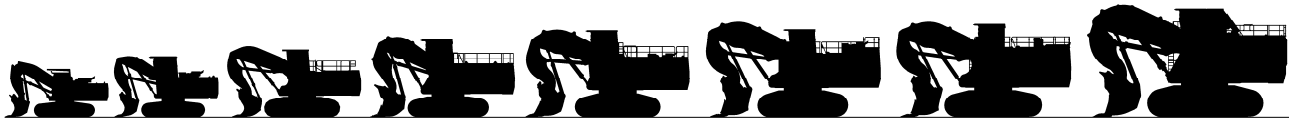
Operating Instructions

CE

Hydraulic Excavator

RH 120E No.

Bucyrus HEX GmbH



1 INTRODUCTION

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	Operating instructions	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**

Gas, dust, steam and smoke

Always start and operate the engine in a well-vented area;

If in an enclosed area, vent the exhaust to the outside;

Do not modify or tamper with the exhaust system

Diesel engine exhaust and some of its constituents are known to cause cancer, birth defects, and other reproductive harm

Operate fuel-operated heating systems only on adequately ventilated premises. Before starting the machine on enclosed premises, make sure that there is sufficient ventilation.

Observe the regulations in force at the respective site.

Carry out welding, flame-cutting and grinding work on the machine only if this has been expressly authorized, as there may be a risk of explosion and fire.

Before carrying out welding, flame-cutting and grinding operations, clean the machine and its surroundings from dust and other inflammable substances and make sure that the premises are adequately ventilated (risk of explosion).

Hydraulic equipment

Check all lines, hoses and screwed connections regularly for leaks and obvious damage. Repair damage immediately. Splashed oil may cause injury and fire.

Depressurize all system sections and pressure pipes (hydraulic system) to be removed in accordance with the specific instructions for the unit concerned before carrying out any repair work.

Hydraulic lines must be laid and fitted properly. Ensure that no connections are interchanged. The fittings, lengths and quality of the hoses must comply with the technical requirements.

Noise

During operation, all sound baffles of the machine must be closed.

Always wear the prescribed ear protectors.

Oil, grease and other chemical substances

When handling oil, grease or other chemical substances, observe the product-related safety regulations (see safety specifications).

Be careful when handling hot consumables (risk of burning or scalding).

Transporting and recommissioning

The machine must be loaded and transported only in accordance with the operating instructions.

Use only appropriate means of transport and lifting gear of adequate capacity.

The recommisioning procedure must be strictly in accordance with the operating instructions.

Excavator layout

Fig. 2-1:

Undercarriage

1 - Track drive
2 – Idler
3 - Track roller
4 - support roller
5 - Crawler track
6 - Track tensioner
7 - Slewing ring
8 - Ladder

Superstructure

10 - Engine
11 - Radiator (engine cooling liquid)
11 - Reservoir (cooling liquid)
13 - Air-intake system
14 - Exhaust system
15 - Fuel tank
16 - Hydraulic oil reservoir
17 - Hydraulic oil cooler
18 - Engine oil reservoir (optional)
19 - Pump transfer gearbox
20 - Working pump
21 - Cooling oil pump
22 - Servo system pump 35 bars
23 - Servo system pump 60 bars
24 - Gearbox circulating pump
25 - Slewing pump
26 - Fan drive pump (cooler, hydraulic oil)
27 - Fan drive pump (radiator, engine cooling liquid)
28 - Air compressor drive (air conditioning system)
29 – Slewing gear
30 – Travel block and rotor
31 – Driver`cab
32 – Control stand with BCS
33 – Control cabinet
34 – Air conditioner (optional)
35 – Fire-extinguisher
36 – Control cabinet with battery main switch
37 - Batteries
38 - Service-station, (tanklift)
39 - Ladder
40 - Ladder
41 - Grease container for central lubrica ting system
42 - Tool cabinet (optional)
43 - Counterweight

Backhoe bucket

53 - Stick
55 - Boom cylinder
56 - Stick cylinder
59 - Monoblock boom
60 - Backhoe bucket
61 - Backhoe cylinder
62 - Toggle link
63 - Toggle lever
64 - Control valves
65 - Quick-action valve

Automatic fire-extinguishing system (optional)

The automatic fire-extinguishing system prevents fire from spreading. It is, however, assumed that the machine is thoroughly cleaned of combustible and easily flammable substances.

The excavator operator and the maintenance personnel must familiarize themselves with the automatic fire-extinguishing system.

Such instruction should be given by a qualified instructor.

The fire-extinguishing system is activated automatically in an emergency.

Refill extinguishers immediately after use ready for further deployment.

In an emergency the fire-extinguishing system is actuated automatically.

Nevertheless particular extinguishing circuit e. g. engine 1 or 2 (LH or RH) can be actuated manually.

Inspection

Have the extinguishing system inspected regularly by an expert. This is required by authorities and insurance companies and is in the interest of your own safety.

Have the fire-extinguishing system checked at the prescribed intervals by authorized testing agencies.

Fig. 2-23:

No.	Element		Function	Symbol
51	**Button**		Not connected	
52	**Button**	**Starting (left engine 1)**	Starts the engine Hold switch approx. 5 – 7 sec. This is necessary to start and pressurize the engine`prelup system After then the engine starts automatically.	START
53	**Button**	**Stopping (left engine 1)**	Shuts off the engine	STOP
54	**Switch**	**Idling (left engine 1)**	Shuts off the engine with 5 minutes`after run.	IDLE
55	**Button**	**Engine monitor (left engine 1)**	Diagnose ON/OFF	
56	**Speed adjustment**	**Potentiometer (left engine 1)**	Regulates the engine speed ▪ turn CCW to limit stop: idling speed ▪ turn CW to limit stop: full-load speed	n / min
57	**Button**	**Engine monitor (left engine 1)**	Listing of fault codes see warning lamps (41 and 42) Increment Decrement	

Fig. 2-28:

No.	Element		Function	Symbol
101	**Button**	**Counting dumper**	Reset with switch (92)	
102	**Button**		Not connected	
103	**Button**	**Boom floating position**	If actuated: boom cylinders are pressurized when retracted ⚠ **Actuate button (103) only when control lever (116) is in "0" position.**	
104	**Button**	**Warning signal**	Activates the horn	
105	**Button**	**Electronic excavator control**	Switches the electronic excavator control on and off.	
112	**Pedal**	**Travelling, left track**	forwards / reverse	
113	**Pedal**	**Travelling, right track**	forwards / reverse	
114	**Foot rest**			
115	**Control lever**		Lifts and lowers the bucket / backhoe bucket stick; Slews and brakes the superstructure.	
116	**Control lever**		Raises and lowers the boom; Tipping and rearward tilting of bucket resp. backhoe bucket.	
117			Not connected	
118	**Button**	Dumper count	To the left – increment count. To the right – decrement count.	

Switching the electrical system on and off

The electrical system is switched on with key-switch (32, Fig. 2-43:). Insert key into key-switch and turn to the right.

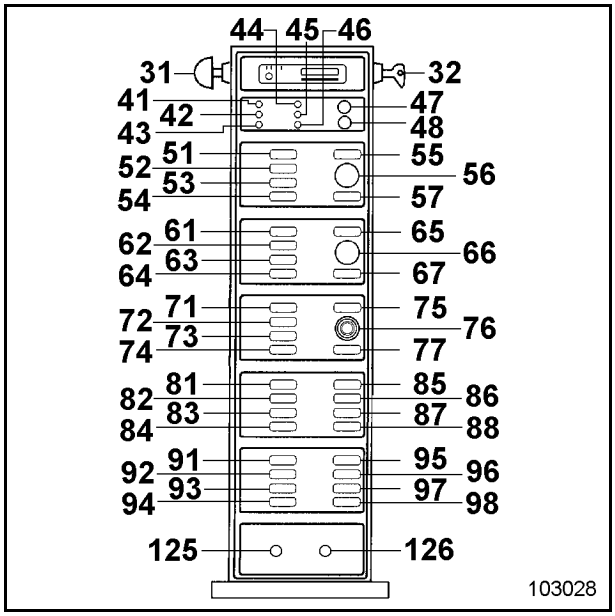

Fig. 2-43:

Battery main switch

The battery main switch is installed in the control cabinet (1, Fig. 2-44:) behind the hydraulic reservoir. The battery main switch disconnect the complete electrical system from the batteries. In the "OFF" position, the battery main switch

- prevent unauthorized starting of the engines
- protect the batteries against inadvertent discharge.

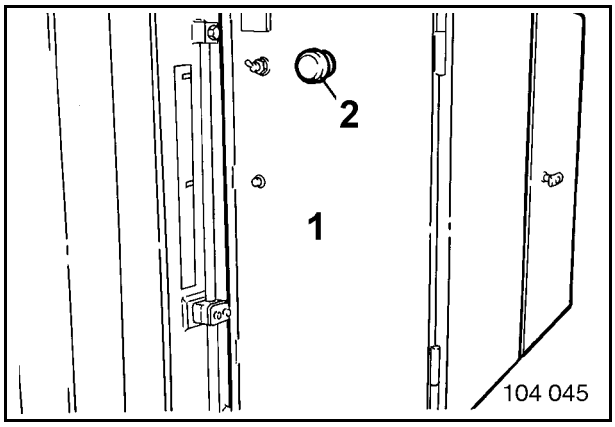

Fig. 2-44:

Only the automatic fire-extinguishing system (optional) remains connected to the power supply even when the battery main switch is in the "OFF" position.

The battery main switch is automatically set to OFF when the the electrical system is switched off with key switch (32, Fig. 2-43:).

Emergency machine drive

Moving the excavator after failure of the hydraulics

The weight of the excavator, the resistance of the crawler tracks and the high reduction in the travel gearboxes make towing or pushing of the excavator in the event of a failure or of defects in the hydraulic system impossible.

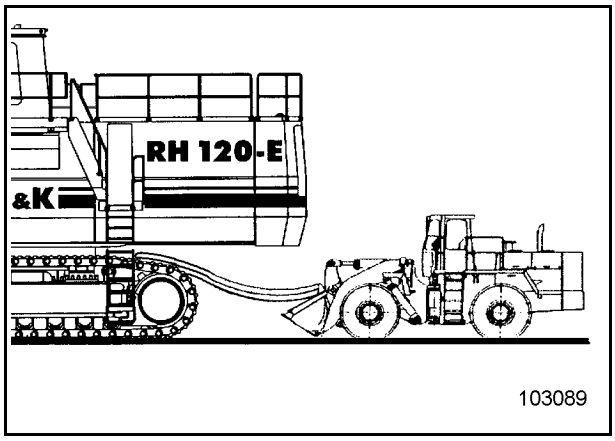

Fig. 2-62:

The excavator can therefore only be moved with the help of another machine (Fig. 2-62:) (wheel loader or grader). The machine used as auxiliary machine must be equipped with a dual-circuit hydraulic system.

Required equipment

- a self-propelled machine with a dual-circuit hydraulic system

max. working pressure	380 bars
min. working pressure	220 bars
pump discharge rate	150 l/min

These are minimum values. The pump discharge rate indicated corresponds to an excavator travelling speed of ca. 3 m/min.

- 4 high-pressure hoses ca. 11 m long; DN 40 1 ½“ SAE Connection at one end; ready for connection to the auxiliary machine at the other.
- 4 plugs (high-pressure type) for 6000 PSI 1 ½“ SAE connections.

Securing the machine

Carry out work on the attachment only if the machine is secured as described in the "Securing the machine" section.

Securing the machine

Selecting the attachments

The machine can be equipped with various attachments. The components of the attachments are assembled with hydraulic cylinders and connectors. Components can be combined in various ways for optimum adaptation of the attachments to the specific application.

Operate the machine only with the equipment and component combinations expressly approved by Terex-GERMANY for this type of machine.

Never install and commission other equipment and component combinations without Terex-GERMANY first having inspected and approved the project in writing.

Protective roof against falling objects

The machine is equipped with an integrated cab-protection roof (FOPS).

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 ist attachments supported on the ground and its driving motors 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 depressurzized:

(do not leave the driver's seat)

- Stand working equipment on the ground
- Shut off the engines
- Move all control levers and pedals repeatedly into all ndirections.

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 leakages with the fingers, but use a piece of cardboard and always wear goggles.

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.

Plan N

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

Location	Servicing work	Quantity/ No.
After 100 Bh		
Engine		
- Bearing		
- Fastening screws	Check for tightness	
Cooling system		
Water filter	Replace	2 x 1
Radiator		
- Bearing		
- Fastening screws	Check for tightness	
Hydraulic system		
Oil cooler		
- Bearing		
- Fastening screws	Check for tightness	
Return-flow filter	Replace	7
Return-flow filter (cooling circuit)	Replace	2
Magnetic rod	Clean	1
Pressure accumulator – emergency lowering	Check function	1
Pressure accumulator - ramp-type ladder (optional)	Check function	1
Pump transfer gearbox	Change oil	2 [3]
- Pre-chambers	Change oil	2 x 3 [3]
Slewing gearbox	Change oil	2 [3]
Fastening screws	Check for tightness	
- Brake chambers	Change oil	2 [3]
Travel gearbox	Change oil	2 [3]
- Pre-chambers	Change oil	2 x 1 [3]
- Brake chambers	Change oil	2 x 2 [3]
Fastening screws	Check for tightness	

[3] cf. “Refilling quantities – Oil“ table

SERVICING WORK

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Hose line for oil and cooling liquid changes

Collect escaping oil and cooling liquid and discard without polluting the environment.

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

Filling and draining is can be done by means of a hose through the service station (tanklift) (Fig. 3-7:).

For filling and draining, a flexible hose is connected to the express coupling on the service station and to the service vehicle at the other end.

The filling operations require an overpressure, whereas the draining operations require low pressure.

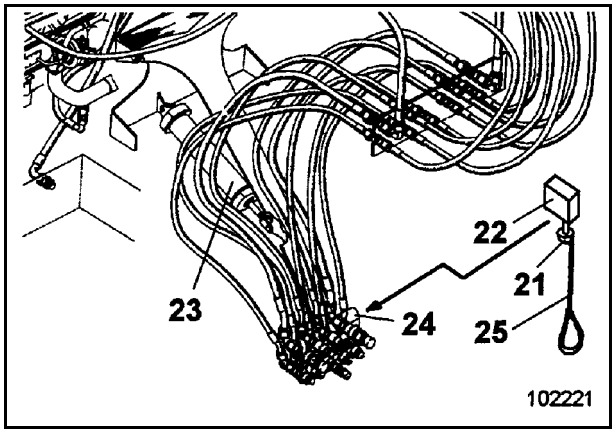

Fig. 3-7:

The engines, the hydraulic oil reservoir, the pump transfer gearboxes, the slewing gearboxes and the radiators (engine cooling liquid) are moreover equipped with automatic drain valves (1, Fig. 3-8:)

These automatic drain valves permit oil- and cooling-liquid changes without polluting the environment.

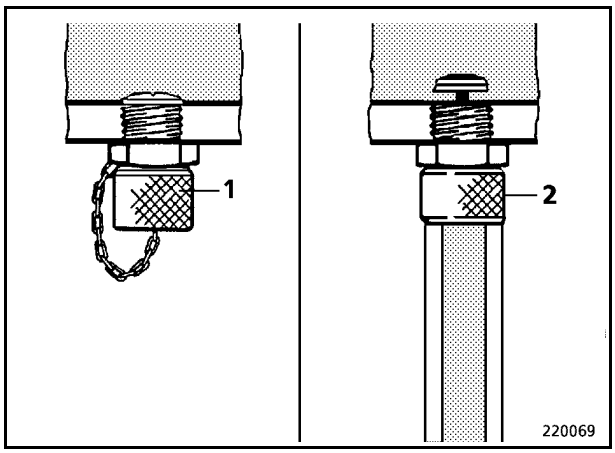

Fig. 3-8:

Change oil or cooling liquid as follows:

- Place a collecting recipient for used oil or cooling liquid under the corresponding automatic drain valve. For the recipient capacity refer to the "Re-filling quantities - Oil" table or to the "Refilling quantities - Other" table.
- Unscrew protective cap from automatic drain valve.
- Screw on hose line (2) to open the valve, so that the oil or the cooling liquid can flow out.
- When the oil or the cooling liquid has drained away, unscrew hose line to allow the valve to close automatically.
- Screw protective cap back in place.

Topping up cooling liquid

Fill cooling liquid through filler tube (1, Fig. 3-27:) orthrough express coupling (7, Fig. 3-28:) into the cooling system.

➲ Unscrew cap of express coupling. Connect the filling hose.

The hose line and its use are described in the "hose line for oil and cooling liquid change" section.

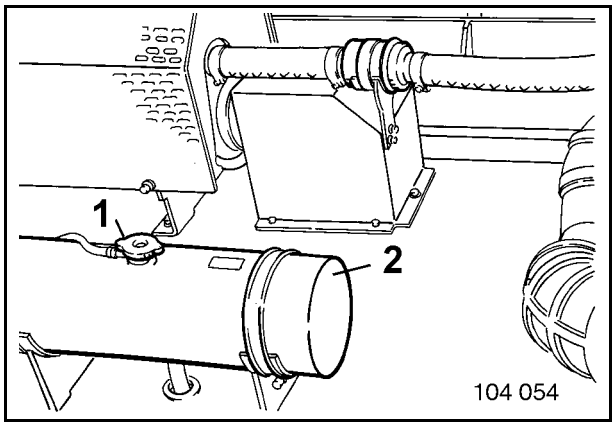

Fig. 3-27:

Do not fill in cold cooling liquid when the engine is at operating temperature.

Before refilling, allow engine to cool down to below 50° C

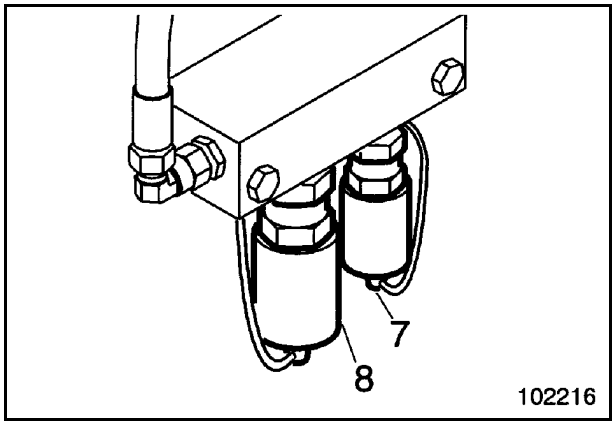

Fig. 3-28:

For topping up of the cooling system use specially prepared water only.

Specially prepared water must consist of:

- calcium-free water, distilled water, rain water
- anti-freeze compound

The anti-freeze compound must always be filled into the system independent of climatic conditions.

In this case, it serves as corrosion protection for the aluminium cooler.

The mixing ratio of anti-freeze / cooling water must be at least 50 % : 50 % (anti-freeze protection down to -40 °C).

For use at lower temperatures, the amount of anti-freeze must be increased accordingly.

After filling in cooling liquid allow the engines to run for short period to eliminate air voids before topping up with cooling liquid to the lower edge of the filler tube.

➲ Remove hose from express coupling. The express coupling closes automatically.

➲ Screw on protective cap.

In case of significant cooling-liquid losses, the whole cooling system must be checked for leaks.

Check regularly:

➲ all lines for leaks and all hose clamps for tightness.

Checking the DAC concentration

Observe the instructions of the engine manufacturer with regard to the DAC concentration (see engine manufacturer's operating instructions).

Water trap (option)

Water contained in the fuel is removed by the water trap (Fig. 3-46:).

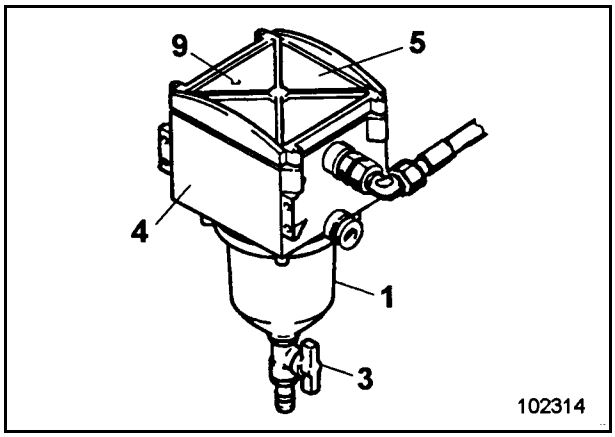

Fig. 3-46:

Servicing

Draining off water

Carry out the following works in accordance with the servicing schedule and at regular intervals:

➲ Loosen venting plug (9, Fig. 3-47:) and leave drain valve (3) open until there is no more water in the diesel fuel flowing out of the valve.

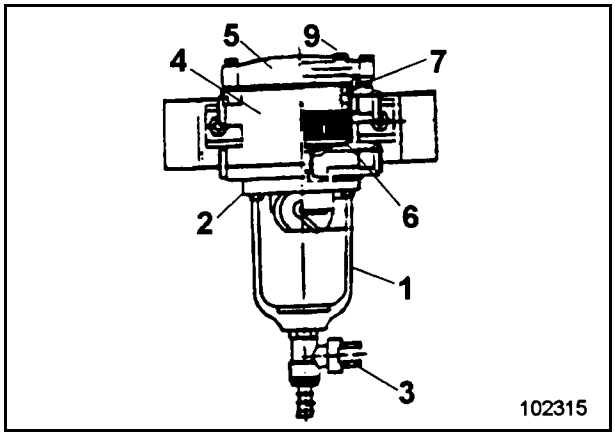

Fig. 3-47:

Collect escaping liquid in a recipient suitable for diesel fuel and discard without polluting the environment.

The liquid flowing out of the valve flushes and cleans the filter element(6) von from top to bottom.

➲ Close drain valve (3) and tighten venting plug (9).

Examples of system sections:

1) working hydraulics
2) servo control circuit
3) precharged return-flow line

Depressurizing

- ➲ Park the excavator on a horizontal surface.
- ➲ Set the working equipment on the ground.
- ➲ Shut off the drive engines.
- ➲ Do not switch off the electrical system

Sections 1 and 2: servo control and working hydraulics

- Shift both control levers repeatedly into all dIrections (Fig. 3-64:).

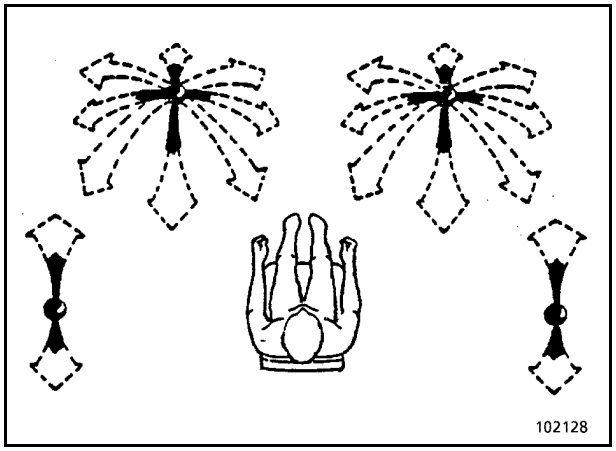

Fig. 3-64:

Section 3: return-flow line

After shutting down the engine, the precharging pressure decreases rapidly through the precharging valve. No measures are required before opening the return-flow line.

Checking the hydraulic oil level

- ➲ Bring hydraulic oil to operating temperature (abt. 50 °C).
- ➲ Park the machine on a horizontal surface.
- ➲ Move all hydraulic cylinders to their central positions.

The oil level must lie between the ½ and ¾ marks of the inspection glass (1, Fig. 3-65:).

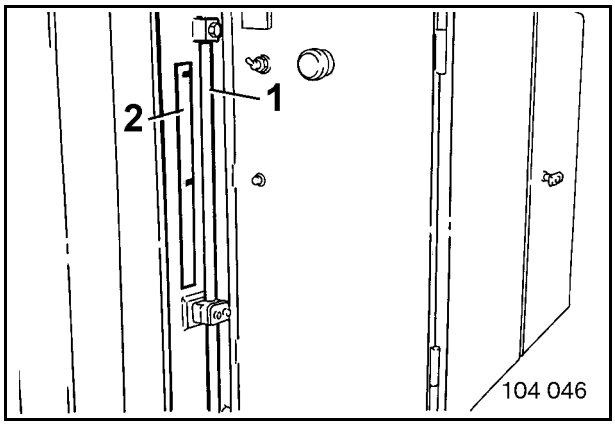

Fig. 3-65:

The hydraulic oil level is monitored by the BCS. The BCS displays a warning on the screen (Fig. 3-66:) if the hydraulic oil level is too low or too high.
Shut off the engines, locate cause and rectify.

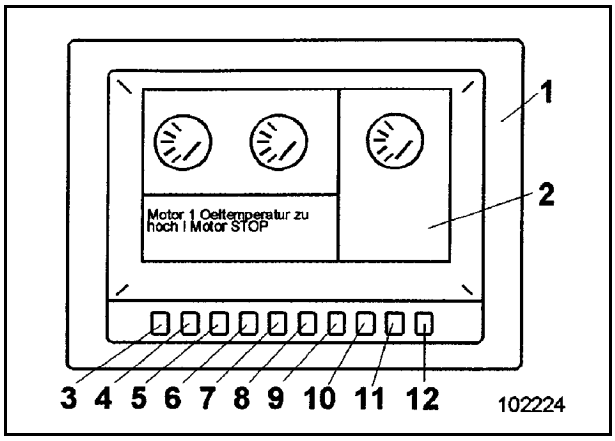

Fig. 3-66:

High-pressure filters for slewing circuit

Each of the two slewing circuits is equipped with a high-pressure filter (Fig. 22).

The filter elements (2, Fig. 23) are only to be cleaned/changed if necessary.

Read and observe: "Inspection and servicing - Safety instructions".

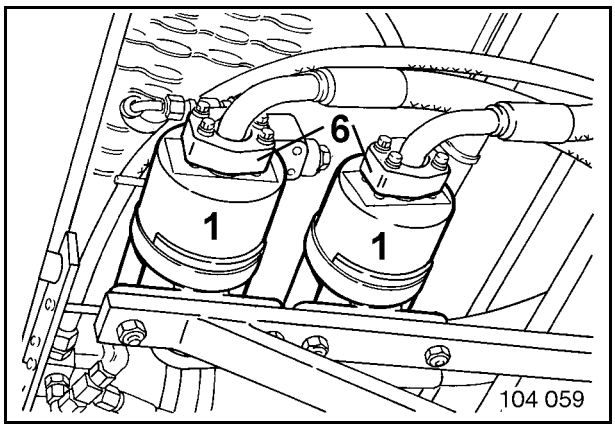

Fig. 3-83:

Shut off the engines.

Risk of scalding from hot hydraulic oil.

The filter housings may also be hot.

Avoid skin contact.

Skin contact with hydraulic oil may cause skin injury.

Wear protective gloves and firm protective clothing.

Collect escaping hydraulic oil and discard without polluting the environment.

Checking/cleaning the filter elements

- Loosen flange (6, Fig. 3-83:).
- Unscrew cover (5, Fig. 3-84:).
- Withdraw filter element (2) together with sealing ring (3) and retaining ring (4) from housing (1).
- Clean filter element (2) with white spirit or paraffin oil.
- Insert filter element into filter housing (1) and refit with new, lightly oiled sealing ring (10) and a new retaining ring (4).
- Screw cover (5) into housing (1).
- Refit flanche (6, Fig. 3-83:) to housing (1).
- heck high-pressure filter for leaks after putting it into operation.

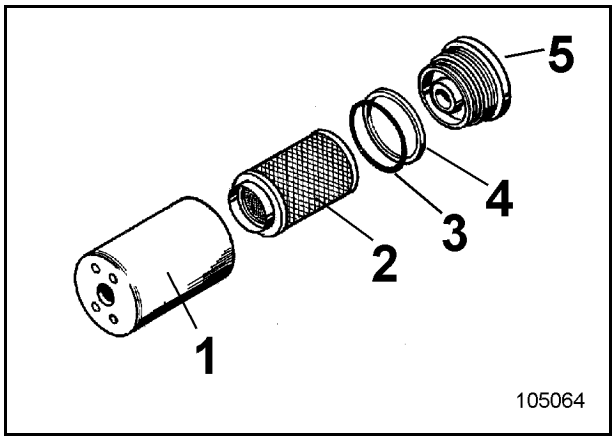

Fig. 3-84:

Pre-chamber

Draining off oil

➲ Prepare a collecting recipient for used oil.

Choose the required capacity in accordance with the "Refilling quantities - Oil" table.

➲ Unscrew plug (7, Fig. 3-102) and drain off oil.

➲ Screw plug (7) back in place.

Filling in oil

Filling in oil cf. “Check oil level”

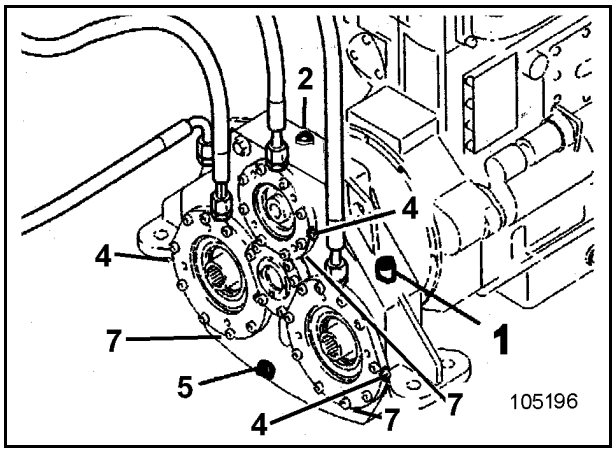

Fig. 3-102

Gearbox venting

The gearbox is vented through breather valve (2, Fig. 3-103:).

Clean breather valve (2) in accordance with the servicing plan.

➲ Unscrew breather filter (2), clean with white spirit or paraffin oil and blow dry with compressed air.

➲ Screw breather filter (2) back in place.

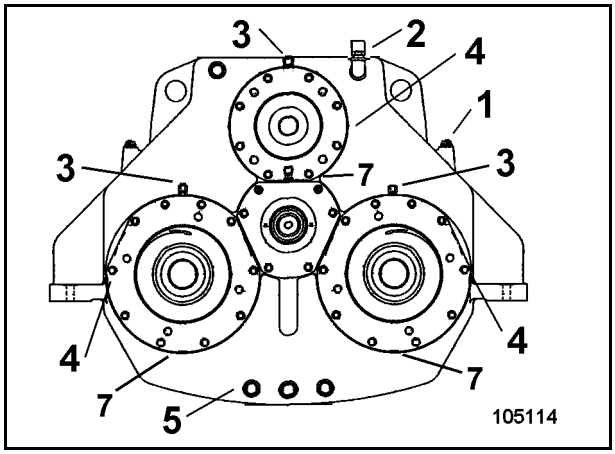

Fig. 3-103:

Pre-chamber

The gearbox is vented through breather valve (2, Fig. 3-104:).

Clean breather valve (2) in accordance with the servicing plan.

➲ Unscrew breather filter (2), clean with white spirit or paraffin oil and blow dry with compressed air.

➲ Screw breather filter (2) back in place.

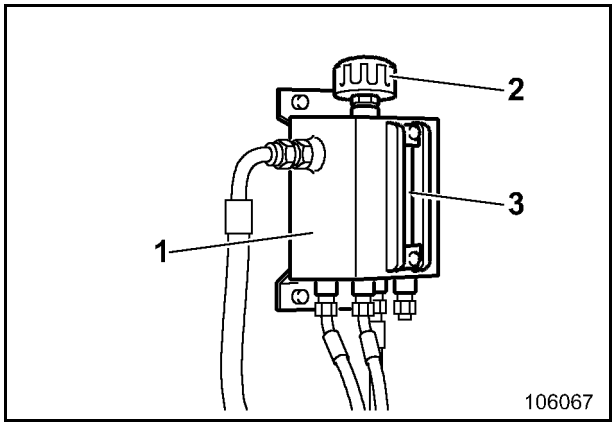

Fig. 3-104:

Track tensioner

Design

The tracks are tensioned with the help of the hydraulic pressure created during travelling. Fig. 3-120:and Fig. 3-121: show parts of the tracks and the tensioner:

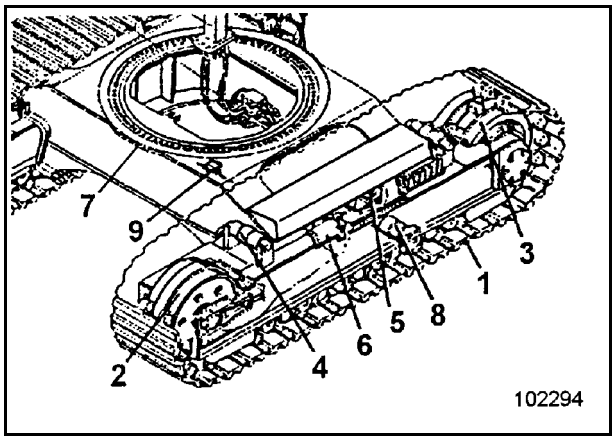

Fig. 3-120:

1 Crawler track
2 Idler
3 Drive sprocket
4 Support roller
5 Pressure accumulator
6 Pressure cylinder
7 Pressure limiting valve
8 Track roller
9 Mini- measuring port

Techncal data

Track tensioning pressure	ca. 70 bars
Pressure limiting valve	330 bars
Gas pressure in pressure accumulator (nitrogen filling pressure)	56 bars

Function

The tensioning system is under permanent pressure of ca. 70 bars which keeps both tracks permanently tensioned. Pressure losses are compensated as soon as the engines have been started. Retensioning is not required.

For cleaning and servicing work, the tracks can be slackened.

To do so:

- ➲ stop the engines
- ➲ open both pressure limiting valves (7, Fig. 3-121:) to slacken the tracks.
- ➲ After the work, screw down the pressure limiting valves (7) to the limit stop.

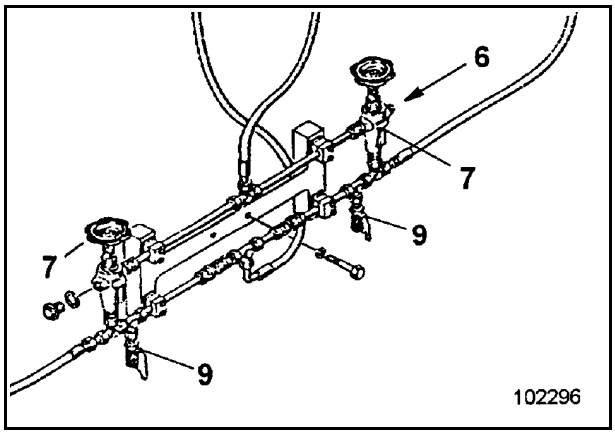

Fig. 3-121:

The pressure-limiting valves (7) are preset to a pressure of 330 bars and sealed in this position. The lead seal must not be removed and the pressure setting of 330 bars must not be changed.

The track tensioners are maintenance-free.

OTHER MAINTENANCE

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Engine

Information about maintenance can be found in the engine operating instructions.

Further servicing works not described are carried out by the Terex-Germany Service or the engine manufacturer.

Cleaning

Check the engines regularly.

- If the engine is cleaned with a steam-jet cleaner, make sure that the jet is not directed towards electrical components.
- If no steam-jet cleaner is available, the engines must be cleaned with suitable cleaning agents (cold cleaners).

Means of fastening

➲ Check fastening screws regularly for tightness.

The seating planes of the screws must be free from paint, dirt and rust.

Cooling system

Check the radiators regularly.

➲ Shut off the engines.

➲ Remove any accumulated dirt.

➲ Clean the fan blades.

➲ Clean the radiators with a jet of water or compressed-air from the outside.

➲ Dry up coolers.

Do not clean radiators with a wire brush or similar hard objects.

In case of firmly adhering dirt, remove radiator and clean.

Exhaust system

Check the fastening screws regularly for tightness when the exhaust system is cold.

Heating and air conditioning

Change the filter mats in the air suction regulary.

The filter mats are located under the driver`seat.

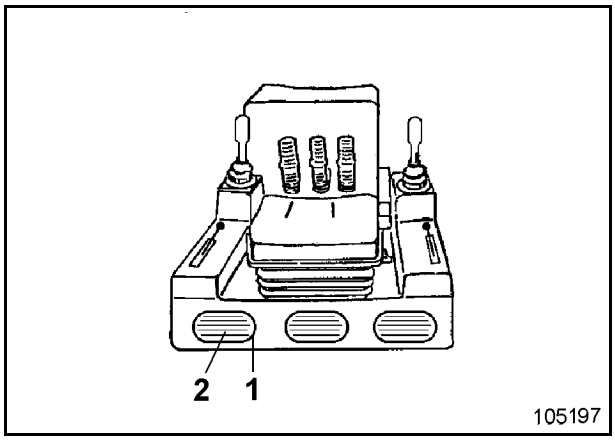

Fig. 3-138:

➲ Remove cover (1, Fig. 3-138:)-

➲ Change filter mats (2)

➲ Fasten cover (1) again.

FIRE AND EXPLOSION HAZARD

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Safety Instructions

Prior to commencing work, inform

- **on the national and corporate rules for prevention of accidents. Pay particular attention to hazards caused by combustible and easily flammable substances.**
- **on the safe handling of the fire extinguishers to be used.**

Avoid smoking and open fire on, next to and below the excavator.

Combustible and easily flammable substances or liquids increase the fire and explosion hazard.
Do not store or handle any flammable substances during operation.

Clean the excavator thoroughly, if possible, with a steam jet (rubber parts and electric components with compressed air - refer to information label), when, for example, oil, grease, fuel or cleaner was spilled.

Such substances may spontaneously ignite if they get into the vicinity of hot units or objects such as turbo superchargers.
Even battery gases can ignite in open flames or fire.
Avoid parking the excavator in places where

- combustible substances such as coal dust or tar are present.
- open or smouldering fire may occur.

Remove the excavator from such an area where combustible or easily flammable liquids have spilled from the excavator onto the ground.

Flying sparks (caused by welding, flame cutting, grinding, electrical short-circuit) may cause fire on the ground that can spread to the excavator.

Place suitable fire guardings (fire barriers) if open fire or flying sparks cannot be avoided during repair work. Apply special protection to cables, cable ducts as well as to hose and pipe lines.

If necessary, also cover the ground with fire-protective blankets.

Ensure sufficient ventilation.

Clean the excavator before starting a job.

Do not keep any fire extinguishers that are not suitable or have not been tested.

Do not extinguish flammable liquids with water.
Use:

- dry-powder,
- carbon-dioxide or
- foam extinguishing compounds.

When getting into contact with burning substances, the fire-fighting water would abruptly evaporate and distribute the substance such as oil over a wide area. Water causes short-circuits in the electrical system thus possibly entailing new hazards.

Call the fire brigade.

Have all your welding, flame cutting and grinding work approved.

5 ANNEX

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	Operating instructions	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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ABBREVIATIONS

A	Four-wheel drive
A	Ampere (SI base unit of electric current)
A2	2-point bracing (claws)
A4	4-point bracing (claws)
abt.	about
ABE	General Operating Permit [Germany]
acc.	according to
Ah	Ampere hours (SI base unit of quantity of electricity)
AOT	Upper part of boom
API	American Petroleum Institute
approx.	approximately
AUT	Lower part of boom
BA	= OI = Operating instructions
Bh	= OH = Operating hour
CE	Communauté Européenne = European community
CECE	Committee for european Construction Equipment (Defines a measure for bucket, grab or scoop filling)
CEN	European Standardization Committee
cm	centimeter (= $^{1}/_{100}$ m)
cm^3/rev	Cubic centimeters per revolution
dB(A)	Decibel (sound intensity according to measuring method A)
dia.	Diameter
DIN	German Industrial Standard
EDS	Electronic diagnostic system
eff.	effective
e.g.	for example
etc.	etcetera
Fig.	Figure, serial number of illustration
FOPS	Falling objects protective structures
FS	Rock shovel (working equipment)
GLR	Full-load controller (electronic module for PMS)
HD	Heavy duty
HDS	Heavy duty small
Hydr.	Hydraulic, Hydraulics
i	Transmission ratio
i.e.	id est = that is
IFN	ISO service rating, blocked
Incl.	including, inclusive of
ISO	International Standardization Organization
kg	Kilogram (unit of weight)
kg/dm^3	Kilograms per cubic decimeter (= unit of specific density)
km/h	Kilometers per hour
kNm	KiloNewtons per meter (1 kNm = 1000 Nm) = unit of torque
kW	Kilowatt (1 kW = 1.36 hp)
l	Liter
Lb/in^2	Pounds per square inch (= psi)
LC	Long crawler
LDA	Charge pressure-dependent full-load limiter
LED	Light-emitting diode
l/min	Liters per minute
LpA	Sound pressure at workplace
LPS	Load-sensing Power System
LS	Limited slip
LS	Load sensing
LwA	Sound power level of the machine in stationary operation
m	Meters
M_A	Tightening torque
MA	Milliampere (=$^{1}/_{1000}$**A**)
max.	maximal, maximum
MH	Mobile hydraulics (excavator)
MHS	Mobile hydraulic excavator for road and rail operation
min.	minimal, minimum
min^{-1}	Revolutions per minute
mm	Millimeter (=1/1000 m)
MONO	Monoblock boom
N	Normal, standard version
N, kN	Newton, kiloNewton (unit of force)
NLGI	National Lubricating Grease Institute (USA)
NLGI--Klasse	Consistency - lubricant classification acc. to DIN 51 818
Nm	Newtonmeter (unit of torque)
No.	Number
OH	Operating hour
OLS	Terex load stabilization
op.inst.	Operating instructions
OW	Superstructure