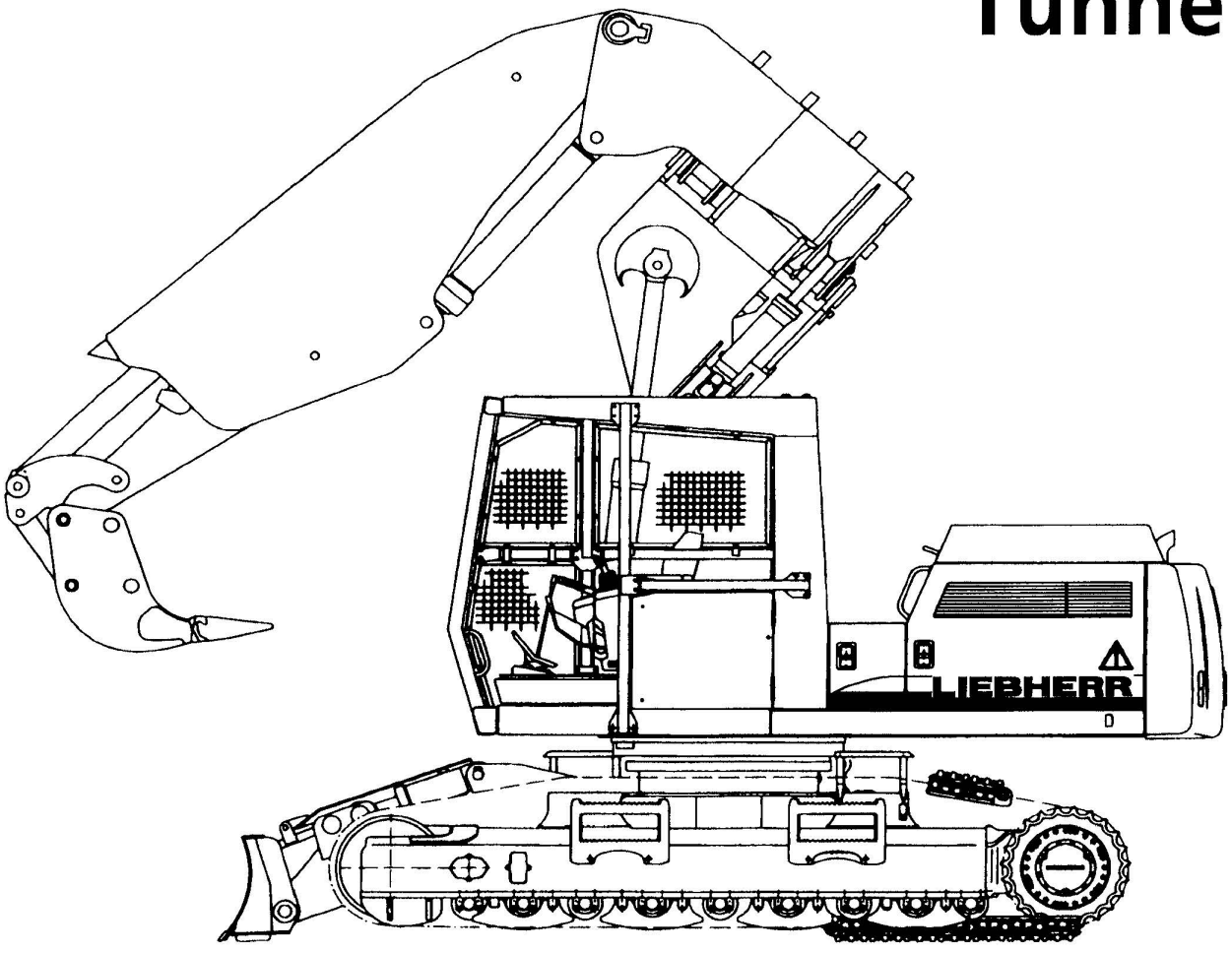
Operation and Maintenance Manual

R 934 B

Tunnel



The wheel loaders and the crawler loaders from Liebherr have also been adapted specifically to tunneling applications. The advantages of the wheel loader's and crawler loader's hydrostatic drive are proven in difficult tunneling applications.

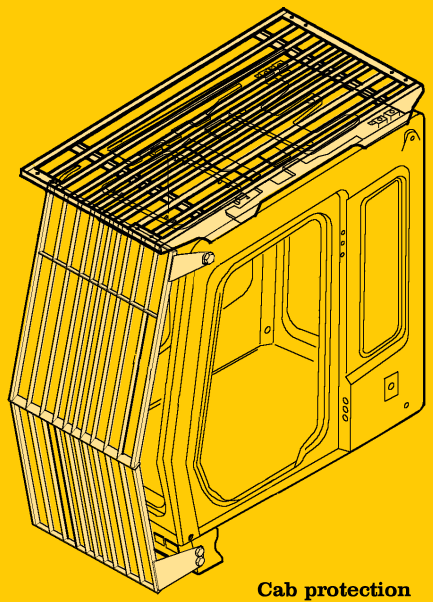
The advantages are: reduced fuel consumption through improved utilization of the installed engine's output, minimal brake wear through the hydr. braking effect of the drive and for the wheel loader tire wear is reduced through continuous adjustment of the required drawbar pull.

The Wheel Loader Adapted to Each Tunnel

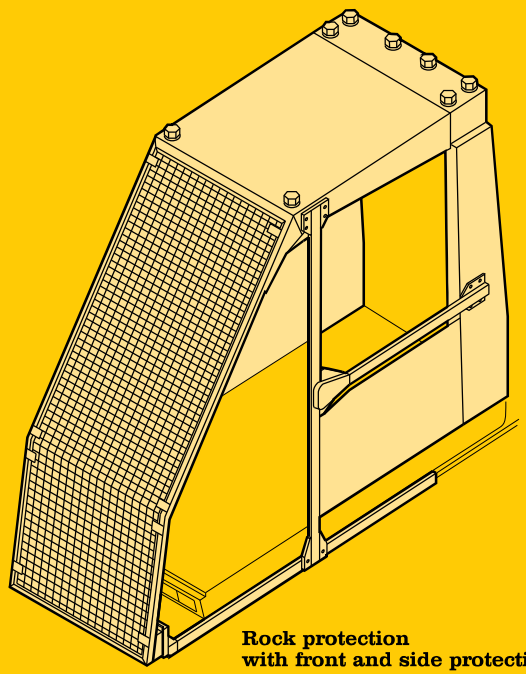
Tunneling machines	L 544 T
Engine	
Manufacturer	Liebherr
Version	4 cylinder, in-line engine, water-cooled, exhaust turbo charged
Type	D 924 T-E A2
Power output	121 kW (165 BHP) at 2000 RPM
Fuel tank	260 l
Operating voltage	24 V
Battery capacity	2 x 110 Ah/12 V
Alternator	Three-phase AC, 28 V/55 A
Attachment hydraulics	
Hydraulic pumps	"Load sensing" variable axial piston pump. Central pivot with two doubleacting, damped steering cylinders
Max. flow	230 l/min.
Max. operating pressure	290 bar
Hydraulic tank capacity	115 l
Drive line	
Design	Stepless hydrostatic travel drive. Type "2plus2". Variable-pitch swashplate pump and two axial piston motors in closed circuit with one axle transfer case
Transmission	"2plus2"
Travel speed	Stepless; 0 – 40 km/h
Control	By travel and inching pedal. The inching pedal makes it possible to control the tractive and thrust forces steplessly at full engine speed. The Liebherr joystick is used to control forward and reverse travel
Operating brakes	Self-locking of the hydrostatic travel drive (acting on all four wheels) and additional pump accumulator brake system with wet multi-disc brakes located in the wheel hubs. Two separate brake circuits
Axles	Planetary final drive in the wheel
Differentials	Automatic limited-slip differentials with 45 % locking action in both axles
Steering	
Design	"Load sensing" variable axial piston pump. Central pivot with two doubleacting, damped steering cylinders
Angle of articulation	40° to each side
Emergency steering	Electro-hydraulic emergency steering system
Attachments	
Geometry	Powerful Z-pattern linkage with tilt cylinder and cast steel cross-tube
Bucket	Rock-bucket with Bofors-teeth for spec. material weight of 2,0 t/m³
Tires	
	23.5R25 Michelin XLD-D2 L5
Noise emission	
In the operator's cab	69 dB(A) without blower 73 dB(A) max. blower output
Outside cab	104 dB(A)

Technical Data Wheel Loader L 544 T

Safety Devices

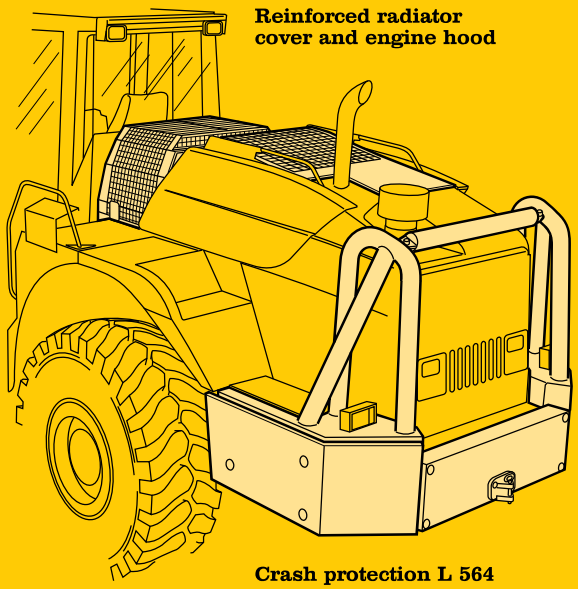


Cab protection

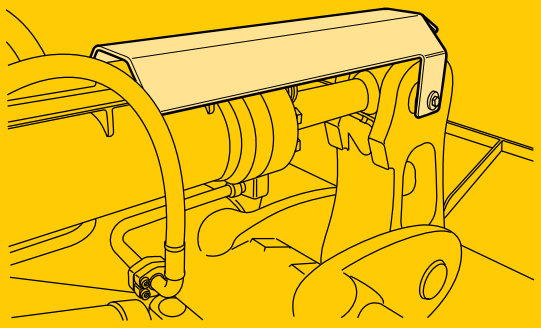


**Rock protection
with front and side protection**

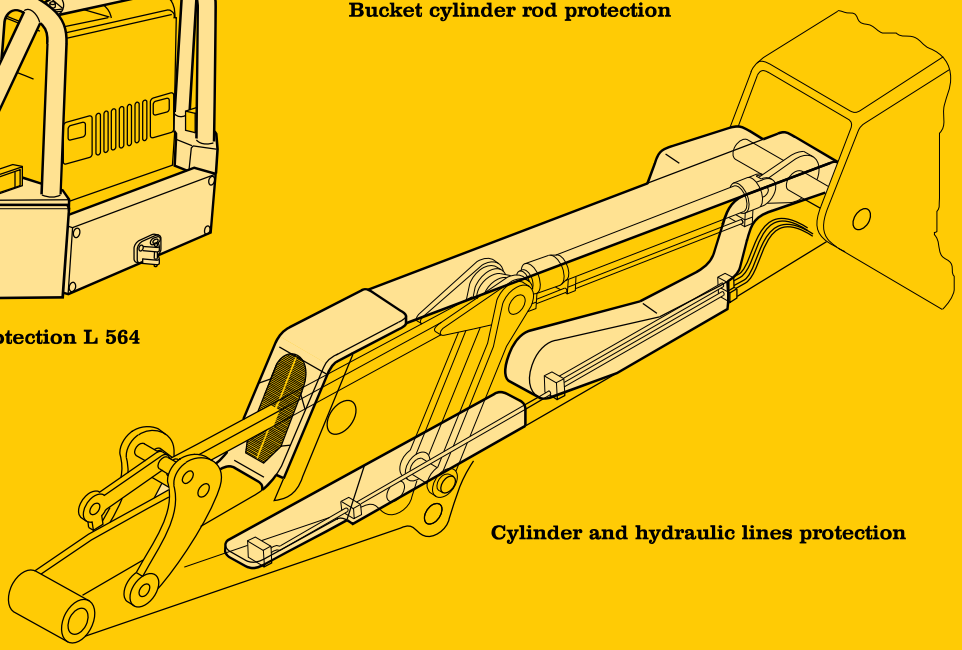
**Reinforced radiator
cover and engine hood**



Crash protection L 564



Bucket cylinder rod protection



Cylinder and hydraulic lines protection

LHB/VF 8420601-2.75-02.03 Printed in Germany by Gerstmayer. Illustrations and data may differ from standard equipment. Subject to change without notice.

**LIEBHERR-HYDRAULIKBAGGER GMBH, D-88457 Kirchdorf/Iller, ☎ (0 73 54) 80-0, Fax (0 73 54) 80-72 94
www.liebherr.com, E-Mail: info@lhb.liebherr.com**

With compliments:

- Check the electrical system regularly. Make sure that any problems, such as loose connections, burnt out fuses and bulbs, scorched or chafed cables are fixed immediately by an electrician or qualified personnel.
- Use only Original fuses with the specified amperage. Never use a different size or stronger fuse than the original fuse.
- On machines with electrical medium or high voltage systems:
  - If there is any problem with the electrical energy supply, turn the machine off immediately.
  - Follow established lockout / tag out procedures where applicable.
  - Any work on the electrical system may only be performed by a qualified electrician or qualified personnel under the guidance and supervision of an electrician, according to electro - technical regulations.
- 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 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 condenser, 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 daily, but at least every 2 weeks for leaks and any externally visible damage! Never check for leaks with your bare hands, use a sheet of paper or something else. Any damaged sections must be replaced immediately! Escaping 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 life is limited. Improper storage, mechanical damage and improper use are the most frequent causes of hose failures. Concerning the hoses, you must follow the safety regulations applicable to your work environment and job site and any federal, state and local safety requirements.
- 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 (see guidelines ISO 8331):
  - Damage on the external layer into the inner layer (such as chaffing, 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, crushing or pliers.
  - 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;

  When replacing hoses or lines, always use Original replacement parts.
- Route or install the hoses and lines properly. Do not mix up the connections!
- Always take care to avoid torsional strain when installing a new hose. On high pressure hydraulic hoses, the mounting screws must be first mounted on both hose ends (full flange or half clamp) and tightened only thereafter.

  On high pressure hoses having one curved end, always tighten first the screws on the curved hose end and only then the screws on the straight hose end.

  Install and tighten the hose clips that may be mounted on the hose middle only when the both hose ends are already tightened.
- Always install hoses so to avoid any friction with other hoses and parts.

  We recommend to keep a distance between hose and other parts of at least one half of the hose outer diameter. Keep a minimum gap of 1/2 inch in any case.

  After mounting a hose connecting two parts that are movable to each other, check during the return to service that the hose is not rubbing in the whole moving range.

  Check daily that all flanges and covers are fixed correctly. It will prevent vibrations and damage during operation.

Safety lever - Servo control 1

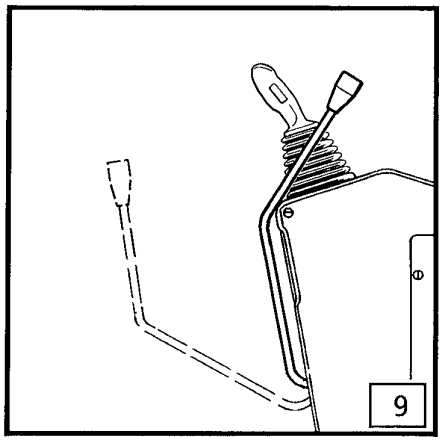
For safety reasons, a safety lever is installed on the left console. The operator must move this lever up before leaving the operator's seat.

The operator may only push the lever down when he is again seated in the operator's seat, ready to work.

When the safety lever is up, the servo pressure supply is interrupted, and no working movements are possible if the joysticks are accidentally actuated.

At the same time the swing brake apply and can no longer be released via the button S17.

When pushing the safety lever down, the brakes recover the previous state (applied or released) before the lever had been pulled up.

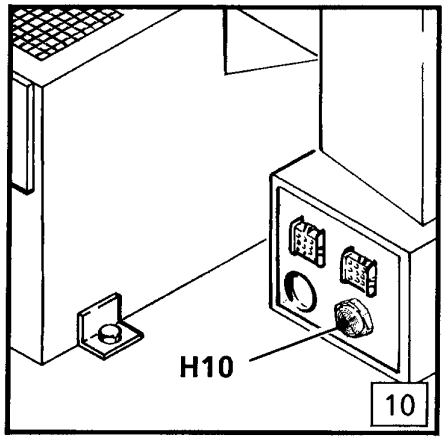


Buzzer H10

During operation, the buzzer H10 sounds to alert the operator, if:

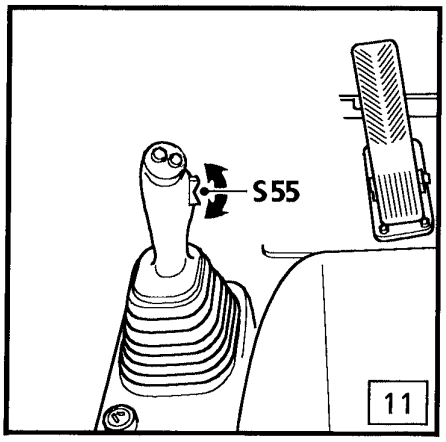
- the coolant level is low (warning symbol on screen 200, page 3.6).
- the engine oil pressure is low (indicator light H2 on monitoring display).

In both cases, reduce engine speed to low idle.
The engine will turn off automatically after a few seconds.



Switch S55

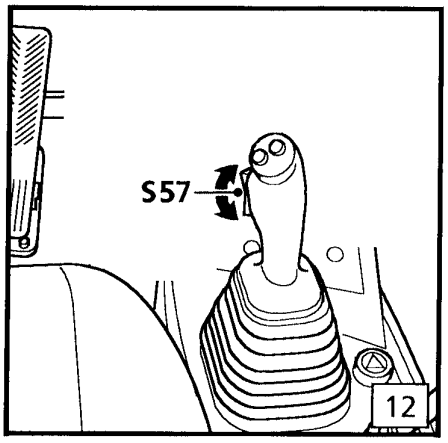
Depending on the special equipments on the machine, the rocker switch S55 on the left joystick handle may have different functions.
On tunnelling excavators, tilting the rocker switch S55 causes the two right pedals to change from the control of the boom rotator into the control of the support blade, see also on page 3.20.



Switch S57 for swing brake control

This rocker switch controls the swing brake when the brake is preselected in semiautomatic operating mode via the push button S17 (see on page 4.12).

Switches S71, S72 and S73, see on page 3.26.



Switch S167 for travel alarm

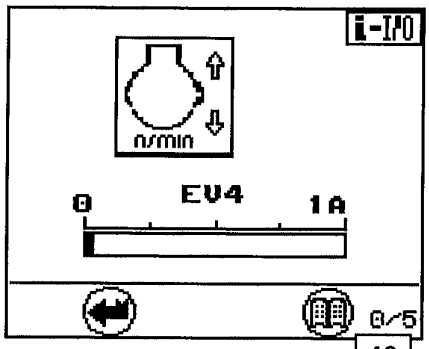
When the switch S167 is depressed, the acoustic warning for travel alarm is alternately changed from one operating mode into the other.

- either the acoustic signal is on in continuous as long as the travel movement is actuated
- or, in the second mode, it will turn off automatically ten seconds after begin of travel movement.

MENU **i - I/O**

a) INFORMATION ABOUT THE CONTROL OF THE ENGINE RPM

The screen 0/5 appears only on machines on which the engine RPM is adjusted by an hydraulic cylinder via an electronic regulation.
The graphic bar in the lower part of the screen gives the momentary value of the regulation current to the RPM control system.



49

b) INFORMATION ABOUT THE HYDRAULIC PUMP
information screens 1 and 2 (fig. 50 and 51)

This screen gives information about the operating position of the hydraulic pump.

The screen 1 (fig. 50) gives following indications for the working pumps:

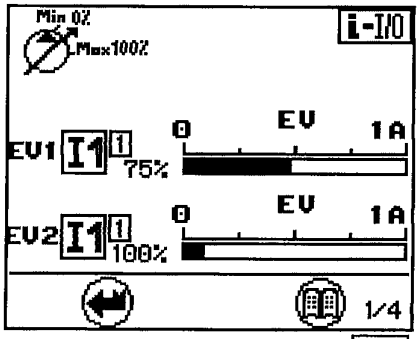
- if a flow limitation is activated for the pump.
  If it occurs, the symbol "R" is displayed in the field TI, see main screen.

  The fig. 50 shows an example with the flow limitation I1 activated, which limits the pump to 75% of the maximum flow.

  Should several flow limitations be actuated at the same time, so the one with the smallest flow value has priority.
- the graphic bar with electric current value indicates for the pump the amount of the momentary flow control signal.

Notice : On machines with Load Sensing hydraulic circuit, only the signal EV1 is displayed, which limits both pumps at the same time.
On other machines, each pump can be limited by its own signal EV1 or EV2.

The present LR solenoid current (current value for power control) is showed on screen 2 (fig. 51).



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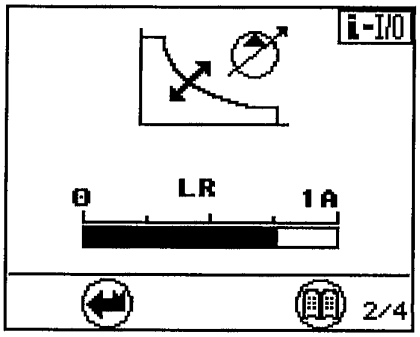
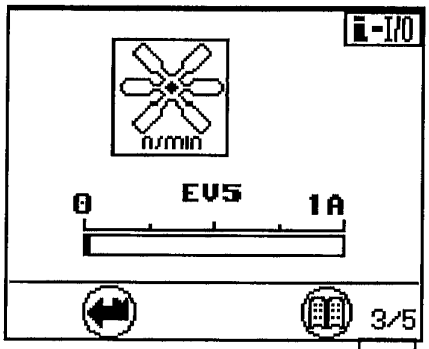


51

c) INFORMATION CONCERNING THE COOLER FAN CONTROL SYSTEM

The screen 3/5 appears only on machines fitted with an electronically regulated cooler fan drive.
The graphic bar in the lower part of the screen gives the momentary value of the current to the regulation solenoid valve for the fan RPM.



52

Touch S79 - Flow divider for special attachment

Should a certain user (cylinder, hydraulic motor, ...) has to be fed with a constant oil flow during the actuation of a special attachment, so the necessary oil flow can be reserved to give priority to this user while depressing the touch S79.
The indicator light in the touch is then lighting up.

The velocity of the other simultaneously actuated working movements is correspondingly reduced.

Key switch S81 - Reduction of swing brake action

Should Your tunnelling machine be fitted with the key switch S81, so you must, before beginning to work with a scrap shear, turn this switch to the right (position "shear and reduced swing braking").
This will reduce the swing brake braking torque and, by the fact, the strain that may be unnecessary induced in the attachment parts and the uppercarriage structure while working with the shear and simultaneously closed swing brake.

Key switch S82 - Pressure reduction for overhead working with hammer

Before digging out the roof of the tunnel using a hydraulic hammer, turn the key switch S82 to the right (position "hammer at roof").
In this position, the operating pressure is somewhat reduced in the boom cylinders, and the overheating of the primary pressure relief valve is avoided.

Push button S84 - Central lubrication system

On machines fitted with a central lubrication system, an additional lubrication cycle of the attachment bearing points and swing ring can be started by depressing the button S84 (see on pages 5.21 to 5.23).

Key switch S88 - Commutation hammer - additional cylinder

This key switch is mounted on machines fitted with a special hydraulic circuit for the supply and the control of either a hydraulic hammer or an additional hydraulic cylinder.
The switch S88 must be turned into the position corresponding to the operated working tool.
In position hydraulic hammer, the pump flow reduction which is actually set for the hammer at the monitoring display is activated, and at the same time, the pressure level in the circuit is adapted to hammer operation.

<u>Special case:</u> Should two hydraulic hammer with different working pressures be used alternately, so S88 is a three positions rotary switch. Select the positions of the switch as follows:

- position "0" when using the hammer requiring the lower pressure
- position "1" when using the hammer requiring the higuer pressure
- position "2" for operation of the special equipement with additionel cylinder (shear, ...)

One of the four light emitting diodes (fig. 17, pos. 61) blinks to show which mode L, F, E or P is preselected (the preselected mode which was in use before the machine was turned off remains stored).

L	Mode LIFT	=	RPM stage 5
F	Mode FINE	=	RPM stage 10
E	Mode ECO	=	RPM stage 8
P	Mode POWER	=	RPM stage 10

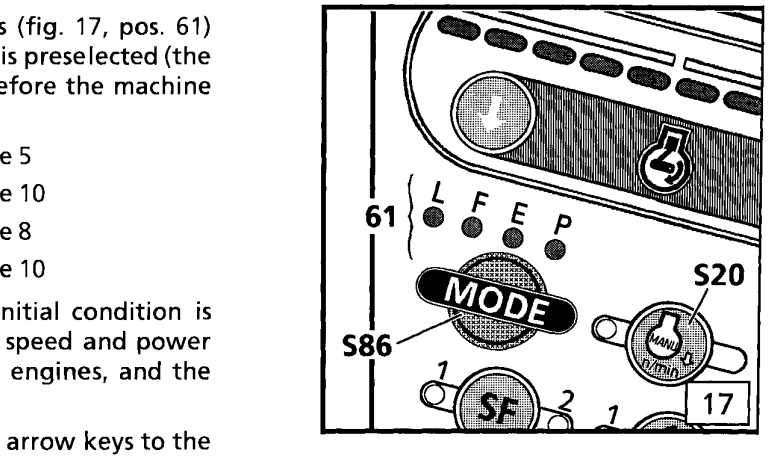
By pushing the mode key S86, the initial condition is confirmed, the corresponding engine speed and power are transferred to the running Diesel engines, and the LED remains on.

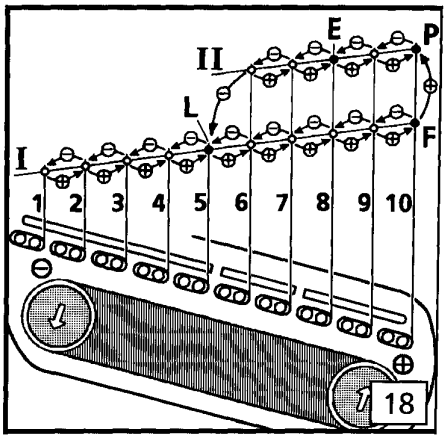
If the engine speed is changed via the arrow keys to the engine speed for mode L, F, E or P, then it jumps automatically to the corresponding mode.

If the engine speed do not correspond to the preselected mode (either because the engine speed had been changed via the arrow keys or lowered via the low idle automatic), the LED blinks to indicate the mode selected before.

In mode E and P, the engine is running at its rated power curve (line II on fig. 18), in mode L and F it works at a power reduced by approx. 20% (line I).

The fig. 18 also show the variation for RPM stages and corresponding engine power when using the buttons S228 and S229.

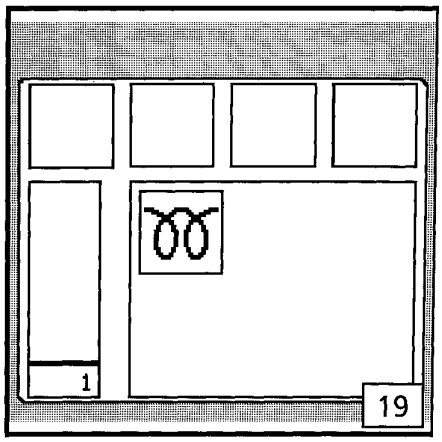




<u>Adjustment via low idle automatic</u>

The low idle automatic is turned on or off via the key S20 (left light emitting diode on the switch is on or off).

When the low idle automatic is turned on, the engine speed increases by itself to the preselected RPM stage as soon as any one of the pilot control units is actuated, and it is automatically reduced to low idle speed, if no pilot control unit is actuated within a given time frame.

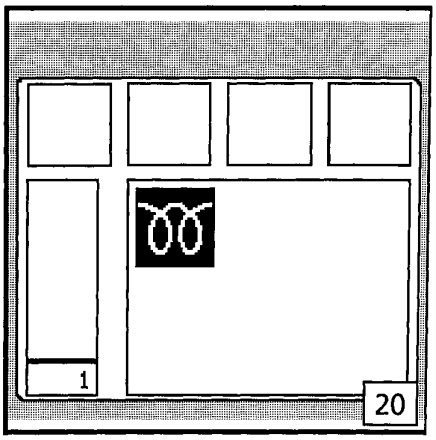


STARTING THE ENGINE WITH FLAME GLOW PLUG AT AMBIENT TEMPERATURES BELOW -12° C (10° F)

Starting the engine with the flame glow plug improves starting the engine at low temperatures.

Turn the ignition key to position -2- preheat.
The symbol "Preheat" is displayed on the screen (fig. 19).
After about 20 seconds the symbol "End of preheat" (fig. 20) will be displayed.
Then turn the ignition key to start position and let it go off as soon as the engine has started.

If the engine does not start, first return the key to the off position before preheating and starting again.

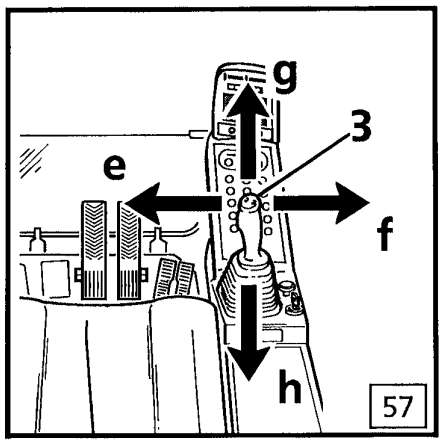


Caution ! **Do not preheat with the flame glow plug if the engine is hot or at operating temperature.**

CONTROL OF THE BUCKET CYLINDER (right joystick 3 - fig. 57)

Push joystick 3) to the left (e) to tilt the bucket in (fig. 56).

Push joystick 3 to the right (f) to tilt the bucket out.

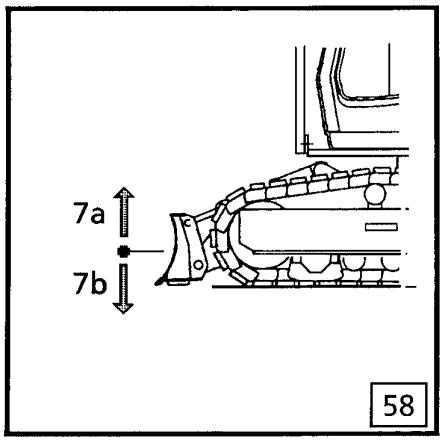


CONTROL OF A BLADE

The support blade or dozer blade is controlled using the two pedals 7a and 7b at the right side of the cab (fig. 61).

Depress the right pedal 7b to lower the blade (fig. 58).

Depress the left pedal 7a to lift the blade.

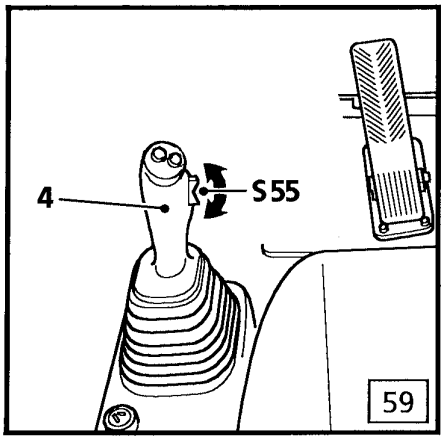


CONTROL OF A BOOM ROTATOR

After the switch S55 in the handle of the left joystick (fig. 59) has been reversed, the two footpedals 7a and 7b (fig. 61) also permit to control the boom rotator of the tunneling attachment.

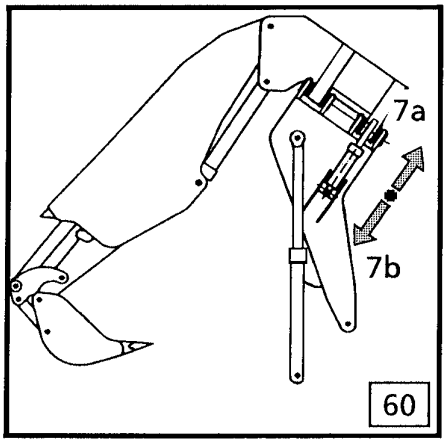
Depress the left pedal 7a to extend the left cylinder of the boom rotator (fig. 60), i. e. to swing out the digging bucket to the left.

Depress the right pedal 7b to retract the left cylinder of the boom rotator (fig. 60), i. e. to swing out the digging bucket to the right.



⚠ CAUTION

Auxiliary control units can have various functions. Always check their functions when starting up the machine.



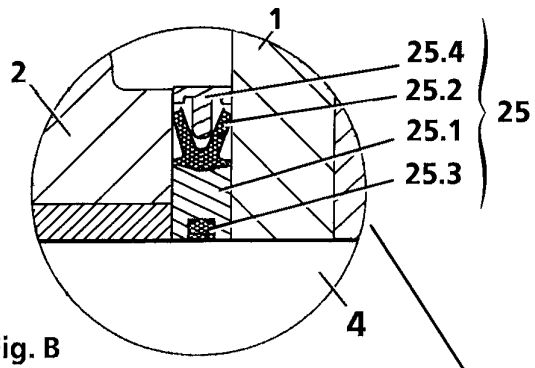
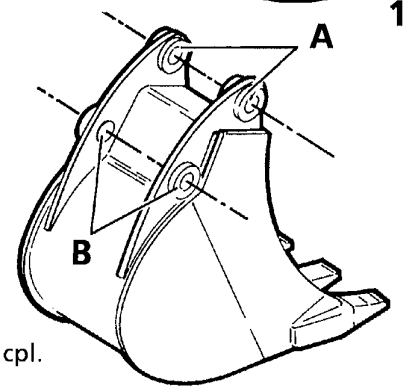
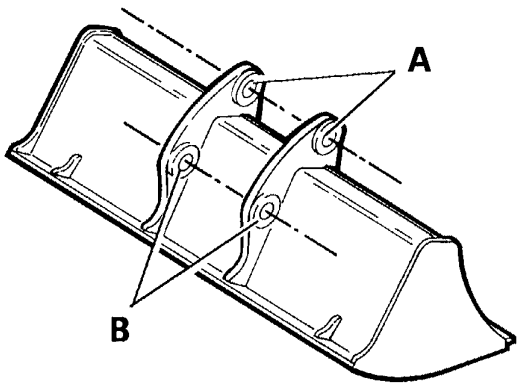


Fig. B

Fig. A





1 Digging bucket
2 Stick
3 Pin
4 Pin
5 Locking plate
6 Locking plate
7 Connector bracket

25 Pin bearing sealing cpl.
25.1 Sealing ring
25.2 Lip seal ring
25.3 O-Ring
25.4 Protection and installation ring
25.5 Assembly screw

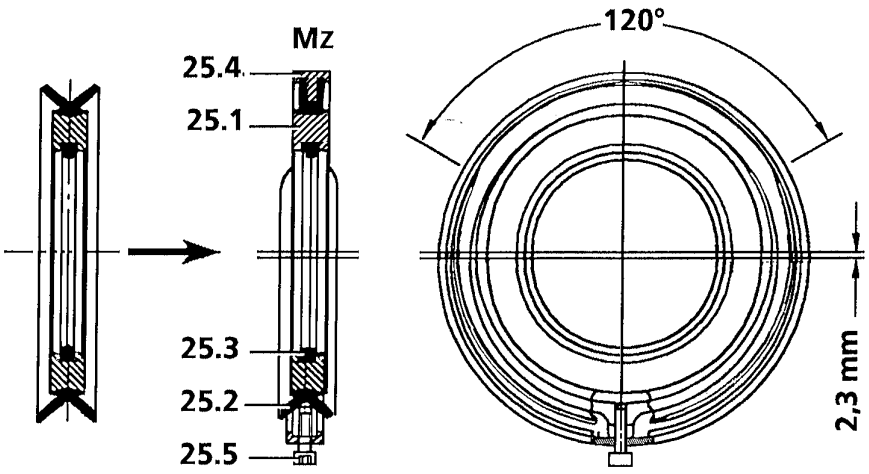


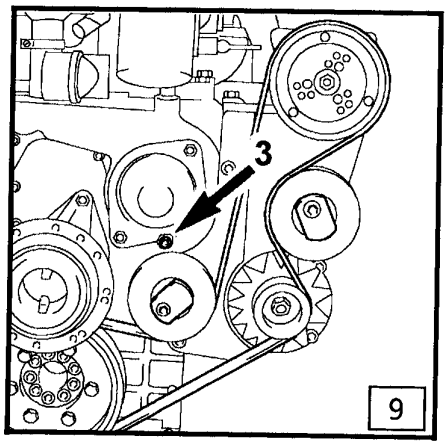
Fig. C

LUBRICANTS AND FUEL CHART R 934 B Litronic

COMPONENTS	SYMBOLS	VISCOSITY (SAE DIN 51512)	SPECIFICATIONS	QUANTITIES
SWING GEAR		1) With swing brake only used as a parking brake SAE 90 2) With swing brake also used as a service brake (Actuated via a foot pedal) SAE 90LS	API GL-5 and MIL-L-2105 B, C or D API GL-5 and MIL-L-2104 B, C or D MIL-L-2105 B	**5,5 l. 1.4 US gal**
TRAVEL GEAR		SAE 90	API GL-5 and MIL-L-2105 B, C or D	**2 × 7 l. 2×1.9 US gal**
SPLITTERBOX		SAE 90	API GL-5 and MIL-L-2105 B, C or D	**2 l. 0.53 Us gal**
SWING RING TEETH		Special grease	See lubricants specifications	
GENERAL LUBRICATIÓN POINTS **Swing ring races Attachment bearings, Track tensioner,,...**		CONSISTENCY 2 NL GI N°2 Grade	MULTUPURPOSE GREASE KP2k or EP2 (Extreme pressure N°2 Grade)	
Hinges, couplings, locks			Engine oil	
Rubber seal on doors and covers			Silicon Spray or talcum	
REFRIGERATING AGENT FOR AIR CONDITIONER			R 134a	**1,9 kg (4.5 lbs) / ➔ SN 14 323** **1,4 kg (3.3 lbs) / SN 14 324➔**
REFRIGERATOR OIL IN AIR CONDITIONER COMPRESSOR			PAG SP 20 (ELF)	**0,21 l. (5 oz.)**
WINDSHIELD WASHER SYSTEM			Commercial Windshield washer fluid or denatured alcohol	**5 l. 1.3 US gal**

Important !

In order to totally drain the coolant from the engine (also when the machine has not been used for a long period of time), the coolant also has to be drained from the cooling pump (pos. 3).



To add coolant and vent the cooling circuit :

Remove the drain hose and reinstall the cover of the drain valve 1 (fig. 7). Close the plugs 2 and 3 on the engine.

Add coolant to the expansion tank through the filler neck 6 (fig. 5)

Start the engine, run it in low idle for about 30 seconds. Turn the engine off, and add more coolant to fill the expansion tank all the way.

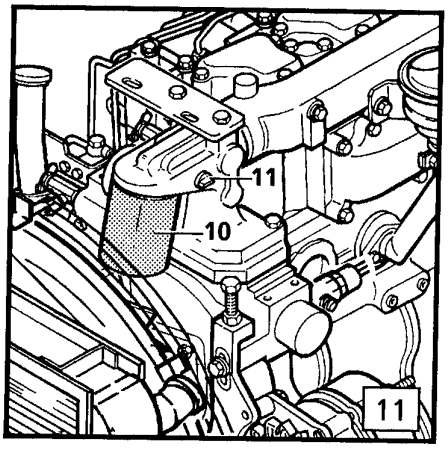
If the engine coolant level indicator actuates during operation, add more coolant, if necessary.

Important !

When adding coolant, make sure that the expansion tank if filled all the way to the top of the filler neck 6, add coolant until the level does no longer drop. It is not possible to overfill the tank.

CHANGING THE WATER FILTER

The water filter contains paste-like corrosion inhibitors which ensure the adequate corrosion protection of the coolant.
The water filter 10 must be replaced every 500 working hours.



- close the shutt-off valve 11 on the filter housing (turn it clockwise).
- unscrew the used element,
- apply a light even coat of lubricating oil to the seal of the new element,
- Install the new element, tighten until the seal touches the filter head. Tighten by hand an additional one-half to three-fourths turn (don't tighten using a tool as a filter wrench, ...),
- open the shut-off valve 11.

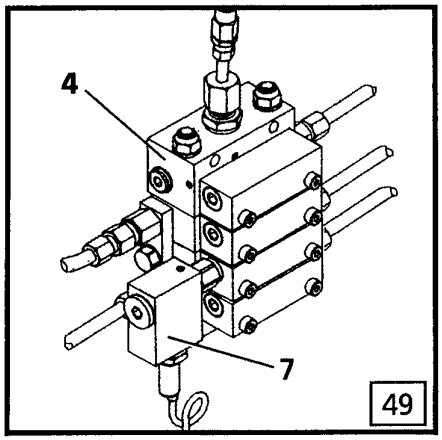
CHANGES IN THE LUBRICATION CIRCUIT

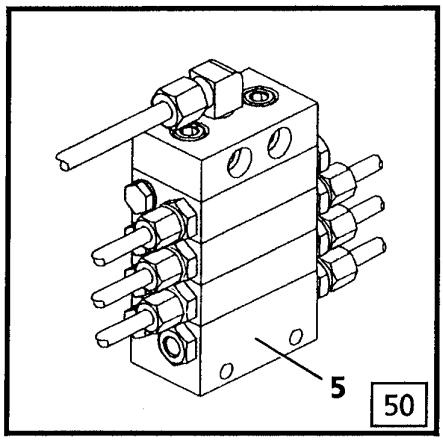
Before you make any changes to the lubrication system (for example when changing the attachment configuration), always check with a LIEBHERR mechanic first.

Never remove a line and close off an outlet, which is not being used, or the whole lubrication system would be blocked.

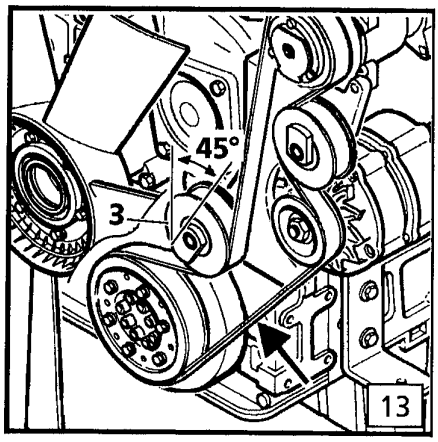
Only plug an outlet after the line has been removed from the distributor and the necessary changes have been achieved at the corresponding distribution elements.

This applies as well for main distributor 4 (fig. 49) as for secondary distributors 5 (fig. 50).





POLY-V-BELT FOR ALTERNATOR AND AIR CONDITIONER COMPRESSOR



Check V-belt tension :

The belt is correctly tensioned if it is pushed down about 13 mm (1/2") when applying a force of 120 N in the middle of the both pulleys on crankshaft and alternator (fig. 13).

To Adjust the V-belt tension :

Loosen the fixing screw 2 of the eccentric tightening pulley 4 (fig.15).

If necessary loosen the screw 1 and turn the pulley 3 to approx. 45° to vertical, and retighten the screw 1.

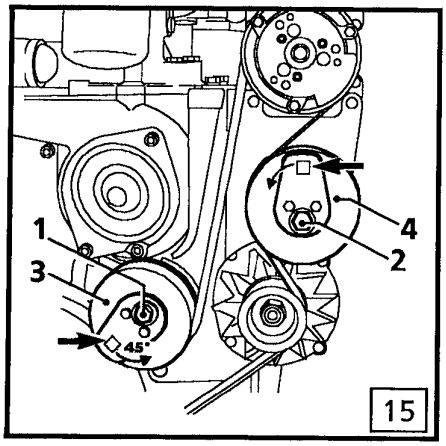
Turn the pulley 4 counterclockwise until the correct belt tension is reached.
Retighten the screw 2, while retaining the pulley 4.

Recheck the belt tension (fig. 13).

To replace the V-belt :

Loosen the screws 1 and 2, and turn the pulleys 3 and 4 so to release the tension of the belt. Remove the V-belt.

Insert a new V-belt and adjust the tension as described above.



CRANKCASE BREATHER / OIL SEPARATOR ASSEMBLY

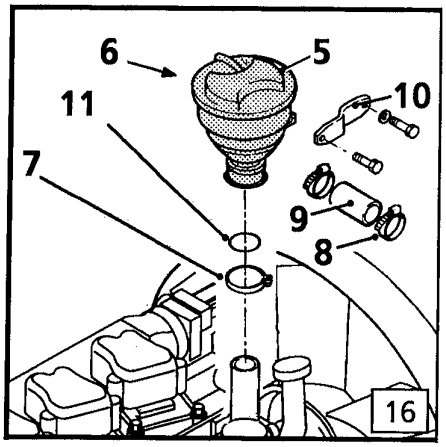
The breather 5 must be replaced at once in case of damage (dented housing or cover) or if oil mist emerges from the vent 6.

Otherwise it must be replaced every two years.

To replace the crankcase breather :

Loosen clamp 7 and hose clamp 8 and push back the connecting hose 9. Remove the bracket 10 and the crankcase breather 5.

Install a new O-ring 11 into the breather. Mount the new breather, push on the connection hose 9 and tighten the clamps 7 and 8. Install and tighten the bracket 10.

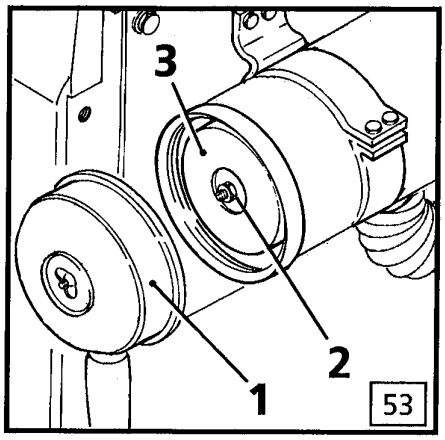


CHANGING THE PRIMARY FILTER ELEMENT

Turn the engine off, remove cover 1, remove the wing nut 2 with seal and remove primary element 3 (fig. 53).

Clean the inside of the filter housing and the sealing surface with a damp rag.
Do not direct compressed air into the housing.

Insert a new element, make sure it is seated correctly, tighten nut 2 and cover filter housing with cover 1.



REPLACING THE SAFETY ELEMENT (fig. 55)

The safety element 6 should be replaced at least once a year or after the main element has been replaced 3 times.

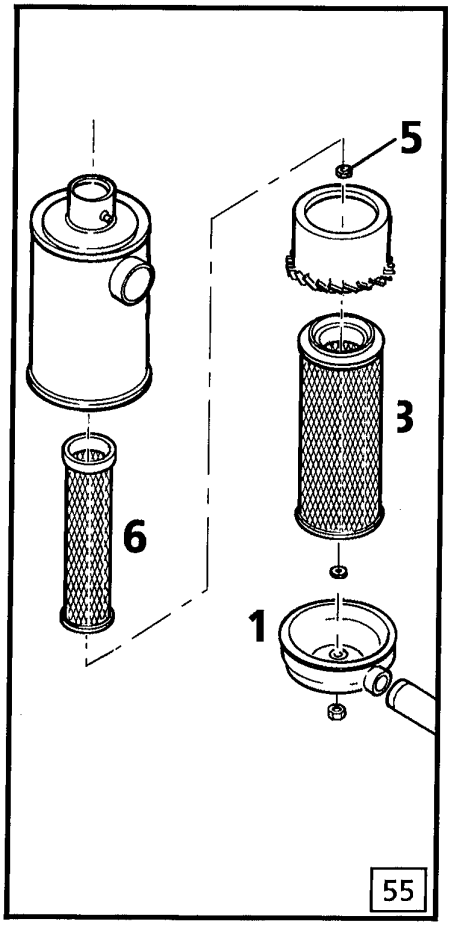
Visually check the safety element. It should be replaced if it looks dirty.

This safety element should only be replaced by a LIEBHERR mechanic!

Remove the main element as described before. Remove wing nut 5 and safety element 6. Carefully clean the inside of the filter housing with a damp rag.
Clean the sealing surfaces and check for damage.

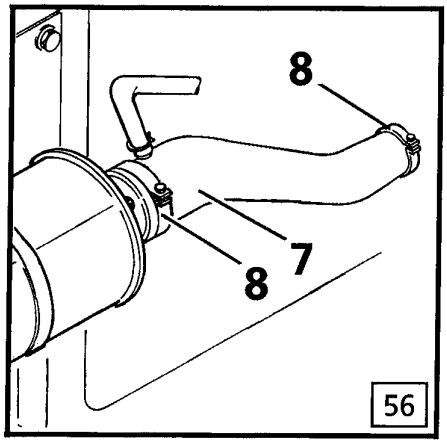
Carefully insert the new safety element and reinstall wing nut 5.

Install the main filter element 3 as described on previous page and close filter housing.



CHECKING THE AIR INLET HOSE (fig. 56)

The connection (exp. pos. 7), especially the air intake hoses between air cleaner, turbocharger, air exchanger (if mounted) and engine intake must be checked for damage and leaks whenever the filter elements are replaced.
If necessary, retighten the screws of the fixing clamps.



Works to be performed

Check / Maintenance at Operating Hours

by maintenance personnel (Operator) — By authorized trained personnel

☐ First and only interval — ○ Repeat interval

At delivery	every 8 - 10	every 10 - 50	at 500, 1500,...	at 1000, 3000,...	at 2000, 4000,...		Notes, performance guidelines / For fill quantities, see lubrication chart
						SWING RING	
	O	O	O	O	O	Lube swing ring bearing	
	O	O	O	O	O	Lube swing ring teeth	
				O	O	Check, if necessary tighten mounting screws	
				O	O	Check pinion gear mesh	
						TRAVEL GEARS	
O			O	O	O	Check oil level and for leaks	
			☐	O	O	Check function and operation of travel brakes	
				O	O	Check mounting screws of gears, sprocket wheels and oil motors	
					O	Replace gear oil (first at 500 hrs.)	SAE 90 or SAE 80W90
						TRACKS	
O	O	O	O	O	O	Check track chain tension visually, retighten if necessary	
	O					Clean track chains (after working hours)	
		O	O	O	O	Check and tighten mounting screws of track pads and sprocket wheels	
			O	O	O	Clean and lubricate sliding surfaces of chain tensioners	
			O	O	O	Check idlers, carrier and track rollers for leaks	
						CAB & HEATER	
		O	O	O	O	Check level in reservoir for windshield washer, refill if necessary	
O				O	O	Check function of heater, (before start of cold season)	
				O	O	Check heater system for leaks	
				O	O	Check and grease locks and hinges on doors and windows	
					O	Check the warm water solenoid valve for function and chocking, clean it as necessary	

ADJUSTABLE OPERATOR'S CAB

The hydraulically adjustable operator's cab is additional equipment which allows the height and/or inclination of the operator's cab to be adjusted steplessly.

- **With a cab adjustable in height on hoist frame** the height can be adjusted steplessly (fig. 1).
- **With an operator's cab adjustable in height and tiltable on hoist frame,** the height and inclination can be simultaneously, steplessly adjusted (fig. 2). By modifying the bolting on the hoist frame, see pages 8.1.4 and 8.1.5, the "Cab adjustable in height only" can be switched over.
- **With an operator's cab tiltable to 30 degrees** inclination between 0 and 30 degrees upwards only can be steplessly adjusted (fig.3).

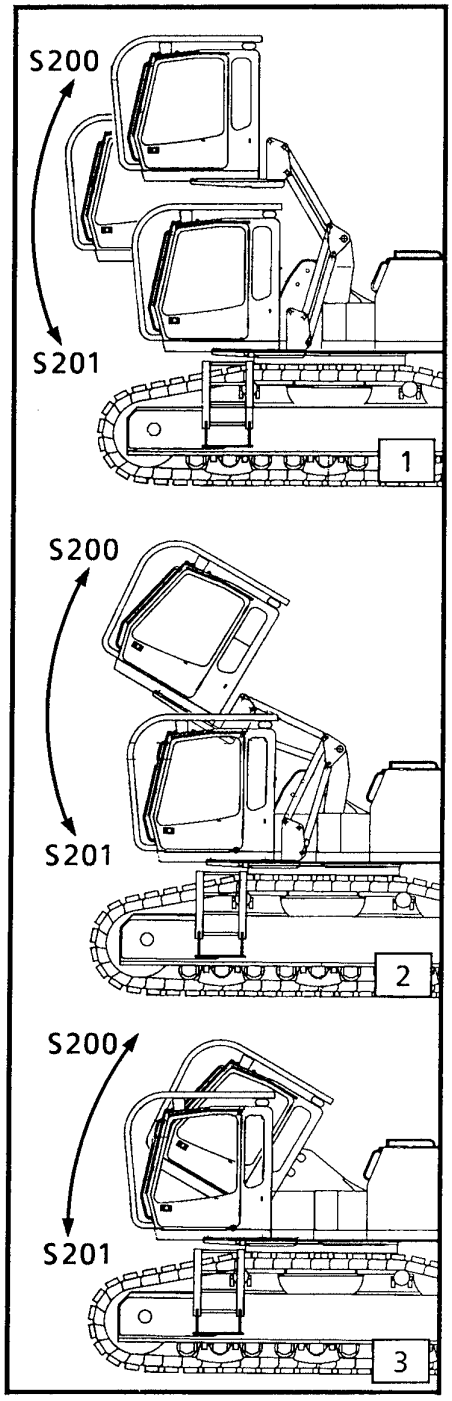
⚠ CAUTION

When operating the adjustable cab, the travel route of the excavator must be clear. It must be even, free of any obstructions and may not go down an incline, which could influence the stability of the excavator.

The cab may only be adjusted when the excavator is not moving.

During the cab adjustment, no personnel may be in close range of the excavator!

Check **every day** the fixation of the cab support before using the excavator!



ENTERING OR LEAVING THE CAB

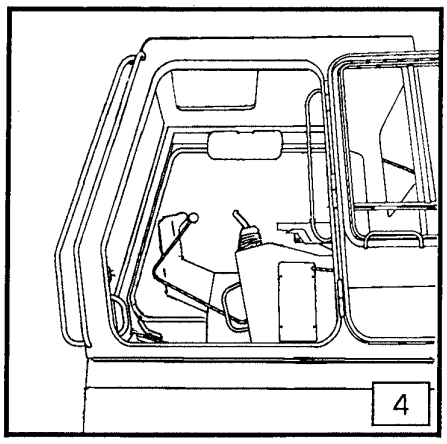
To enter or leave the cab, always use the itended entry aids (steps and hand rails).

⚠ CAUTION

NEVER JUMP OFF THE HYDRAULIC EXCAVATOR.

⚠ CAUTION

It is essential to have your seat belt fastened if you want to operate the machine with the cab door opened.
If your machine is not fitted out with a belt, so you must compulsorily get one installed before you start working with opened cab door.



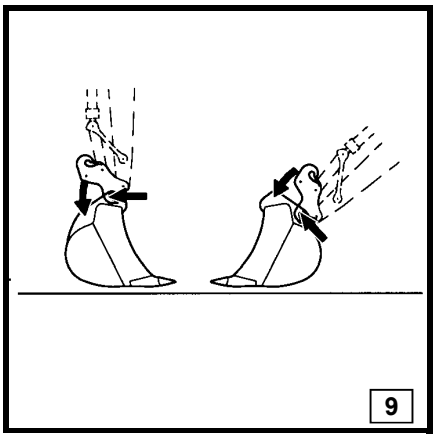
ATTACHING THE WORKING TOOL

Position the quick change coupler in such a way that the tool can be mounted on the attachment hook (fig. 9 and 10) .

Backhoe buckets can alternatively be used as front buckets after changing the attachment pins.

Raise the tool from the ground and extend the bucket cylinder until the bearing plates of the tool (fig. 11) are resting at the stops of the quick change coupler SWH (fig. 1, pos. d).

The attachment bore holes of the tool must be flush with the locking pins (fig. 11 and 12).



9

CAUTION

- **Keep tools near the ground.**

LOCKING THE COUPLER

With the push button S19 activated, press left push-button "S5L" (fig. 6) on left joystick 4 until the locking pins are completely out.

The symbol "locking pins" on the screen should extinguish and the buzzer should stop sounding.

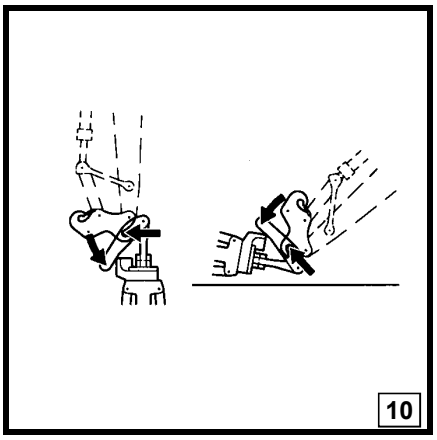
Deactivate push button S19 (indicator light extinguishes).

If properly attached, the tool is now locked in place.

Check visually if the tool is fitted firmly.

In addition, the operator must perform a cycle with the tool where the tool may only be raised far enough that the secure fitting, e.g. if the pins are in the pin holes, can be checked by tilting the tool in and out.

No one is permitted in the danger zone during a test run!



10

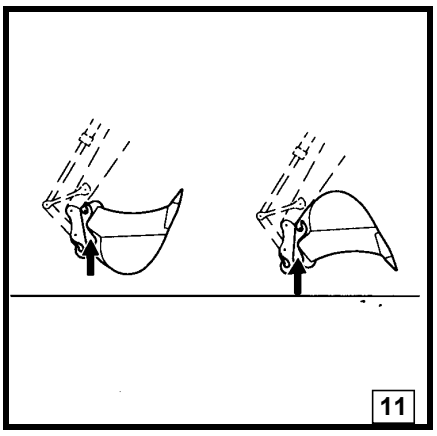
DANGER

If a buzzer sounds or a warning symbol lights up and no locking or unlocking procedure was initiated, shut down operation immediately.

This may be due to the locking pins changing their fitting position unchecked, e.g. because of leakage.

If buzzer/warning light are not actuated during any procedure, shut down operation immediately. This may be due to breaks in the cable, a defective plug connection or a defective proximity switch.

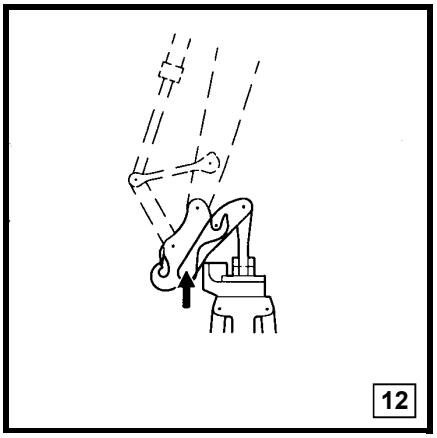
Operation may only be reinitiated after defective parts have been repaired or replaced.



11

N**otice:**

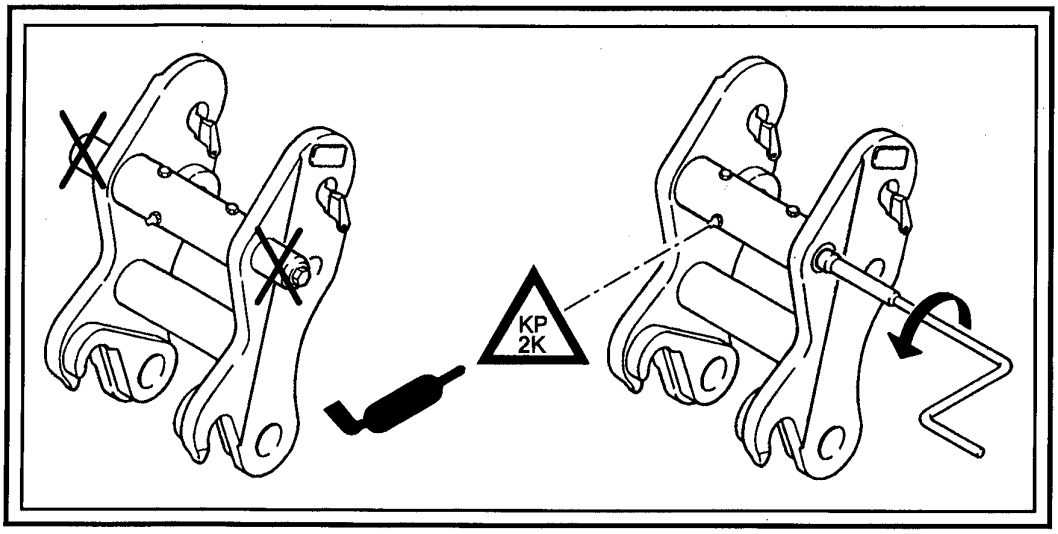
Before starting operation with tools, e.g. grapple, ditch cleaning bucket, observe all special instructions for mounting and dismantling.



12

MAINTENANCE RECOMMENDATIONS

The bearing lube points of the mechanical quick change coupler must be lubricated at least once a week.



NOTICE

Make absolutely sure that the locking pins are retracted when lubricating.

If the locking pins are extended, the hollow space between the locking pins fills up with grease so that these pins can no longer be moved.

For grease specificartions, see grease and service items charts.