the locking brackets apart to lock in place.

Locking holes for three window positions:

- | | |
|----------------|--------|
| Window closed: | Pos. 1 |
| Ventilation: | Pos. 2 |
| Window open: | Pos. 3 |



MACHINE OPERATING SAFETY

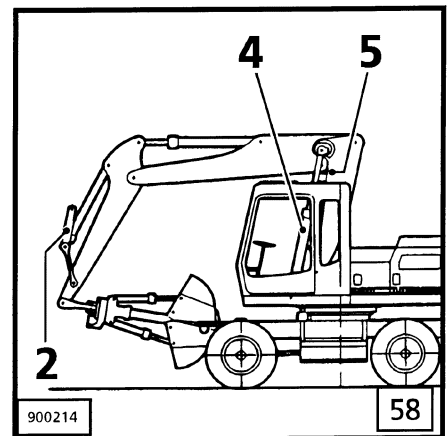
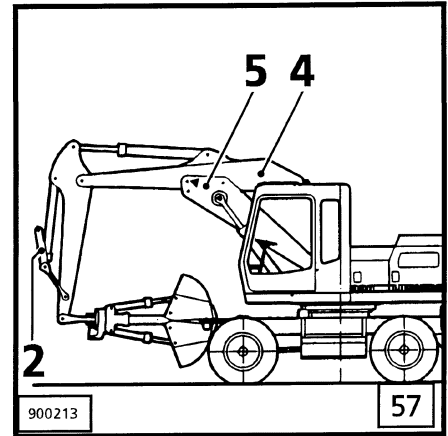
- Familiarize yourself with job site rules. Be informed about traffic and hand signals and safety signs. Ask who is responsible for signaling.
Check your surrounding for any obstacles in the working and movement range, check the load carrying capacity of the terrain, and secure the job site to shield it from any public highway traffic.
- Always keep a safe distance from overhangs, walls, drop offs, and unstable ground.
- Be alert of changing weather conditions, bad or insufficient visibility and of changing ground conditions.
- Be alert for utility lines, check the location of underground cables, gas and water lines, and work especially careful in that vicinity. If necessary and/ or if required, call local authorities to mark the location.
- Keep sufficient distance to electrical lines. When working in the vicinity of high voltage electrical lines, keep proper distance to assure that the attachment does not come close to the lines.
DANGER! You must inform yourself about safe distances.
- In case you do touch a high voltage line by accident, proceed as follows:
 - do not leave the machine,
 - move the machine, if possible, from the danger zone until you obtain sufficient distance,
 - warn any personnel in the vicinity not to come close to the excavator and not to touch it,
 - instruct or initiate that someone turns off the voltage.
 - Do not leave the machine until you are absolutely sure that voltage in the line, which had been touched or damaged, has been turned off!
- Before moving the machine, make sure that the attachments and equipment is secured properly to avoid accidents.
- When traveling on public roads or highways, make sure to observe traffic regulations, and make sure that the machine meets federal and local public highway standards.
- Always turn on the lights if visibility is bad or if you are still working during dusk.
- Never allow other personnel on the excavator.
- Operate the excavator only while seated and with the seat belt fastened, if installed.
- Report any problems or needed repairs to your foreman or supervisor and make sure they are corrected immediately.
- Do not move the excavator until you are certain that no one is endangered by moving the excavator.
- On machines without negative brakes check the brake system before starting to work, as outlined in the **Operation and Maintenance Manual**.
- Never leave the operator's seat while the machine is still moving.
- Never leave the machine unattended, with the engine running.
- When moving the excavator, keep the upper-carriage in lengthwise direction and keep the load as close as possible to the ground.
- Prevent any working movements, which could tip the machine over. If the excavator begins to tip or slip on a grade, immediately lower the attachment and load to the ground and turn the excavator facing downhill.
If possible, always operate the excavator with the attachment positioned uphill or downhill, never sideways.
- Always travel slowly on rough or slippery ground and on slopes.
- Always travel downhill at permissible speed, so you don't lose control over the machine. The engine must run at nominal speed, use only the foot pedals to brake and slow down the machine.
Never shift during down hill travel, always shift to a lower gear before traveling downhill.
- Never load over an occupied truck. Request that the driver leave the cab, even if a rock protection is installed.
- For demolition work, clearing, crane operation, etc. always use the appropriate protection device designed for this specific application.
- If operating in visually obstructed terrain or whenever necessary, have another person guide you. Always have only one person signal you.
- Allow only experienced persons to attach loads or to guide operators. The guide must be visible by the operator and / or must be in voice contact with him.
- Depending on the attachment combination, it is possible for the bucket teeth to hit the cab, the cab protection or the boom cylinders. Be very careful when the bucket teeth get in this range to prevent any damage.

HYDRAULICALLY ADJUSTABLE BOOM (fig. 56 and 58)

- Turn the uppercarriage in lengthwise direction (align over the steering axle) and lock it with the locking pin to the undercarriage (see page 4.13).
- Tilt the bucket in and bring the stick into a vertical position (fig. 56).
Hang the grapple from the grapple bracket (fig. 58) and flip the connector linkage 2 upward. Secure the connector linkage with two screws.
- Fully extend the basic boom cylinder 4 (fig. 56 and 58) and fully retract the adjustable boom cylinder 5.
- Secure the attachment by closing shut off valve 6 (fig. 56) to prevent the attachment from dropping further (does not apply if check valves are installed on the boom cylinders).
- Bring the outrigger / blade support into on road travel position (see page 4.10) and secure mechanically.
- Turn off control for working hydraulic
Turn the joystick function off to prevent inadvertent movement of the attachment via the rocker switch S35 (fig. 54). If the indicator light lights up, the joystick levers are functioning.



The shut off valve may not be utilized as a shut off valve for load lifting work



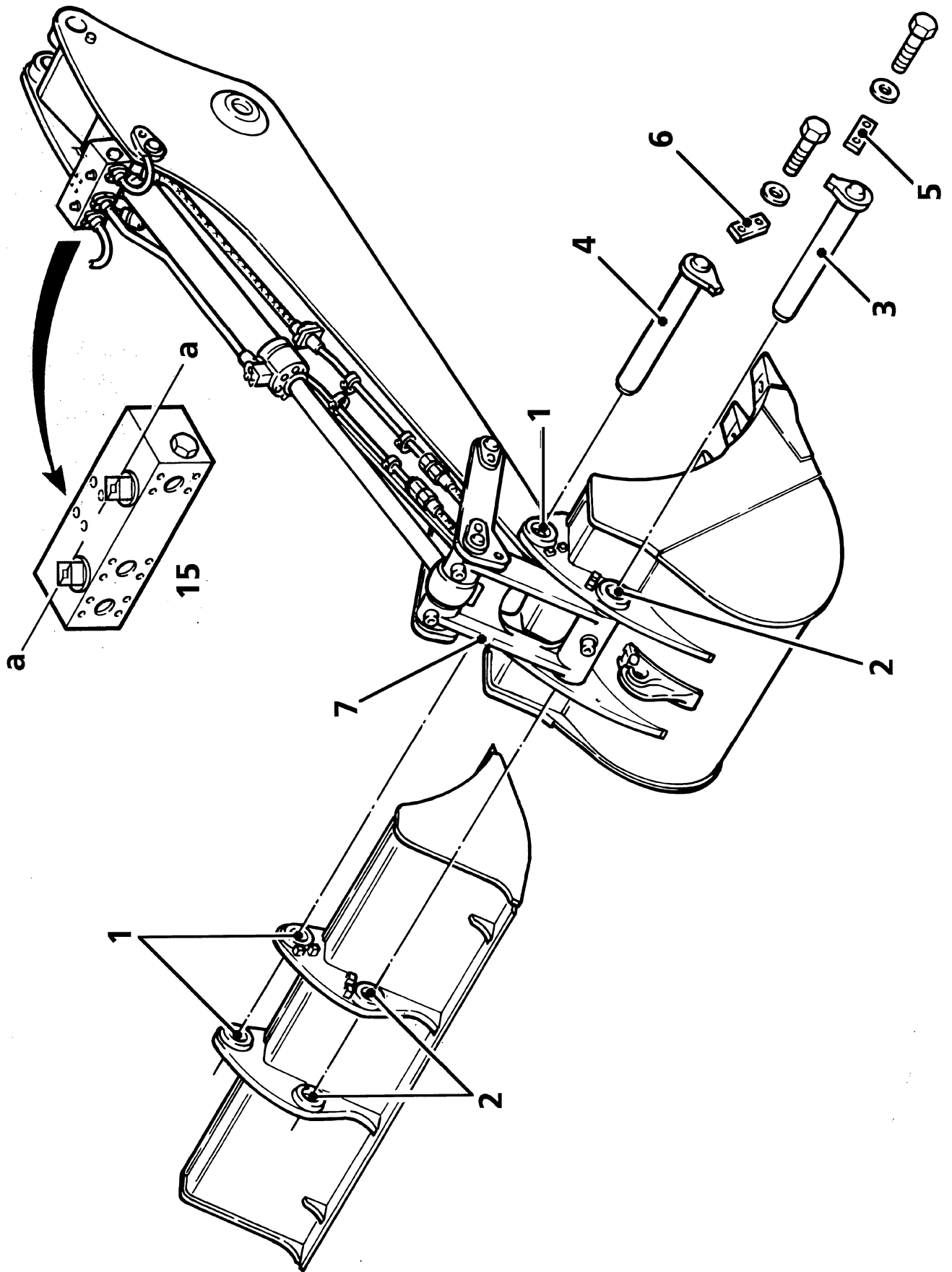
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**FUEL :**

Diesel fuel should meet the following minimum specifications. The sulfur content should not exceed 0.5 % .

A higher sulfur content can affect oil change intervals and engine service life .

Flow improvers for Diesel fuels in very low temperatures

In ambient temperatures below 0°C, the flow properties in warm temperature type Diesel fuel can be insufficient due to paraffine clouding. The same can happen for cold weather type Diesel fuels below -15°C .

Often Diesel fuel is offered with an additive, for temperatures to -20°C .

To prevent problems, at even lower temperatures, the Diesel fuel should be mixed with normal gasoline or petroleum .

Adding normal gasoline should be seen as an emergency measure, and may not exceed 30 % in volume.

Super gasoline may not be used to mix with Diesel fuel.

When adding other fuels or additive to the Diesel fuel, the engine performance may drop. For that reason, keep any added mixtures as low as possible, depending on the ambient temperatures.

For safety reasons, always mix fuels in the fuel tank.

When refueling, add the lighter additive before the Diesel fuel. Then run the engine until the mixed fuel has been distributed throughout the complete fuel system.

See chart below for ratios.

Additives to Diesel fuel (flow improvers)

Commercially available flow improvers can also improve Diesel fuel performance in cold temperatures. Read and observe all manufacturer's instructions and quantities when using additives.

Permitted fuel specifications:

DIN EN 590
Nato Code F 54, F 75
BS 2869 : A1 and A2
ASTM D 975 - 88 : 1 D and 2

Diesel fuels - mixture ratio (Vol.-%)

Ambient temperatures °C	Summer Diesel fuel %	Additive %	Winter Diesel fuel %		Additive %	
			- 15°C	- 20°C	- 15°C	- 20°C
0 bis - 10	70	30	100	100	-	-
- 10 bis - 15	50	*50	100	100	-	-
- 15 bis - 20	-	-	70	100	30	-
- 20 bis - 25	-	-	50	70	*50	30

* If more than 50% are required, use only petroleum (no regular gasoline) .

TO ADD OIL TO THE HYDRAULIC TANK



Before draining the oil or before taking the cover on the return filter off, turn bleeder filter 2 (fig. 17) one turn off to relieve tank pressure.

Remove cover of return filter 1 (fig. 18) and add oil via the filter element until the level reaches the center mark of the sight gauge.

Reinstall cover and retighten bleeder filter 2.

If possible, always use a hydraulic oil filler pump to add or remove hydraulic oil.

The hydraulic tank can also be drained via the drain hose, which has been supplied for that purpose, and the drain valves in the bottom of the tank (fig. 19).

Pos. 3 Drain valve for collector area

Pos. 4 Drain valve for filtered area



After every hydraulic oil change, the hydraulic pumps must be bled (see page 6.8).

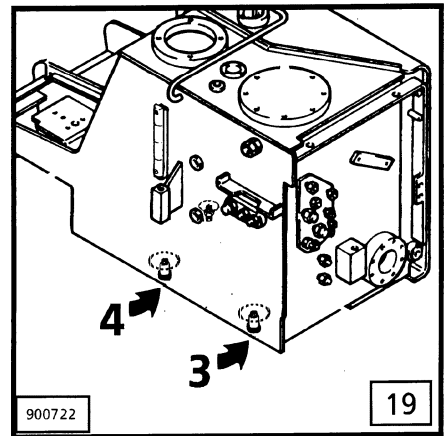
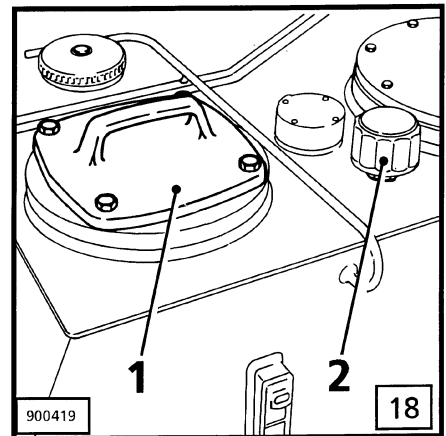
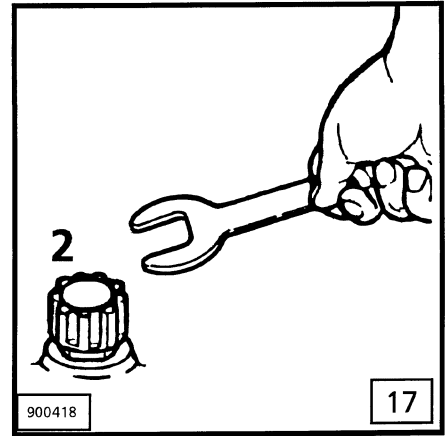
For oil specifications and quantities, see lubrication chart. For oil change intervals, see maintenance schedule.

TO DRAIN OFF CONDENSATION

Drain off condensation regularly. To do so, place the drain hose onto the drain valves 3 and 4 (fig. 19) until the oil runs clear of any water. (For intervals, refer to maintenance plan).

NOTE

When using "environmentally friendly hydraulic fluids" and after machine down time (after about 2 days) we recommend to drain off any moisture in the hydraulic tank before operating the machine.



RETURN FILTER (Fig. 13, pos. 1 and fig. 15) :

The magnetic rod in the return filter (fig. 15, pos. 2) should be checked daily during the first 300 operating hours, then every week.

The glass filter insert 5 (in return filter) needs to be changed first at 50-100 hours, then every 500 hours and every time a problem had occurred, which caused contamination of the hydraulic system.

NOTE

When working in dusty conditions, observe the special guidelines for filter change, see page 5.7!

Cleaning the magnetic rod, changing the filter element

Remove four screws (fig. 15, pos. 3) on the filter cover and pull off the cover 1 with magnetic rod 2.

Carefully clean magnetic rod 2.

Remove spring 4 and pull out ring 7. Remove the filter element 5 and insert the new filter, with the LIEBHERR decal on top.



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

Replace cover 7 carefully, making sure it is centered. Be sure the O-ring 8 is not damaged.

Insert spring 4, install cover 1 and make sure the O-ring 6 is seated correctly.

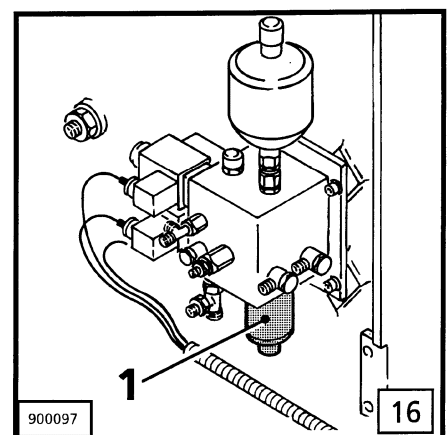
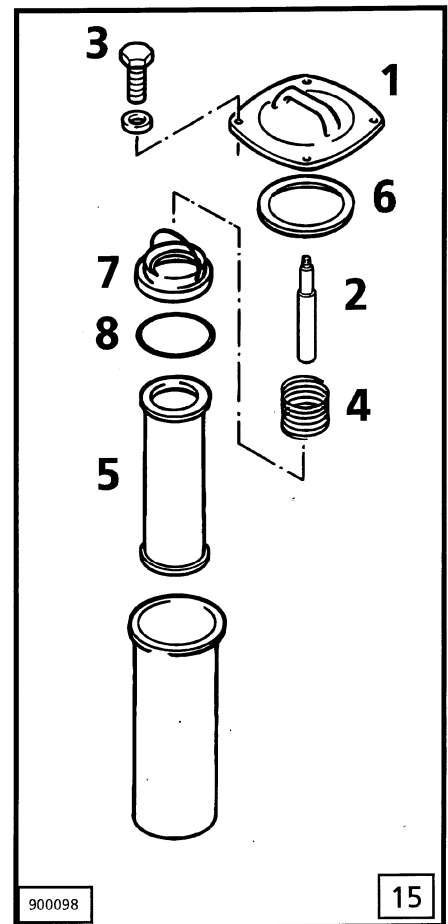
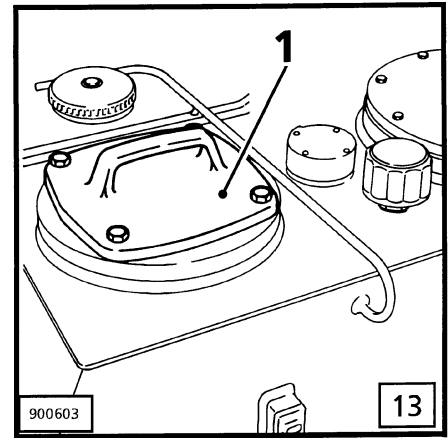
SERVO OIL FILTER

The pressure filter in the servo oil unit (fig. 16, pos. 1) must be cleaned every time the return filter element is changed.

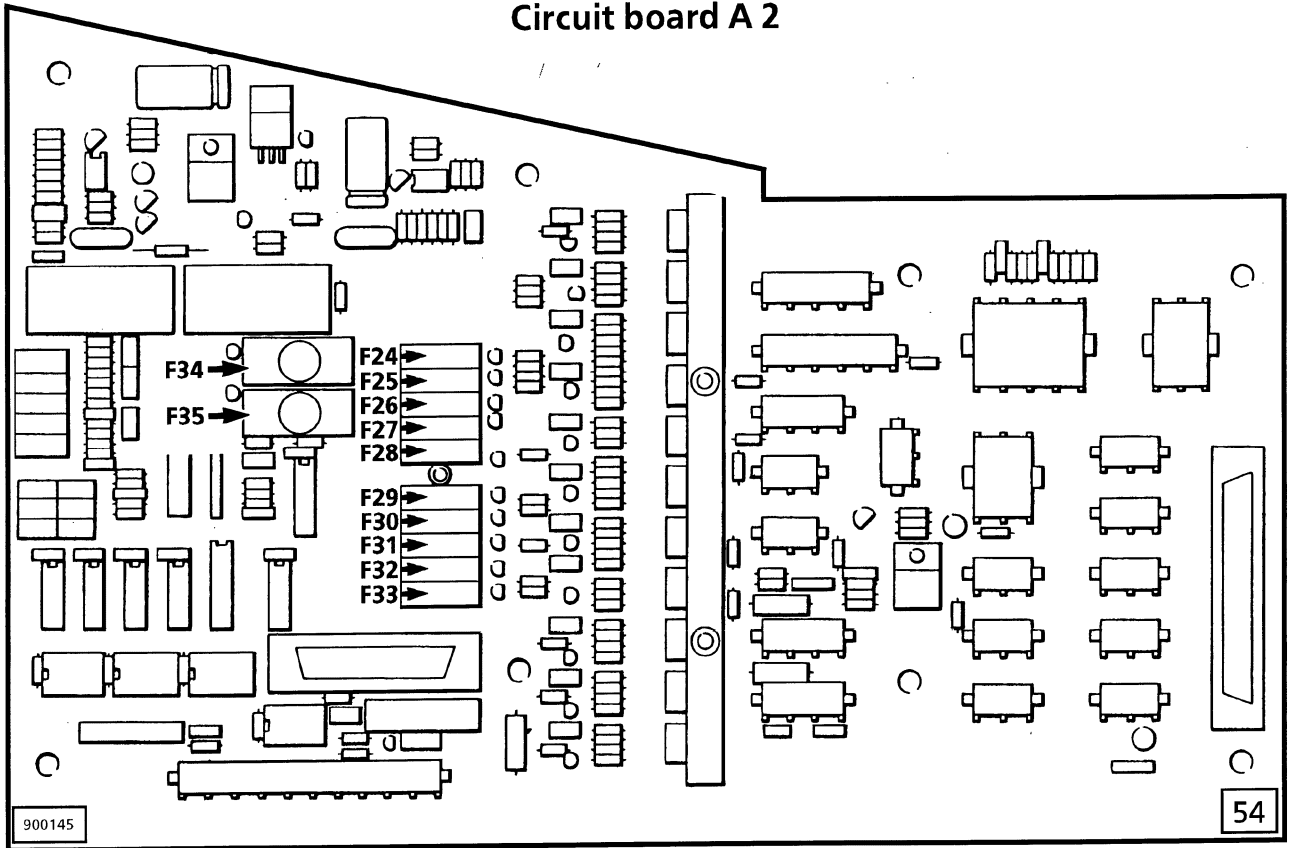
To clean the pressure filter

Remove the filter housing, remove the filter element and clean the housing.

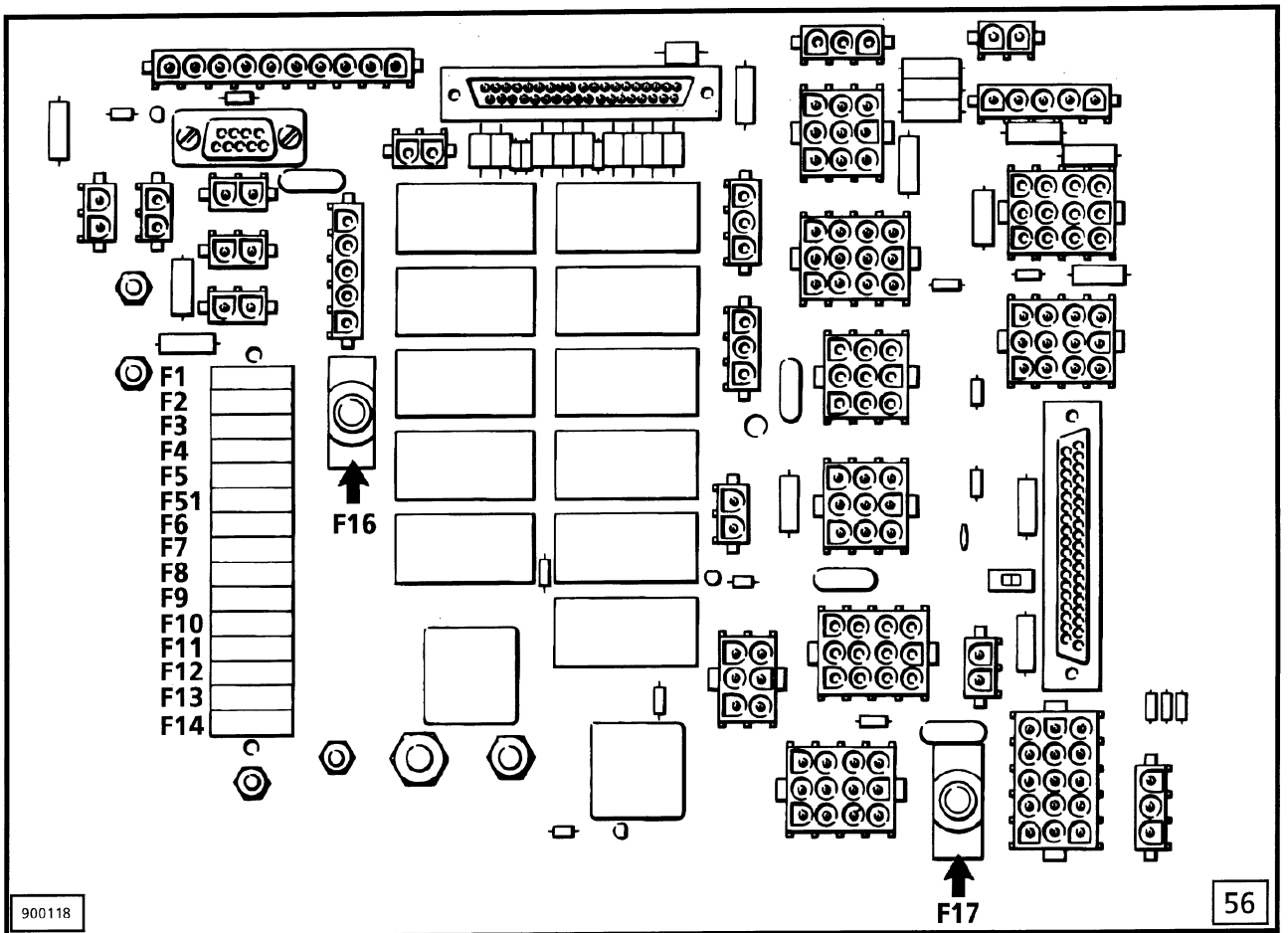
Insert new filter element, lubricate the threads, install the filter housing and **tighten it by hand**.



Circuit board A 2



Circuit board A 1



The overload warning device consists of an adjustable switch (pos. 1), which is connected with the piston side of the hoist cylinder.

If the pressure in the hoist cylinder reaches the setting of the shifting pressure, the pressure switch sends a signal to the indicator light H16 and the buzzer to warn the operator.

 **CAUTION**

When performing load lifting work with hydraulic excavators, it is imperative to observe all applicable accident prevention guidelines.

The overload warning device does not shut the machine down if the permissible load momentum has been reached. The operator is only alerted to this situation.

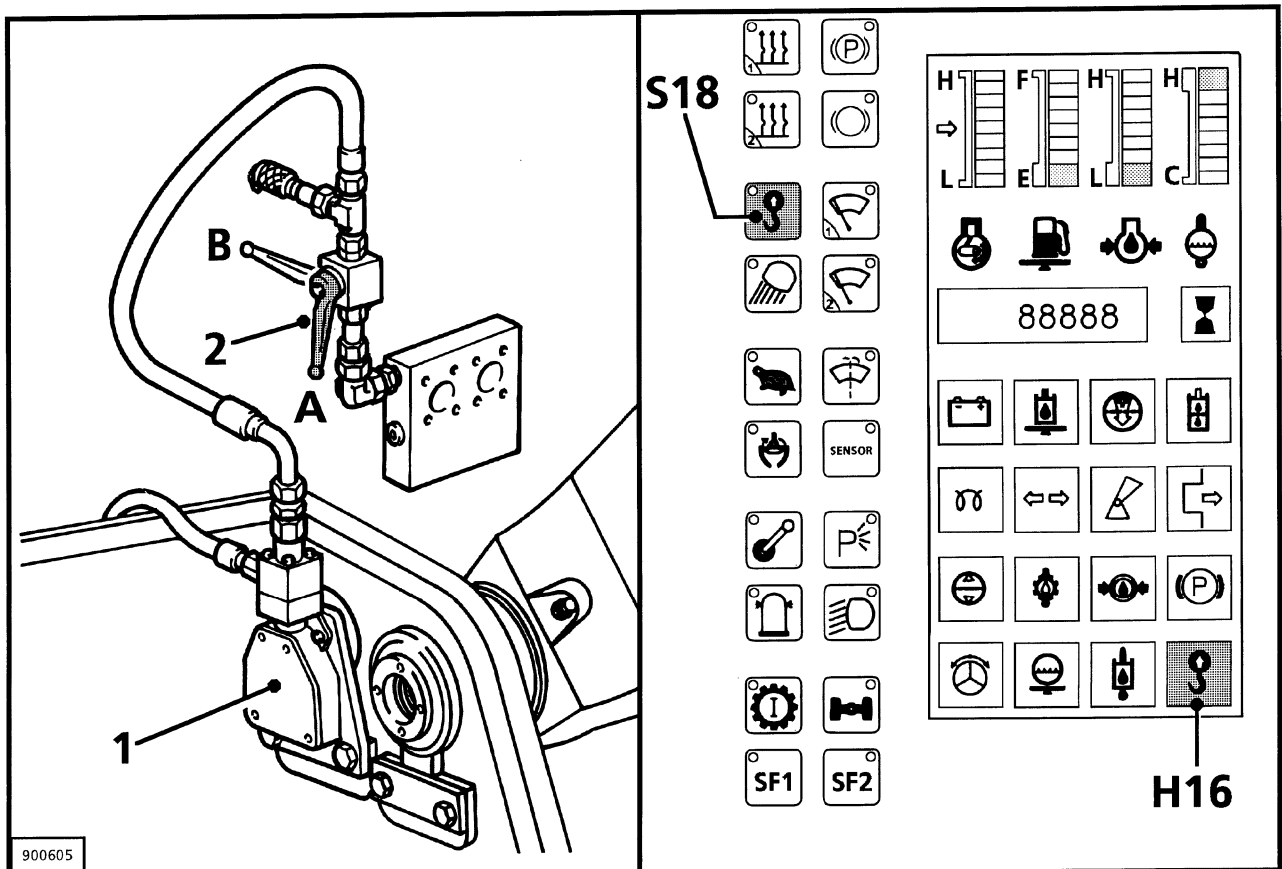
OPERATION

In order to put the overload warning device into operation, open shut off valve 2 (position A). The warning system is actuated via switch S18, the indicator light integrated in the switch lights up.

The overload warning device must be checked daily for proper function, before beginning any load lifting work.

To check the device, fully extend the hoist cylinder to the stop. Continued movement of the joystick in 'boom up' direction must trigger the indicator light H16 to light up and the buzzer must sound.

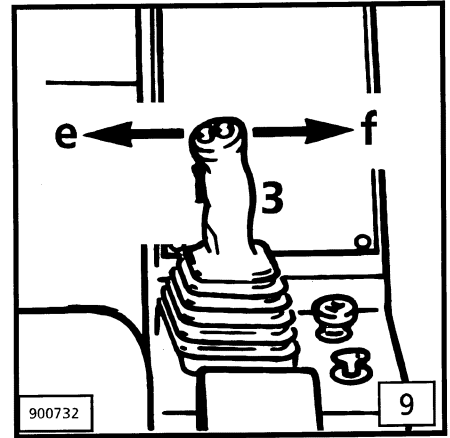
For excavation work, the overload warning device must be turned off and the shut off valve 2 must be closed (position B).



JOYSTICK RIGHT 3 (fig. 9)

TOWARD "e" = extend bucket cylinder

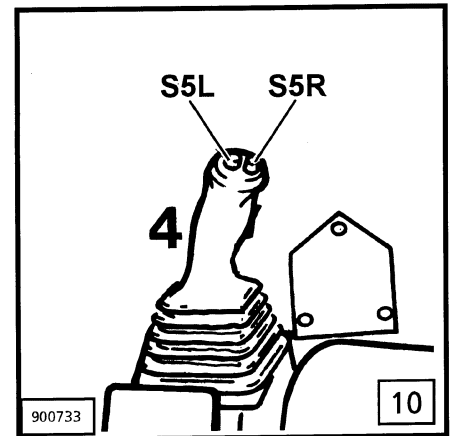
TOWARD "f" = retract bucket cylinder



JOYSTICK LEFT 4 (fig. 10)

PUSH-BUTTON LEFT "S5L" =
extend locking pins (attachment locked)

PUSH-BUTTON RIGHT "S5R" =
retract locking pins (attachment unlocked)



INSTALLING TOOLS

Position stick and tool as in figure 11.



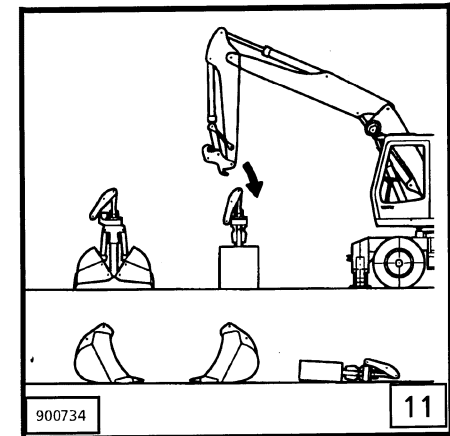
The tool must be lying freely on level ground.

Deflect right joystick 3 (fig. 5) toward "f" and retract the bucket cylinder fully.

Switch on the additional attachment function "Rotate grapple" by actuating switch S19 (fig. 3) (indicator light lights up).

Move key switch S47 (fig. 5) to "I" position. The buzzer sounds.

Press right push-button "S5R" on left joystick 4 (fig. 10) until the locking pins (fig. 1, pos. b) are fully retracted. The indicator light H26 (fig. 7) "locking pins inserted" lights up red.



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