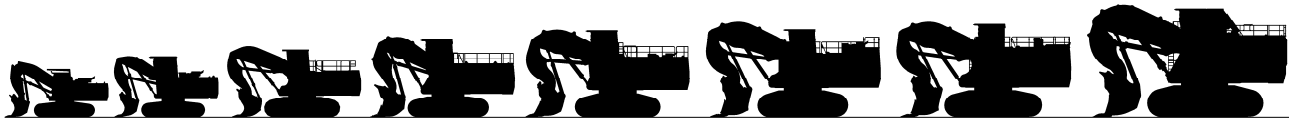
Operating Instructions

CE

Hydraulic Excavator

RH 30E No.

Bucyrus HEX GmbH



FUEL SYSTEM

ELECTRICAL SYSTEM

HYDRAULIC SYSTEM

Organizational measures

The operating instructions must always be at hand at the place of use of the machine, e.g. by stowing them in the place provided for such purpose.

In addition to the operating instructions, observe and instruct the user in all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection.

These compulsory regulations may also deal with the handling of hazardous substances, issuing and/or wearing of personal protective equipment or traffic regulations.

The operating instructions must be supplemented by instructions covering the duties involved in supervising and notifying special organizational features, such as job organization, working sequences or the personnel entrusted with the work.

Personnel entrusted with work on the machine must have read the operating instructions and in particular the chapter on safety before beginning work. Reading the instructions after work has begun is too late. This applies especially to persons working only occasionally on the machine, e.g. during setting up or maintenance.

Check - at least from time to time - whether the personnel is carrying out the work in compliance with the operating instructions and paying attention to risks and safety factors.

For reasons of security, long hair must be tied back or otherwise secured, garments must be close-fitting and no jewellery, such as rings, may be worn. Injury may result from being caught up in the machinery or from rings catching on moving parts.

Use protective equipment wherever required by the circumstances or by law.

Personal protective equipment and the working clothing

Depending on the cleaning, servicing and/or repair activities to be performed, the personal protective equipment and the working clothing may consist of the following items:

- fall arresters
- protective suit
- helmet
- goggles
  e. g. for cleaning work
  or for welding work
- protective gloves
  e.g. for work on hot units
  for grinding and welding work
- protective working gloves
  e.g. for fitting work
  for grinding and welding work
- ear protectors

Observe all safety instructions and warnings attached to the machine.

See to it that safety instructions and warnings attached to the machine are always complete and perfectly legible.

In the event of safety-relevant modifications or changes in the behaviour of the machine during operation, stop the machine immediately and report the malfunction to the competent authority/person.

Never make any modifications, additions or conversions which might affect safety without the supplier’s approval. This also applies to the installation and adjustment of safety devices and -valves as well as to welding work on load-bearing elements.

Spare parts must comply with the technical requirements specified by the manufacturer. Spare parts from original equipment manufacturers can be relied on to do so.

Replace hydraulic hoses within stipulated and appropriate intervals, even if no safety-relevant defects have been detected.

Adhere to prescribed intervals or those specified in the operating instructions for routine checks and inspections.

For the execution of maintenance work, tools and workshop equipment adapted to the task on hand are absolutely indispensable.

The personnel must be familiar with the location and operation of fire extinguishers.

Observe all fire-warning and fire-fighting procedures.

2804201

Operation - Safety instructions

Operating Instructions

Never operate the machine before having read and understood the operating instructions.

Pay special attention to:

the "Fundamental Safety Instructions" and all warnings and safety instructions attached to the machine.

Familiarize yourself with the layout, the functioning and the sense of actuation of the control elements prior to starting up the machine.
Activate the control elements from the driver's seat only.

Keep the operating instructions with the machine at all times.

Operating personnel

The operating personnel must be fully informed of the operation and application of this or comparable machines.

The necessary know-how can be acquired in several days' instruction, e.g. by an O&K-Mining mechanic or by attending an O&K-Mining operators' training course.

Personal protective gear and working clothing

Wear a safety helmet and working footwear with non-slip soles. Smooth soles may slip from steps and pedals, resulting in injury or incorrect operation.

Wear closely fitting working clothing when operating the machine. Loose, wide garments may result in control levers being inadvertently activated.

Safety belt

For machines with a safety belt for operating personnel:

Check the safety belt attached to the driver's seat. In the event of damage or after an accident, have it replaced immediately.

Apply safety belt before starting work.

State of the machine

Operate the machine only in a safe state and only in accordance with its designated use. Always observe the safety instructions.

Always have inspection and maintenance work carried out on schedule.

Operate the machine only with the equipment and component combinations approved by O&K-Mining. Clear-cut data are given in the technical specification.

Never install and commission - other equipment and component combinations without O&K-Mining having first inspected and approved the project.

Before starting work or travelling with the machine, check that the braking, signalling and lighting systems are fully functional.

Poor visibility may result in accidents. Always clean the windows and the glass covers of all lamps before starting up the machine.

Check that all warnings and safety instructions attached to the machine are present and legible.

DRIVER'S CAB

2804265

Entering and leaving the machine - Safety instructions

Clean off oil, grease, soil, mud, snow, ice and other substances from shoes, grab handles and steps.

Keep steps, platforms and grab handles in a non-slippery condition.

Risk of injury due to slipping.

For entering and leaving use only the steps, platforms and grab handles provided (see Fig. 1).

Always face the machine when entering or leaving it.

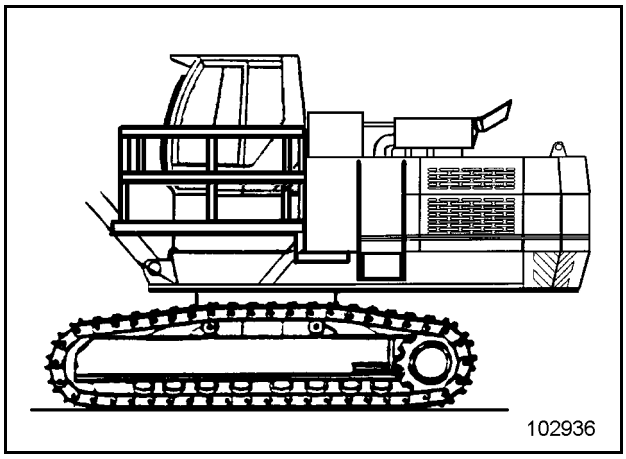


Fig. 1

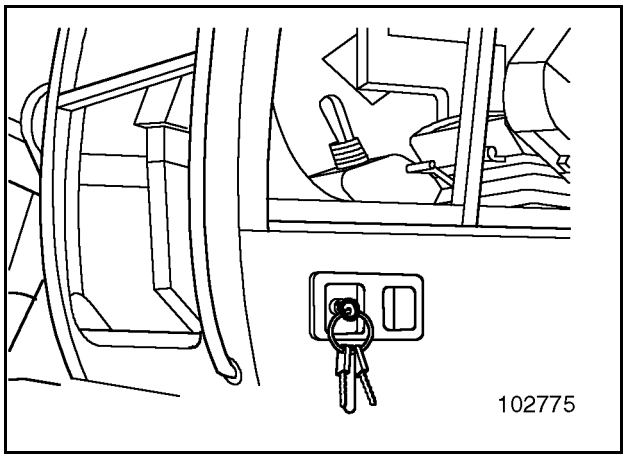


Fig. 2

Opening and closing the door

Opening the door

- Unlock the door with the key (Fig. 2).
- Depress the lock button and pull the door open.
- The door can be arrested when it is completely open.

To open the door from inside, raise lever (2, Fig. 3).

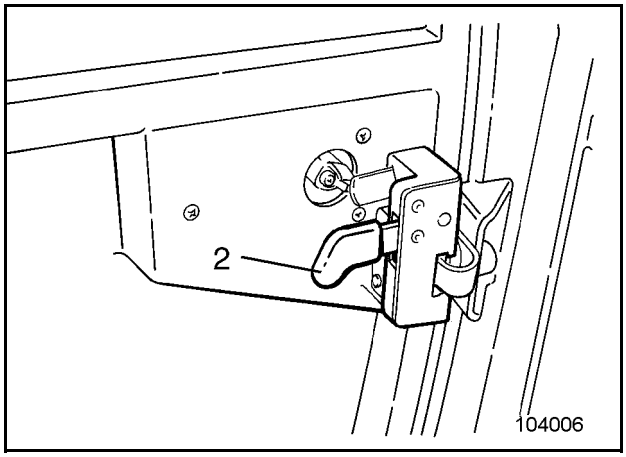


Fig. 3

Closing the door

- Unlock the open and arrested door with unlocking lever (1, Fig, 4) and close the door.

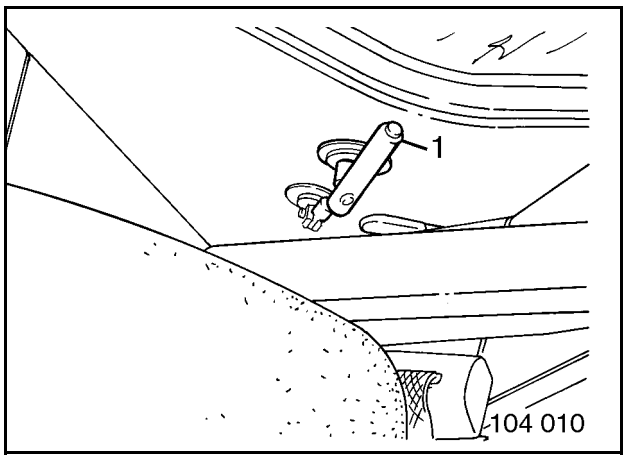
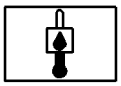
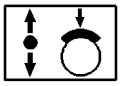


Fig. 4

(Fig. 3)

No.	Designation		Function	Symbol
14	**Thermometer**	**Hydraulic oil temperature**	Indicates the temperature of the oil in the hydraulic reservoir.	
15	**Warning lamp**	**Slewing pump contamination**	Lit when the slewing pump is contaminated with metallic particles.	
16	**Warning lamp**	**Slewing pump temperature**	Lit when the temperature of the slewing pump is too high.	
17			Free for optional equipment	
18	**Indicator lamp**	**Travelling 2nd speed range**	Lit when the 2nd speed range has been selected.	
19	**Warning lamp**	**Min. hydraulic oil level**	Lit when the hydraulic oil level is below limit value. **Shut off engine**	
20	**Warning lamp**	**Min. fuel**	Lit when the fuel has been used up, so that there is only the fuel reserve (abt. 115 l) left	
21	**Indicator lamp**	**Track parking brake**	Lit when the parking brake is applied. - The parking brake is automatically applied when the machine is stationary. - The parking brake is automatically released when the "Travel" function is active.	
22	**Warning lamp**	**Main pump I contamination**	Lit when the hydraulic pump I is contaminated with metallic particles	
23	**Warning lamp**	**Main pump II contamination**	Lit when the hydraulic pump II is contaminated with metallic particles	
24			Free for optional equipment	
25			Free for optional equipment	

(Fig. 8)

No.	Element	Function	Symbol
70	**Speed control (Potentiometer)**	Controls the engine speed - turn counter-clockwise to the limit stop: idling speed - turn clockwise to the limit stop: full speed	
71	**Travelling and working speed (Potentiometer)**	Controls the travelling and working speed for special working conditions - turn counter-clockwise to the limit stop: speed = min. (minimum flow rate for main pumps) - turn clockwise to the limit stop: speed = max. (maximum flow rate for main pumps)	
72	**Key-switch**	Activation /De-activation of electrical system Position 1: function check of indicator and warning lamps in satellites I and II and of buzzer Position 3: starting of engine	
73		Free for optional equipment	
74		Free for optional equipment	
75		Free for optional equipment	
76		Free for optional equipment	
77		Free for optional equipment	
78		Free for optional equipment	
79	**Pushbutton Boom-floating position (only for loading shovel equipment)**	When actuated: boom cylinders are pressurized when when retracted. **Depress button (79) only when control lever (88) is in position "0"**	
80	**Pushbutton Horn**	Sounding of the horn	

Defrosting the front and rear windows

Misted or iced windows obstruct the operator's view of the hazard zone.

The machine may be set in motion only after the windows are defrosted and when the operator has a clear view of the hazard zone.

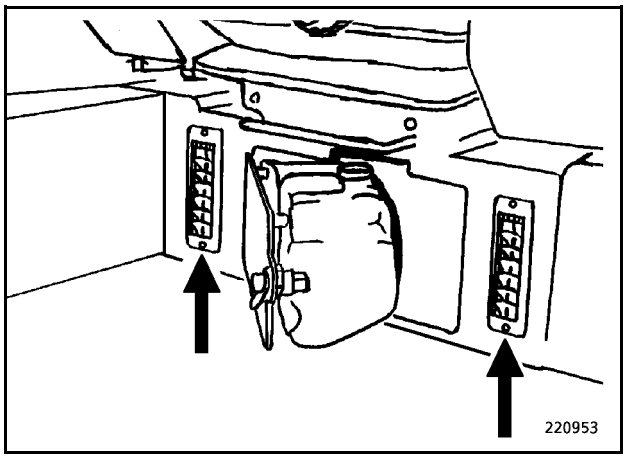


Fig. 3

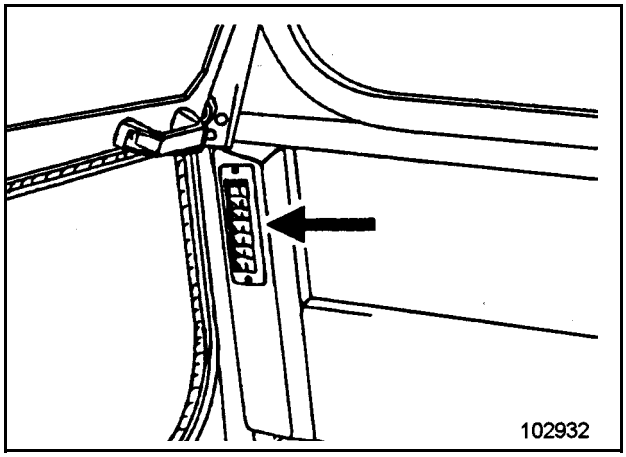


Fig. 4

- Start up the engine. Full heating performance is available only after the engine has reached its operating temperature.
- Close the outlets under the driver's seat (Fig. 3).
- Open the outlets (Fig. 4) completely and turn them in the direction of the front window.

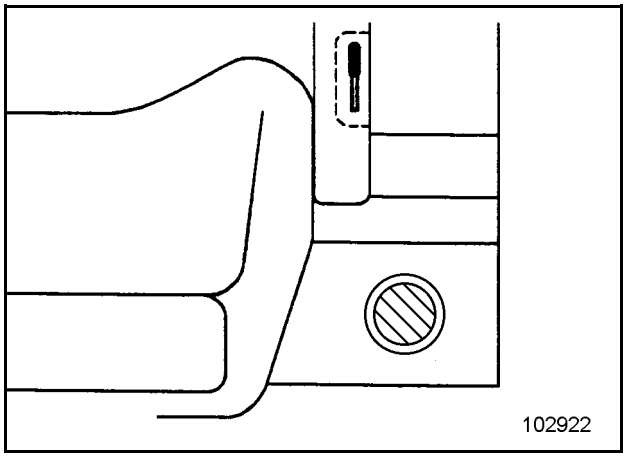


Fig. 5

- Open the outlets (Fig. 5) completely and turn them in the direction of the rear window.
- Turn knob (94, Fig. 6) to maximum heating performance.
- Turn rotary switch (60, Fig. 7) to step **3** .

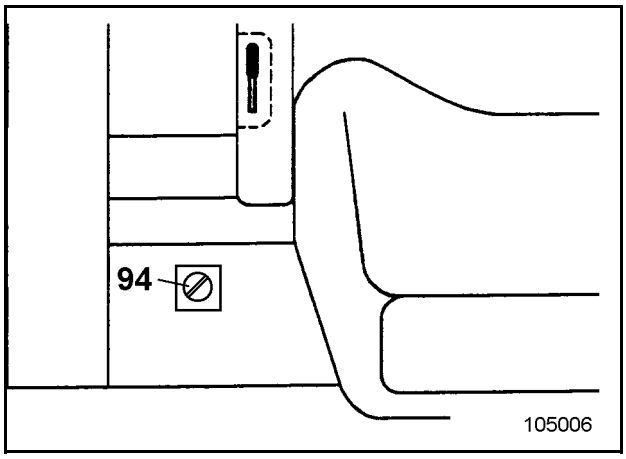


Fig. 6

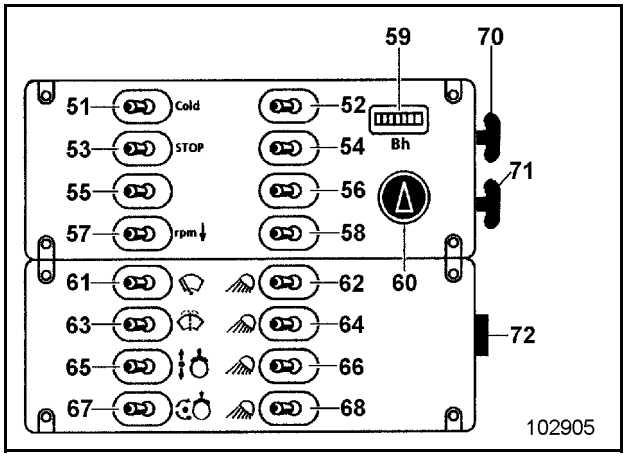


Fig. 7

At low temperatures, bring the engine down to moderate speed, then activate all hydraulic functions for about 10 minutes (bring to service temperature). For further instructions, see section "Lubricants".

If the warning lamps for engine temperature, engine oil pressure, coolant level, alternator or hydraulic oil filter control (with hydraulic oil at service temperature) light up: Lower the working equipment and shut off engine.

Parts of the attachment may damage the machine if they are moved into extreme positions (see illustrations 1 and 2).

Work carefully, avoiding extreme positions of this kind.

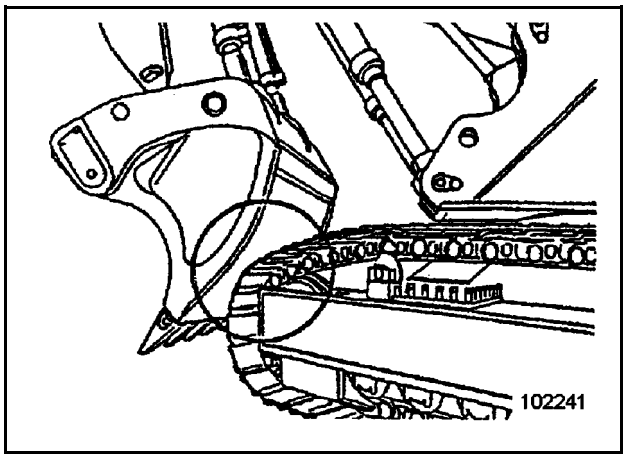


Fig. 1

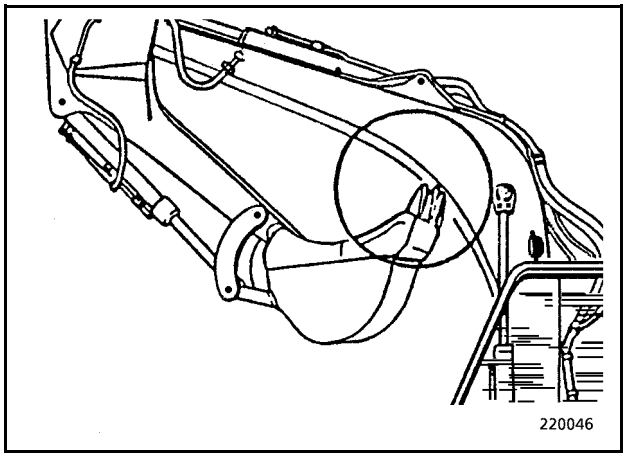


Fig. 2

□

Switching on the overload warning system

Detach catch (8, Fig. 3) from support (7) and turn the cam-plate (5) in such a way that both catches (8 and 9) are in alignment above one another (Fig. 3).
Connect the catches (8 and 9) by screwing them together.

Activate the overload warning system, the lifting power boost and the delivery-rate reduction functions with switch (56, Fig. 4).
The indicator lamp (34, Fig. 5) lights up.

Switching off the overload warning system

Screw catches (8 and 9, Fig. 3) apart.

Fasten catch (8) to fixing point (7).

Deactivate the overload warning system, the lifting power boost and the delivery-rate reduction functions with switch (56, Fig. 4).

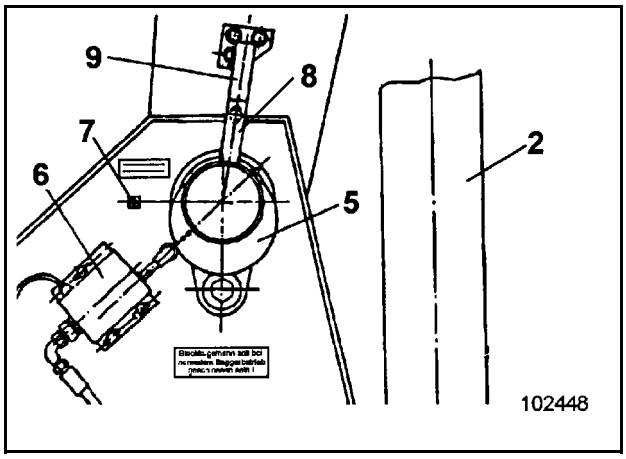


Fig. 3

For travelling during lifting operations, the excavator works without the power boost and delivery-rate reduction functions.
The overload warning system remains functional.

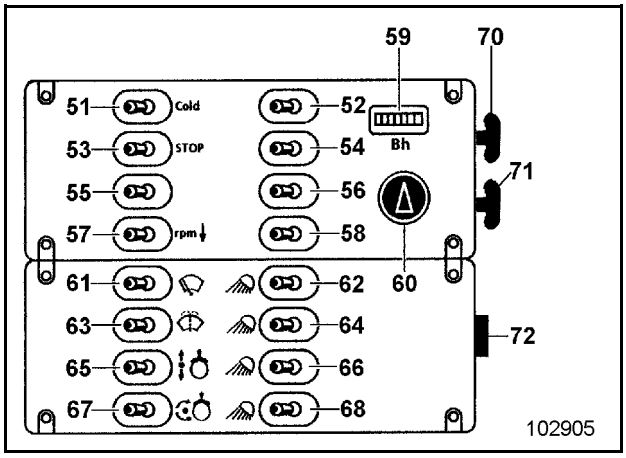


Fig. 4

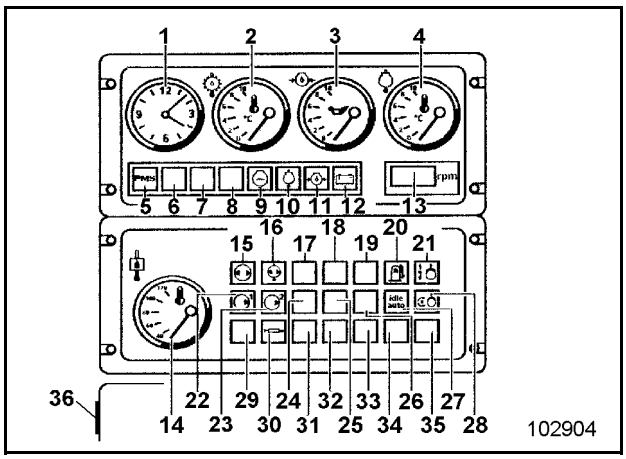


Fig. 5

Checking the overload warning system

Before carrying out lifting operations, the overload warning system must be checked for proper and safe functioning.

Depress the switching tappet of the electro-hydraulic control unit (6, Fig. 3) by hand or extend the boom cylinders (2) completely until the maximum working pressure is reached.
Warning lamp (35, Fig. 5) must now light up.

If the warning lamp (35) lights up to indicate a fault or if it does not light up at all, have the overload warning system checked and repaired by O&K Mining.

Relieving residual pressure in the hydraulic system

Only unpressurized hydraulic systems may be opened. Even when a machine is parked on a horizontal surface with its attachments supported on the ground and its driving motor switched off, there may still be substantial residual pressure in parts of the hydraulic system, e.g. primary pressure from the last hydraulic movements prior to stopping the machine.

Residual pressure is reduced only gradually. If an intervention into the hydraulic system is to be undertaken immediately after stopping, the system must be depressurized:
(do not leave the driver's seat)

- **Stand working equipment on the ground**
- **Shut off the engine**
- **Move all control levers and pedals repeatedly into all directions.**

Screwed connections, piping, hydraulic hoses

Repair any leakage in the piping and hose system immediately.

A fine, highly pressurized jet of hydraulic oil can penetrate the skin.

Never search for leakges with the fingers, but use a piece of cardboard and always wear goggels.

If oil has penetrated into the skin, consult a doctor immediately.

Never repair damaged piping; always replace them.

Replace hydraulic hoses immediately on detecting any damage or moist areas.

Tighten leaking screw plugs only when the system is depressurized.

Escaping oil is an environmental hazard.

Non-polluting disposal

Dispose of oils, greases, cooling liquids, detergents, solvents and oil-containing components such as filters, cleaning rags, replaced wearing parts and unusable machine parts without polluting the environment and separately from other waste.

Do not dispose of these substances together with household wastes.

Fill these substances into the containers provided for such purpose.

Like any other oil, also bio-degradable, "environment-friendly" hydraulic oil must be disposed of separately.

Do not allow oils and oily wastes to penetrate into the soil. They are an environmental hazard.

Seals

Individual spares may contain asbestos. Such spares or their packaging are marked with: a

Never process spares containing asbestos mechanically. Inhaling asbestos dust is a health hazard.

Clean sealing faces prior to assembly.

Engine exhaust gases

Exhaust gases from engines are a health hazard: never inhale them.

When working on enclosed premises, draw off exhaust gases with a suction plant and ventilate the premises well.

Plan N - After initial commissioning and during the running-in period

Location	Servicing work	Quantity / No.
After 100 OH		
Engine		
- Bearing		
- Fastening bolts	Check for tightness	
Centrifuge (optional)	Clean	1
Cooling system		
Water filter	Replace	1
Radiator		
- Bearing		
- Fastening bolts	Check for tightness	
Hydraulic system		
Oil cooler		
- Bearing		
- Fastening bolts	Check for tightness	
Return-flow filter	Replace	2
Magnetic rod	Clean	2
Pressure accumulator	Check pressure	1
Pump transfer gearbox	Change oil	1 [1)]
Slewing gearbox	Change oil	1 [1)]
Fastening bolts	Check for tightness	
Travel gearbox	Change oil	2 [1)]
Fastening bolts	Check for tightness	
Slewing ring		
Fastening bolts (slewing ring undercarriage and superstructure)	Check tightness (cf. Technical handbook)	
Superstructure		
Fastening bolts, especially at superstructure / pedestal / driver's cab	Check for tightness	
Undercarriage		
Fastening bolts - track pads	Check for tightness (cf. Technical handbook)	
All lines, fittings and connections	Inspect visually for leaks, wearing marks	

[1)] Cf. "Refilling quantities - Oil" table.

Lubricating chart - Grease / Loading Bucket (legend)

Pos.	Greasing location	Number	Lubricant properties	Grease every ... operating hours
1	Central lubricating system - grease container	1	V 1)	10

All other greasing points are supplied with grease by the central lubricating system.

Refilling quantities - Grease

Greasing location, component	Lubricant properties	Filling quantity in kg
Central lubricating system - grease container	V 1)	5
Internal gearing - roller-bearing slewing ring		20

1) Cf. section "Lubricants"

Bh = OH Operating hours

SERVICING WORK

2413586

Draining hose for oil changes

Collect escaping oil and discard without polluting the environment.

Carry out oil changes when the machine is at operating temperature; warm oil drains away more easily.

The engine, hydraulic oil reservoir and the slewing gearbox are equipped with special oil drain valves (1, Fig. 1).
These plugs permit to carry out oil changes in a clean and non-polluting way.

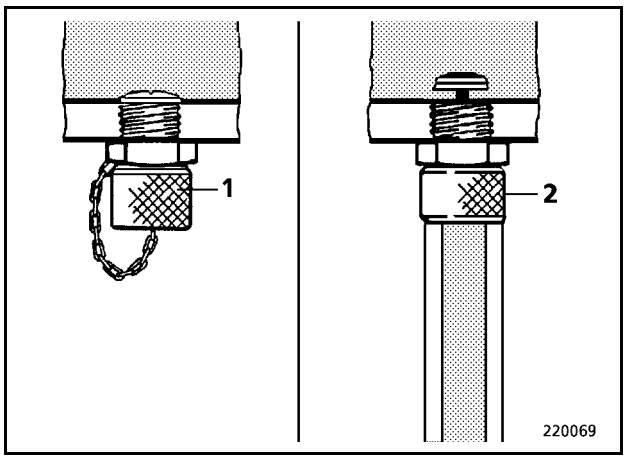


Fig. 1

Carry out oil changes as follows:

- Place a recipient for waste oil under the drain opening (choose the capacity of the recipient in acc. with the "Refilling quantities - Oil" table).
- Choose the proper draining hose from the tool kit.
- Unscrew protective cap from oil drain valve.
- Screw on draining hose (2); the valve opens and the oil drains away.
- After the oil has drained away unscrew draining hose; the valve closes automatically.
- Screw protective cap back in place. □

Never clean filter element by beating against hard objects.

Replace the main filter element after 1000 operating hours or 3 cleaning cycles, at the latest, however, after one year of operation.

Safety filter element

Replacement

Replace the safety filter element (5, Fig. 8) after 1000 operating hours or 3 cleaning cycles of the main filter element, at the latest, however, after one year of operation.

Never clean the safety filter element, but always renew.

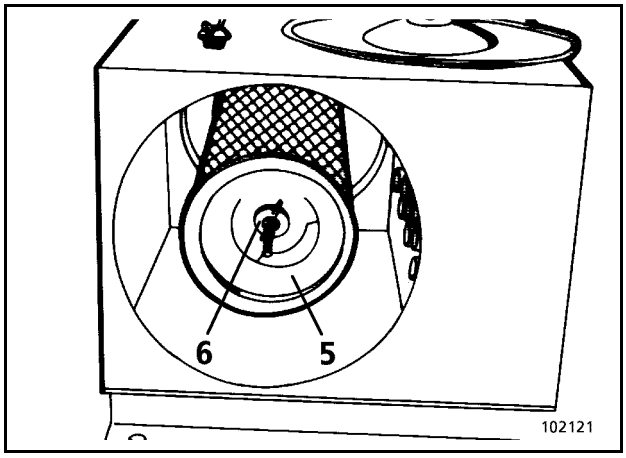


Fig. 8

- Remove main filter element (4, Fig. 9) as described above.
- Unscrew nut (6, Fig. 8) and withdraw safety filter element (5).
- Install new safety filter element and cleaned or new main filter element.

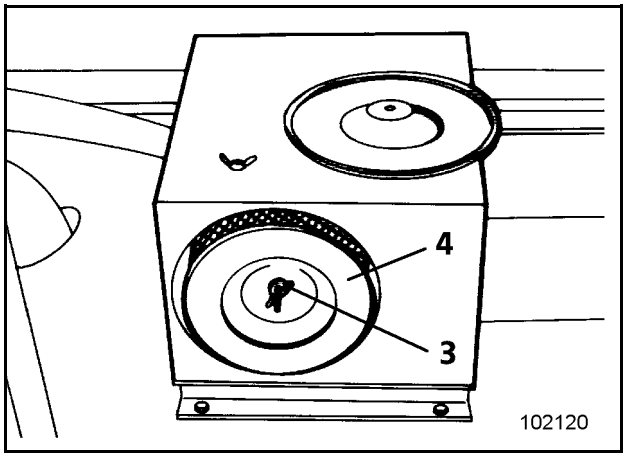


Fig. 9

Air-intake line

At regular intervals:

- check intake line for leaks and hose clamps for tightness;
- replace hoses between filter housing and engine.

During all works on the air-intake system ensure proper sealing to prevent unfiltered air from reaching the engine.

Dust collection

Dust accumulating on the filter-housing bottom is constantly being sucked away by the exhaust system during operation.

A non-return valve (7, Fig. 10) in the suction line prevents engine exhaust gases from being sucked in.

At regular intervals:

- check suction line for leaks and hose clamps for tightness.

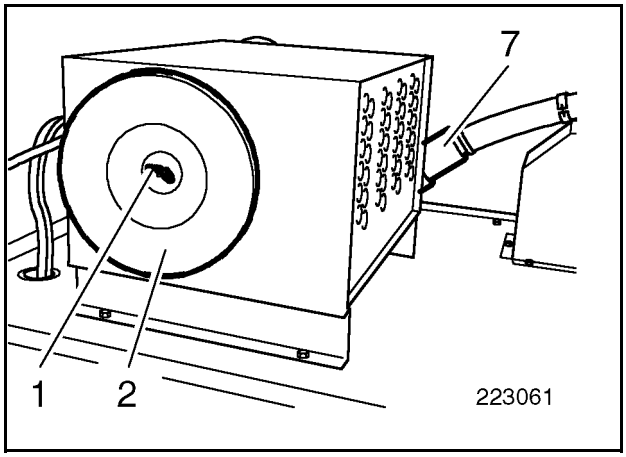


Fig. 10 □

Changing the hydraulic oil return-flow filters

Read and observe the "Inspection and servicing - Safety instructions" chapter.

Shut off the engine.

Risk of scalding caused by hot hydraulic oil.

The hydraulic oil reservoir itself may also be hot.

Avoid skin contact.

Skin contact with hydraulic oil can cause skin injury.

Wear protective gloves and firm working clothing.

Collect escaping hydraulic oil and discard without polluting the environment.

The return-flow filters must be replaced:

- when servicing works in accordance with the servicing plan are carried out;
- when the "Hydraulic oil filter" warning lamp (satellite II) lights up when the hydraulic oil is at operating temperature. The filter elements (25, Fig. 5) are then heavily contaminated.
  (The warning can be disregarded if the lamp lights up only shortly during starting of the engine);
- after repairs on the hydraulic system;
- in case of damage.

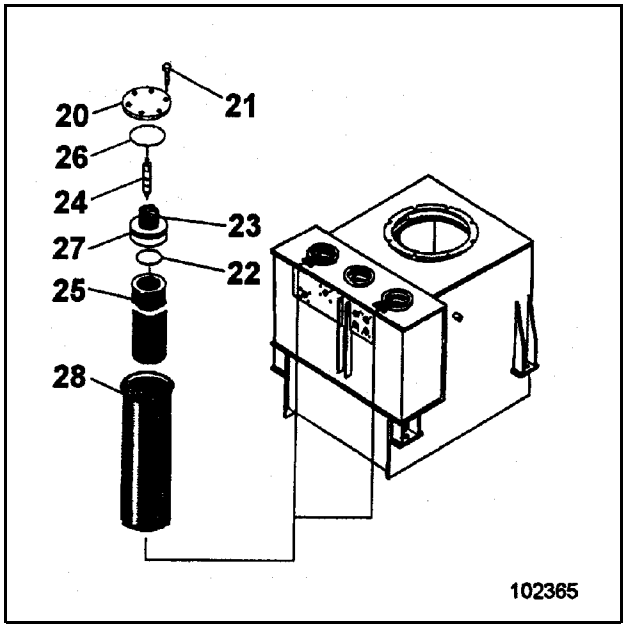


Fig. 5

- Remove cover (20) and retaining disk (23) as described under "Topping up with hydraulic oil".
- Clean the magnetic rod (24).

If abraded metal and metal filings adhere to the magnetic rod, locate the cause or contact the O&K-Mining Service.

- Withdraw filter element (25) together with sealing ring (22).

If the filter elements are damaged, remove basket (28) and clean down with spirits or petroleum.

- Lower basket (28) into tank.
- Insert new filter element (25) together with sealing ring (22).
- Fit retaining disk (23) with sealing ring (27).
- Refit cover (20) with sealing ring (26).

Proceed in the same way to replace the other filter elements (25).

Group	Inspections prior to commissioning		Regular inspections
	at the factory	at the place of use	
II $p \geq 1$ bar und $p \cdot l \leq 200$	Pressure testing Manufacturer s certificate of satisfactory manufacturer and pressure testing	Inspection certificate (check of correctness and correct installation) issued by authorities	Test programme to be drawn up by end user based upon experience with the type of operation and fluid.

□

CENTRAL LUBRICATING SYSTEM

2486213

Design and function

The excavator is equipped with an automatic central lubricating system ensuring regular the regular supply of grease to all greasing points except those mentioned in the "Lubricating chart - Grease" for the backhoe bucket.

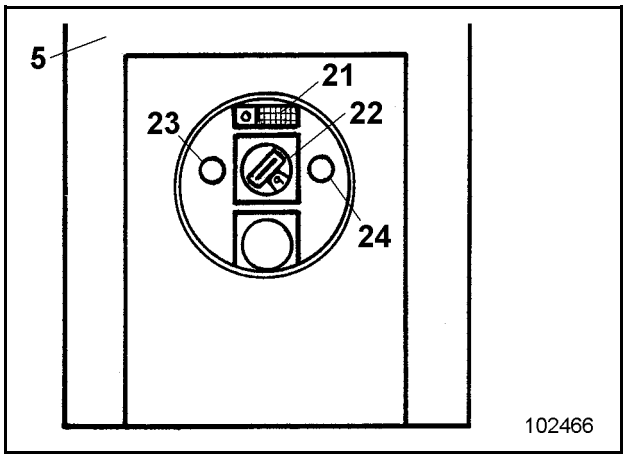


Fig. 1

When the electrical system is switched on with the key- switch, the indicator lamp (23, Fig. 1) lights up and the lubricating system is activated.
The indicator lamp (23) is visible after removing cover (20, Fig. 2).
All lubricating points connected to the system are greased at regular intervals. During the greasing cycle, indicator lamp (24, Fig. 1) is lit up.

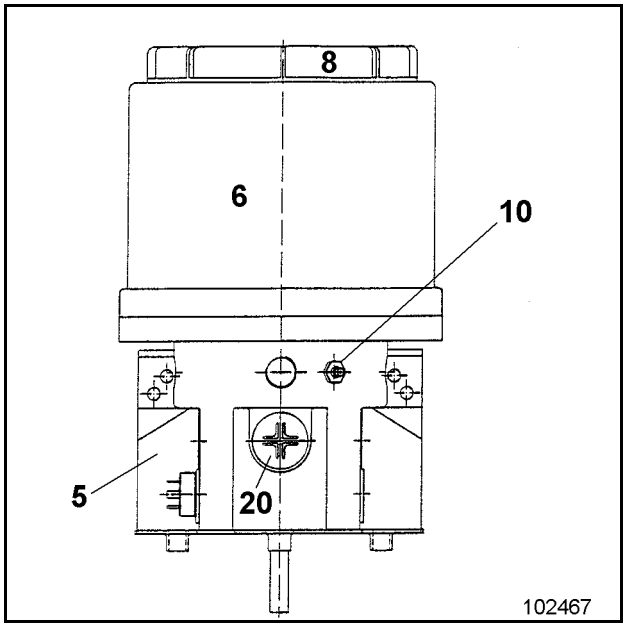


Fig. 2

A grease pump (5, Fig. 3) with attached grease container (6) pumps the grease through lines (7) to the main distributors (17 and 18, Fig. 3 and Fig. 4).
There is no main distributor (18) if the excavator is equipped with a backhoe bucket.

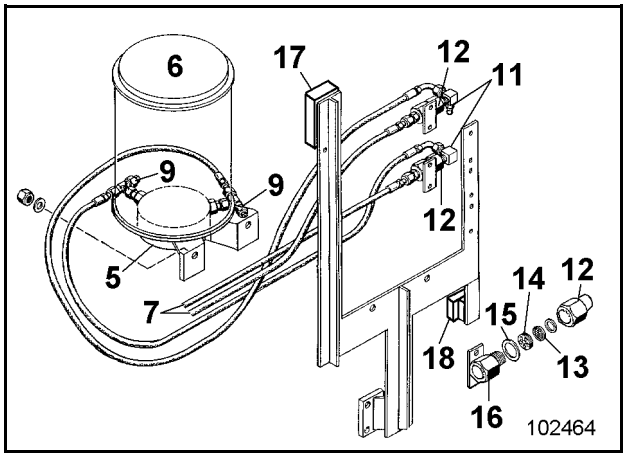


Fig. 3

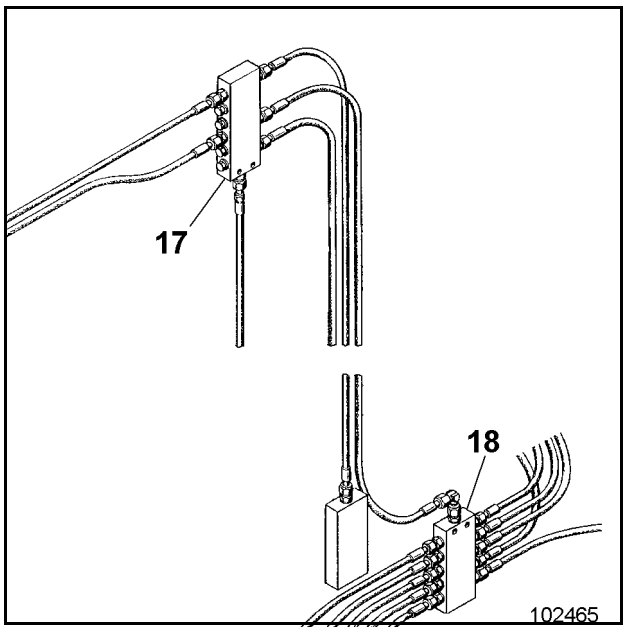


Fig. 4

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Repair work - Safety instructions

Operating instructions

Never carry out repair work without having read and understood the operating instructions.

Pay special attention to:

"Fundamental Safety Instructions",

"Inspection and servicing - safety instructions"

and all warnings and safety instructions attached to the machine.

The descriptions of job sequences provide only experienced personnel with the necessary instructions.

The operating manual must be kept with the machine at all times.

Repair personnel

Repair personnel must have know-how and experience relevant to repairing this or comparable machines.

In the absence of such know-how, meticulous training must be given by experienced repair personnel, e.g. from O&K-Mining.

Working in greater heights

Always wear safety harnesses when working at greater heights.

Wear an approved safety harness; it must be equipped with fall arresters and safety cables.

Prestressed units

Never open defective prestressed units but replace them as an entirety.

In exceptional cases, open only when the system and the operating sequence are precisely known and any special tools required are available.

The operating manual contains no information on this point.

Dismantling components

Never do dismantling while the machine is at operating temperature.

Oils, greases or coolants may have a high temperature and result in burning or scalding.

Leave time for the machine to cool down.

Before starting work, depressurize piping and hoses, cylinders, radiator, hydraulic tank and other systems or units.

Replace defective components in good time to prevent major damage.

Clean the defective component carefully before dismantling it.

Mark the dismantled parts in the correct sequence to faciliate re-assembly.

When dismantling the component, close off exposed hose and piping connections, exposed drill holes and housings carefully to prevent any dirt from penetrating.

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PART 5 - ANNEX

	Operating manual	Target group
Part 1	INTRODUCTION FUNDAMENTAL SAFETY INSTRUCTIONS	**Operating personnel** **+** **Inspection and servicing personnel** **+** **Repair personnel**
Part 2	OPERATION	**Operating personnel** The operating personnel must have know-how relevant to the operation and the application of this or comparable machines.
Part 3	INSPECTION AND SERVICING	**Inspection and servicing personnel** The inspection and servicing personnel must have know-how relevant to the inspection and servicing of this or comparable machines.
Part 4	REPAIR WORK	**Repair personnel** The repair personnel must have know-how and experience relevant to the repair of this or comparable machines.
Part 5	ANNEX	**Operating personnel** **+** **Inspection and servicing personnel** **+** **Repair personnel**
Part 6	INDEX	**Operating personnel** **+** **Inspection and servicing personnel** **+** **Repair personnel**

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NOTES