SERVICE MANUAL

RAMMER S 55

Rammer

⚠ WARNING

Study this manual before installing, operating or maintaining this equipment. You must understand and follow the instructions in this manual. You must observe all relevant laws and regulations. Otherwise You and/or others can be seriously injured.

For Rammer Hydraulic Hammers from Serial Number:

55A02XXX/A01

Publications:	S 55 Operation and Maintenance Manual,	AS55022
	S 55 Service Manual,	AS55024

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C O N T E N T S

1. INTRODUCTION

General information

This manual instructs you on your Rammer hammer and its safe operation and maintenance. Study this manual before installing, operating or maintaining this equipment. The hammer is a powerful tool. Used without proper care, it can cause damage. Use it properly and use it well. Chapter 2 *Operation* is arranged to guide you how to operate the hammer safely.

Pay particular attention to all safety messages. They are there to warn you of possible hazards.

⚠ WARNING

Denotes a hazard exists. If proper precautions are not taken you/others could be seriously injured.

CAUTION!

Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator/others and possible damage to the equipment.

To use the hammer correctly, you must also be a competent operator of the carrier machine. Do not use or install the hammer if you can not use the carrier machine.

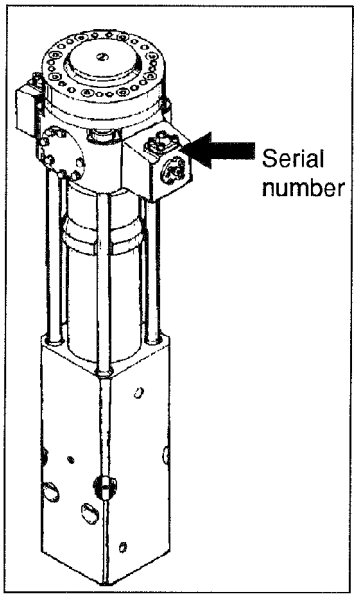
Do not rush the job of learning. Take your time and most important, take it safely.

If there is anything you do not understand, ask your Rammer dealer. He will be pleased to advise you.

REMEMBER

BE CAREFUL
BE ALERT
BE SAFE

Hammer model and serial number



This manual deals with the Rammer S 55. The equipment serial number is stamped on a metal plate, which is in the valve body, near return line connection.

It is important to make correct reference to the serial number of the hammer when making repairs or ordering spare parts. Identification of serial number is the only proper means of maintaining and identifying parts for specific hammer.

Using the manual

This manual is arranged to give you a good understanding of the equipment and its safe operation. It also contains maintenance information and technical specifications. Read this manual from front to back before using or maintaining for the first time. If you do not understand something or you are unsure, ask your Rammer dealer. Do not guess. Read all safety statements carefully. Be safe and be careful.

Page numbering system in this manual is not continuous. There is a gap of few pages between sections. This allows for the insertion of new pages in later issues.

In this manual, the units of measurement are metric. For example, weights are given in kilograms (kg). In some cases the other unit follows in parenthesis (). For example 28 liters (7.4 USgal).

good condition. If needed, your Rammer dealer will deliver you new manuals.

Warranty

The customer should be provided with a separate warranty sheet, where are explained warranty terms. Check always that this warranty sheet is provided with the hammer. If not, contact your Rammer dealer immediately.

Hammer card

A hammer card is filled after the installation inspection by the Rammer dealer and a copy of it is sent to the manufacturer. This card is very important because no warranty claims are handled without it. Make sure that you get a copy of it after the installation inspection and that it is correctly filled.

Spare part orders

When you need spare parts or some information concerning maintenance or your hammer, please contact your Rammer dealer.

Quick deliveries are secured by exact orders.

Required information:

1) Name of customer, contact person
2) Order number (when available)
3) Delivery address
4) Mode of delivery (air mail etc.)
5) Required delivery date
6) Invoicing address
7) Model and serial number of hammer
8) Name, number and required amount of spare parts

1.1 SAFETY - YOURS AND OTHER PEOPLE'S

All mechanical equipment can be hazardous if operated without care or correct maintenance.

In this manual you will find warning messages. Read them and understand them. They tell you of hazards and how to avoid them. If you do not understand the messages, ask your employer or your Rammer dealer.

Safety is not just a matter of responding to the warnings. All the time you are working with your Rammer hammer you must be thinking what hazards there might be and how to avoid them.
Do not workwith the hammer until you are sure that you control it.

Do not start any job until you are sure that you and those around you will be safe.

If you are unsure of anything, about your Rammer hammer or the job, ask someone who knows. Do not assume anything - check it out.

SAFETY CHECK LIST
General Safety

⚠ WARNING

Read carefully following warning messages. They tell you of different hazards and how to avoid them. If proper precautions are not taken you/ others could be seriously injured.

Manuals
Study this manual before installing, operating or maintaining the hammer. If there is anything you don't understand, ask your employer or your Rammer dealer to explain it. Keep this manual clean and in good condition.

Study also the operating and maintenance manual of your carrier before operating Rammer hammers.

Clothing
You can be injured if you do not wear proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job.

Examples are: a safety helmet, safety shoes, safety glasses, well-fitting overalls, ear-protectors and industrial gloves. Keep cuffs fastened.

Do not wear a necktie or scarf.

Keep long hair restrained.

Care and alertness
All the time you are working with the hammer, take care and stay alert. Always be careful. Always be alert for hazards.

Lifting equipment
You can be injured if you use faulty lifting equipment.

Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job and you know how to use it.

Tools
Do not use Rammer hammers or hammer tools for lifting. Contact your Rammer dealer to find out how to lift with your carrier.

CAUTION!

Read carefully following safety messages. Failure to follow these safety practices could result in injury to the operator/others and possible damage to the equipment.

Regulations and laws
Obey all laws, worksite and local regulations which affect you and your equipment.

SAFETY CHECK LIST
Operating Safety

⚠ WARNING

Read carefully following warning messages. They tell you of different hazards and how to avoid them. If proper precautions are not taken you/ others could be seriously injure.

Practice
You and others can be killed or injured if you do unfamiliar operations without practicing them first. Practice away from job site, on a clear area.

Keep other people away.

Do not perform new operations until you are sure you can do them safely.

Equipment condition
Defective equipment can injure you or others. Do not operate equipment which is defective or has missing parts.

Make sure the maintenance procedures in this manual are completed before using the equipment.

Equipment limits
Operating the equipment beyond its design limits can cause damage. It can also be dangerous.

Do not operate the equipment outside its limits.

Do not try to upgrade the equipment's performance by unapproved modifications.

Communications
Bad communications can cause accidents.

Keep people around you informed of what you will be doing. If you will be working with other people make sure they understand any hand signals you will be using.

Work sites can be noisy. Do not rely on spoken commands.

Work site
Work sites can be hazardous. Inspect the site before working on it.

Check for potholes, weak ground, hidden rocks etc. Check for utilities (electric cables, gas and water pipes etc.). Mark the positions of underground cables and pipes if you will be breaking the ground.

Metal splinters
You can be injured by flying splinters when driving metal pins in and out. Use soft-faced hammer or drift to remove and fit metal pins, such as pivot pins. Always wear safety glasses.

Banks and trenches
Banked material and trenches can collapse.

Do not work too close to banks and trenches where there is a danger of collapse.

Safety barriers
Unguarded equipment in public places can be dangerous. In public places, or when your visibility is reduced, place barriers around the machine, to keep people away.

CAUTION!

Read carefully following safety messages. Failure to follow these safety practices could result in injury to the operator/others and possible damage to the equipment.

The hammer must be greased regularly during operation. See Chapter 3 *Maintenance*.

Do not operate hammer as standard assembly under water, or it will be damaged.

Take care when lifting/handling. The Rammer S 55 including its tool, hoses and adapter, weighs 1270 kg (2800 lb).

SAFETY CHECK LIST
Maintenance Safety

⚠ WARNING

Read carefully following warning messages. They tell you of different hazards and how to avoid them. If proper precautions are not taken you/ others could be seriously injured.

Repairs and maintenance
Do not try to do repairs or any other maintenance work you do not understand.

Modifications and welding
Non-approved modifications can cause injury and damage. Contact your Rammer dealer for advice before modifying the hammer. Before welding on the hammer while it is installed on the carrier, disconnect the carrier alternator and battery. Note that welding of the Rammer hammer tools will render them useless and make the warranty void.

Hydraulic fluid
Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin get medical help quickly.

Accumulator
The hammer incorporates one pressure accumulator. The accumulator is pressurized even when there is no hydraulic pressure to the hammer. Attempting to dismantle the accumulator without first releasing the pressure can cause injury or death. Do not try to dismantle pressure accumulators, contact your Rammer dealer first.

Hydraulic pressure
Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the carrier engine and operate the controls to release pressure trapped in the hoses.

During hammer operation, keep people away from the hydraulic hoses.

1.2 RAMMER S 55

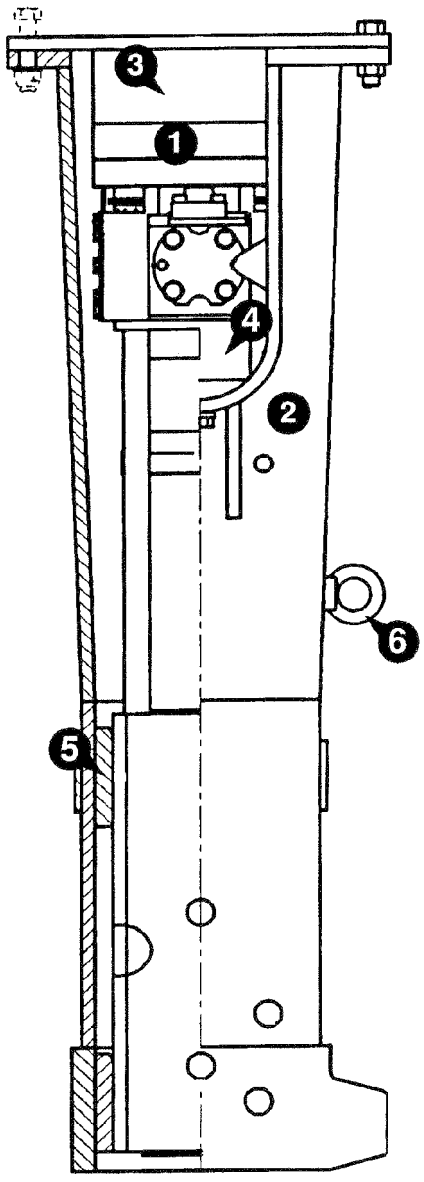
The purpose of this part of the manual is to introduce you to the Rammer S 55. The main parts of the hammer will be named and identified. What they do and how they do it will be briefly explained.

Your Rammer dealer will gladly give you more information if you want it.

General description

Key

1 Hammer
2 Housing
3 Buffer
4 Buffer
5 Wear plate
6 Lifting eye



The hammer is a hydraulically operated breaker. It can be used on any carrier which meets the necessary hydraulic and mechanical installation requirements (See *Technical specification).*

However, you should pay attention where and how you use your hammer.

S 55 is designed to be used in breaking concrete, asphalt and frozen ground. It can be used also in breaking moderate sized boulders as well as in demolishing reinforced structures and for french excavation, benching and clearing work.

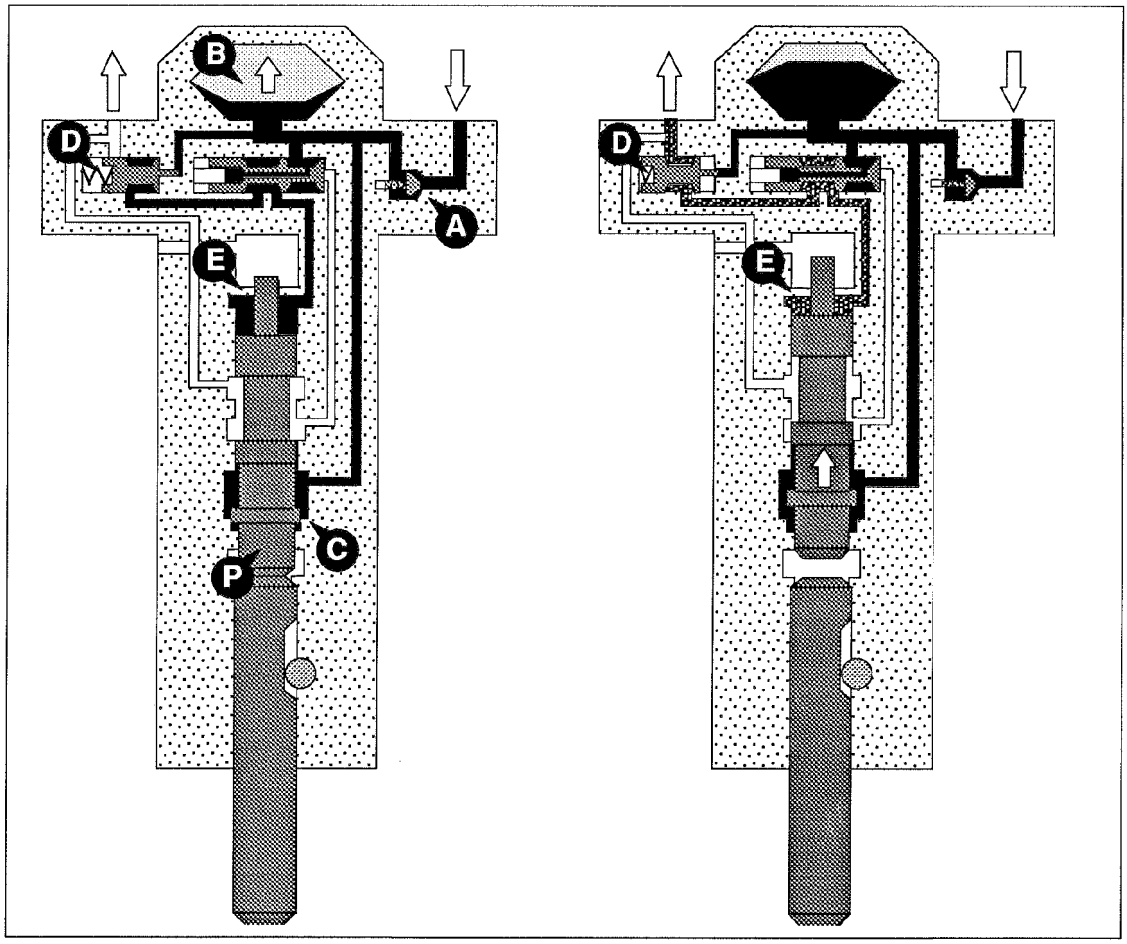
The hammer is located inside a housing, which protects the hammer's mechanism during operation.

Basically, the unit functions by repeatedly raising a steel piston and driving it down onto the head of a removable breaking tool.

No extra pressure accumulators are necessary since the internal pressure accumulator absorbs hydraulic pressure peaks. The impact energy of the hammer is constant and independent of the carrier's hydraulic system.

The operating principles of the hammer are described in the end of the Chapter 1 *Introduction.*

1.3 PRINCIPLES OF OPERATION



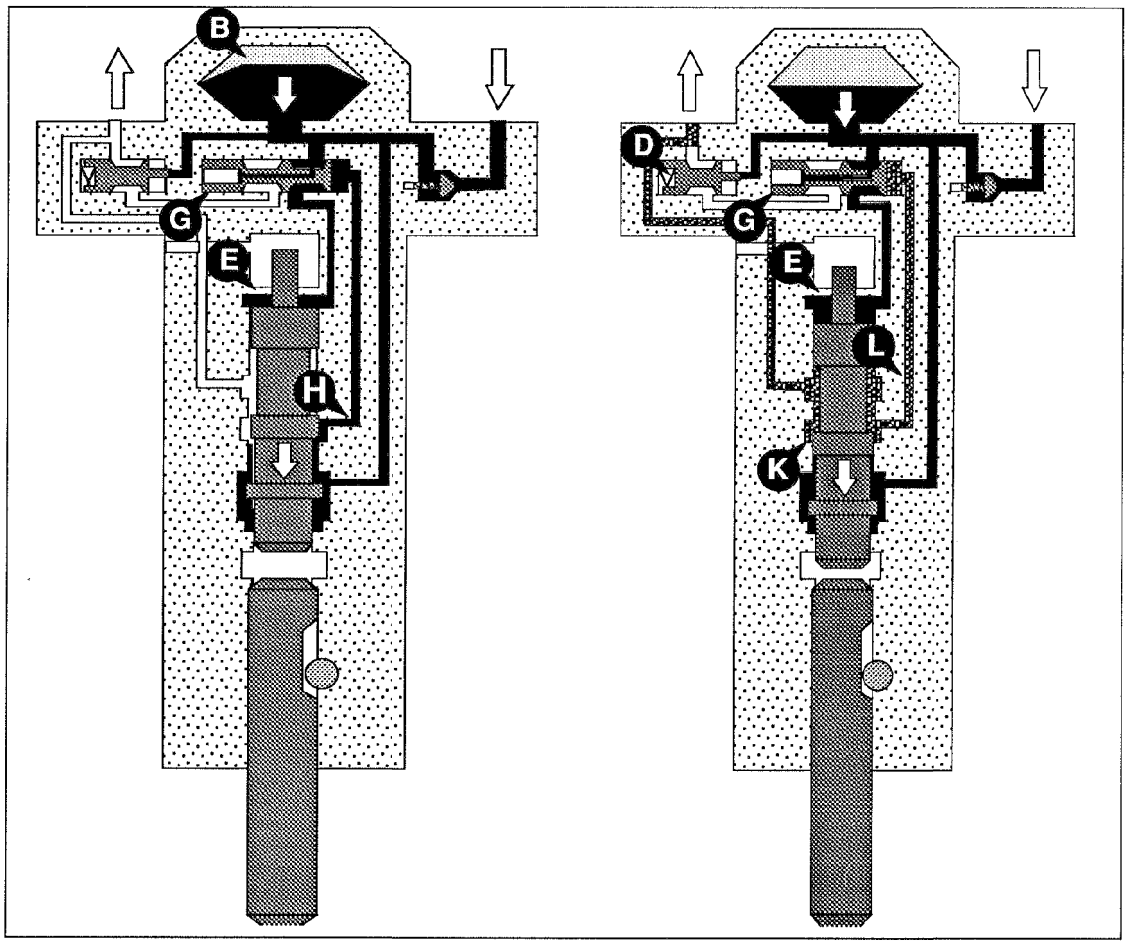
1) Start up

Oil flows through the check valve (A) into the accumulator (B) and to the space (C) under the piston (P). The pressure control valve (D) has closed the outlet channel from space (E) and prevents the piston to move. Pressure inside the hammer increases and compresses the nitrogen gas inside the accumulator.

2) Return stroke

When the preset operating pressure has been reached, the valve (D) opens the outlet channel from space (E) to tank line. Piston starts the return stroke, due to the pressure under the piston.

High pressure
Tank pressure



3) Impact stroke

In its highest position, the piston allows the pilot pressure to pass through the channel (H) to the other end of the main valve (G). Main valve changes position and opens the space (E) to the accumulator (B). The piston starts its impact stroke, during which oil is supplied from the accumulator.

4) Impact stroke (final stage)

Piston moves downwards with high velocity. Groove (K) in the piston connects pilot channel (L) to tank line. Main valve (G) starts to move back and connects space (E) to outlet channel. Moving of piston causes reduction in the accumulator pressure and activates the pressure control valve (D) to close the outlet channel. After the impact the piston remains in position until the oil pressure rises and the cycle is repeated (phase 1).

2. OPERATION

This chapter describes the correct working methods and how to choose the correct tool for the job. To increase the hammer's working life, pay particular attention to correct working methods.

The hammer is a powerful machine and lots of damage can be done if you do not know how to use the hammer well and safely.

Read this chapter before operating Rammer hammers.

Choosing tools

Rammer can offer a selection of standard and special tools to suit each application. The correct type of tool must be selected to get the best possible working results and longest life time for tool.

1. Blunt
- For igneous (e.g. granite) and tough metamorphic rock (e.g. gneiss) into which tool doesn't penetrate
- Concrete
- Breaking boulders

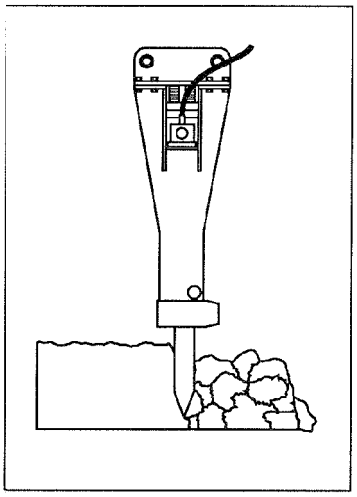
2. Chisel and Moil
- For sedimentary (e.g. sandstone) and weak metamorphic rock into which tool penetrates
- Concrete
- Trenching and benching

Principles of breaking

There are basically two ways of breaking with a hydraulic hammer:

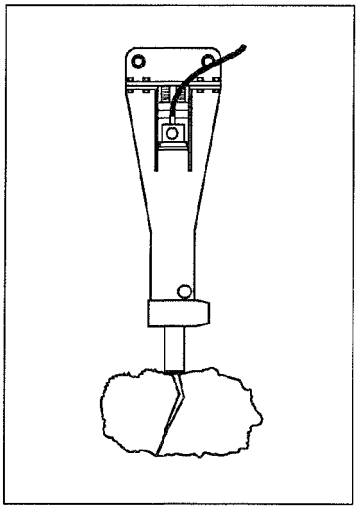
a) Penetrative (or cutting) breaking

In this form of breaking moil point or chisel tool is forced inside the material. This method is most effective in soft, layered or plastic, low abrasive material. Using of chisel in hard material will cause the sharp edge to wear very quickly.



b) Impact breaking

In impact breaking , material is broken by transferring very strong mechanical stress from the tool into material to be broken. Best possible energy transfer between tool and object is achieved with a blunt tool. Impact breaking is most effective in hard, brittle and very abrasive materials. The high impact energy of the S 55 makes it suitable for impact breaking.



2.1 CORRECT WORKING METHODS

1. Prepare the carrier for normal excavation work.

a) Move the carrier to required position.
b) Engage the parking brake.
c) Set the drive to neutral.
d) Disengage the boom lock (if fitted).

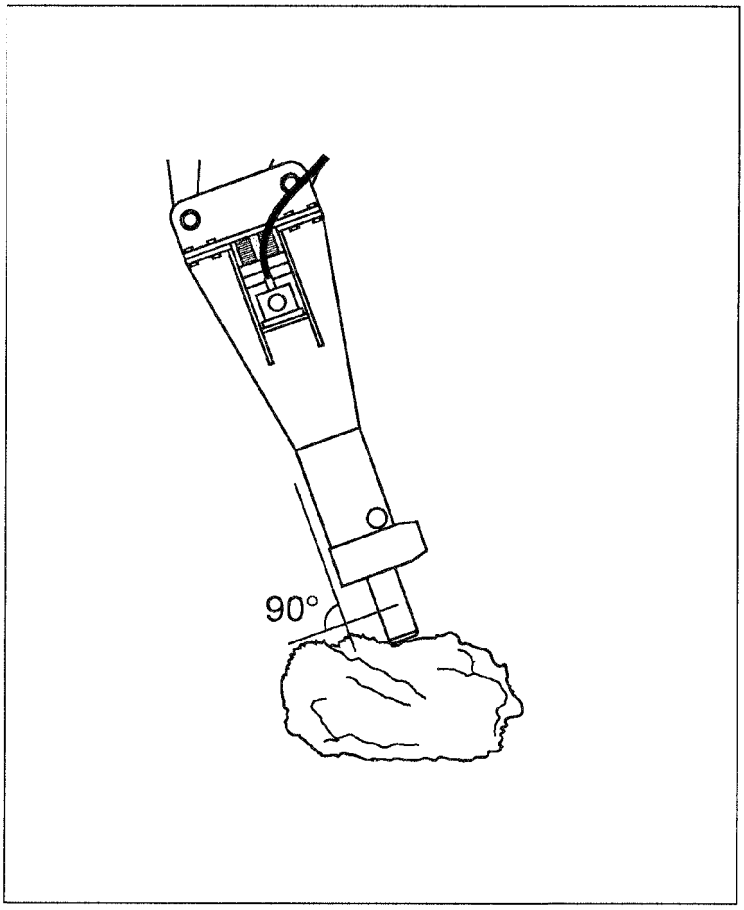
2. Set the engine speed to the recommended engine RPM.

3. Place the tool against the object at 90 degrees angle. Avoid small irregularities on the object which will break easily and cause either idle strokes or incorrect working angle.

4. Use the excavator boom to press the hammer firmly against of the object. Do not pry the hammer with the boom. Do not press too much or too little with the boom. Correct force is applied, when the front wheels or the front end of the excavator are about to rise into the air. It is no use to lift the front wheels more than 5 cm, the pushing force will be the same.

⚠ WARNING

Protect yourself and your neighborhood against flying chips of rock. Do not operate the hammer or carrier if someone is too close to the hammer.



5. Start the hammer

6. Do not let the tool move outwards from hammer when it penetrates. Keep boom down pressure on the hammer

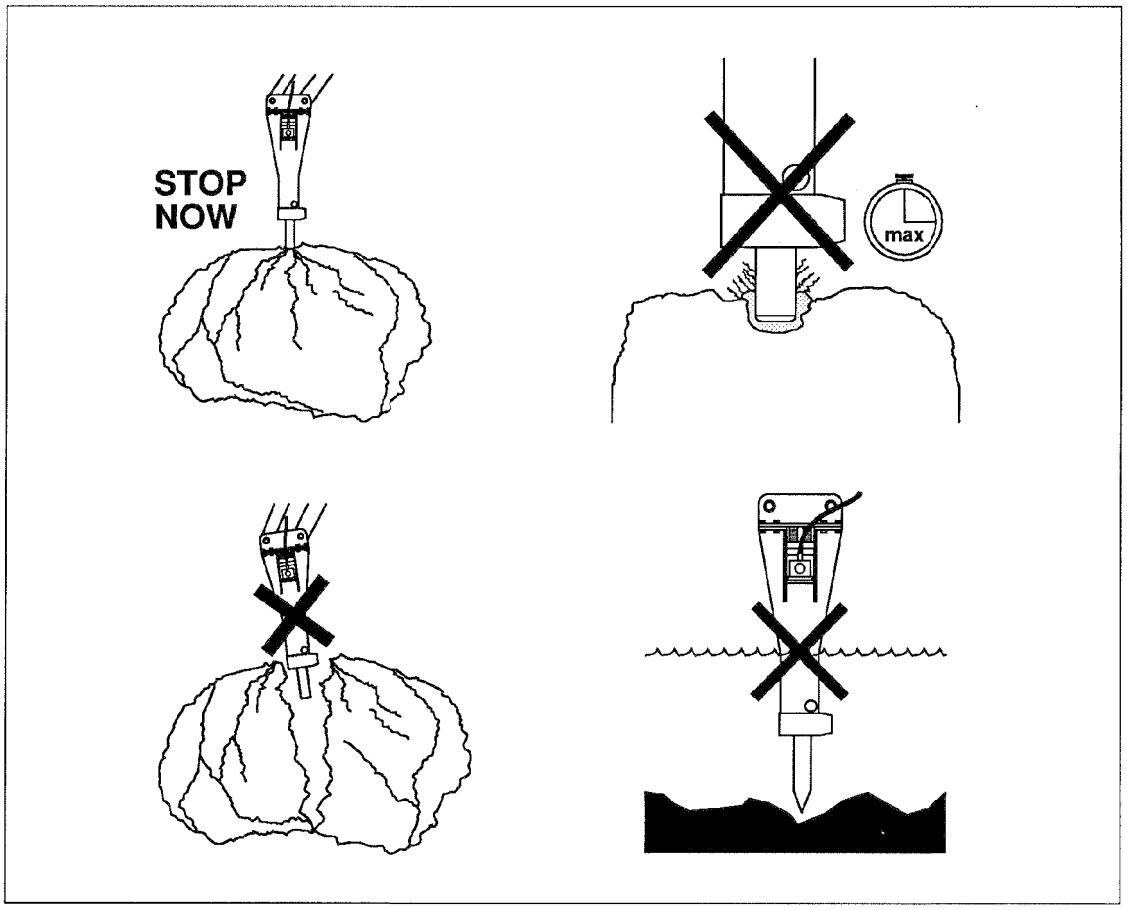
7. Keep the tool at 90 degrees angle at all times. If object moves or its surface breaks, correct angle immediately. Keep feed force and tool aligned.

8. Stop the hammer quickly. Do not allow the hammer to fall down and make idle strokes when object breaks.

   Constant idle strokes have a deteriorating effect on the hammer.

   If hammer falls down, the housing wears out more quickly.

9. Do not strike in one spot for more than 15 seconds at a time. If object does not



break, stop the hammer and change position of the tool. Working too long in one spot will make stone dust under the tool. Dust dampens impact effect.
Also tool will overheat which increases wear of tool.

10. When breaking concrete, hard or frozen ground, never strike and bend with the tool at the same time, because the tool may snap off. Bending may be caused by stone which is inside hard or frozen ground. Be careful and stop striking if you find sudden resistance under the tool.

Note: Listen to the hammer's sound while you are using it. If the sound becomes thinner and the impact less efficient, the tool is misaligned with the material and/or there is not enough "pressing" force on the tool. Realign the tool and press the tool firmly against the material.

CAUTION!

The hammer as a standard assembly, must not be used under water. If water fills the space where the piston strikes the tool, a strong pressure wave is generated and the hammer may be damaged.

For underwater operations consult your Rammer dealer for underwater models.

2.2 OPERATING TEMPERATURE

The operating temperature is -20°C – +80 °C (-4°F – +176°F).

If the temperature is lower than -20°C (-4°F), the hammer and tool has to be preheated before starting operation in order to avoid breakage of the accumulator membrane and the tool. During operation they will remain warm.

If the temperature of the hydraulic oil exceeds +80°C (+176°F), an auxiliary oil cooler is needed.

The oil viscosity must be between 1000–15 cSt while the hammer is being used (See Chapter 3 *Maintenance*).

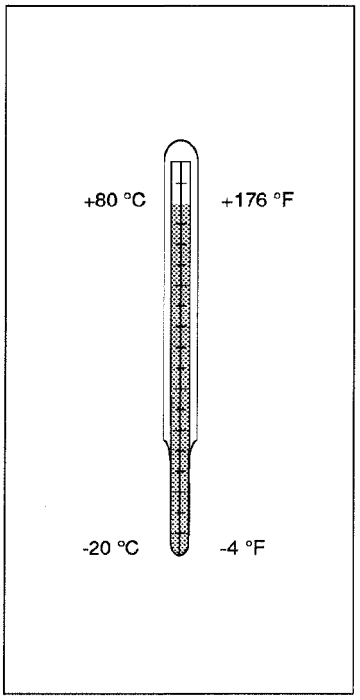
2.3 NOISE DAMPENING

Operating the hammer near residential areas or other noise exposure areas can cause noise pollution.

In order to avoid unnecessary noise, please follow these basic rules:

1. When operating with the hammer, keep the tool at 90° to the material. Working at other angle presses the hammer against wearing plates (from S 52 to G120) and this increases noise by 10 dB.

2. Replace or fix all parts that are worn out, damaged or loosened. This not only saves your hammer but it decreases the noise level.



3. MAINTENANCE

This section of the manual describes how to maintain your hammer.

General information

Whenever maintenance work is carried out, keep following basic rules in mind:

1. The hydraulic hammer is a precision made hydraulic machine. Absolute cleanliness and great care are basic and essential matters in the handling of any hydraulic components. Dirt is the worst enemy in hydraulic systems.

2. Handle hammer parts carefully and remember to cover cleaned and dried parts with clean lint free cloth.

3. Do not use any other than purpose designed materials for cleaning hydraulic parts. Never use water, paint thinners or carbon tetrachloride.

4. Components, gaskets and seals in the hydraulic system should be oiled with very clean hydraulic oil before assembly.

3.1 MAINTENANCE INTERVALS

Note: Times given refer to hours of hammer operation.

Every two hours or daily

- Grease the tool shank and the tool bushings. See page C-4.
- Grease wear plates daily (once in a shift/8 hours). See page C-4.
- Observe hydraulic oil temperature, all lines and connections as well as impact efficiency and evenness of operation.
- Tighten loose connections.

Every 10 hours or weekly

- Remove the retaining pin and the tool and check their condition. Grind the burrs away if necessary.
- Check that the tool has received sufficient greasing. Grease more frequently, if necessary.

Every 50 hours or monthly

- Check the tool shank and tool bushings for wear. See page D-4.
- Check the hydraulic hoses. Replace if necessary. Do not let dirt get into the hammer or hoses.

3.2 MAIN INSPECTION

It is recommended to have the main inspection done by your Rammer dealer after **50–100 operating hours.**

Contact your Rammer dealer for more information about the main inspection.

- Check all hydraulic connections.
- Check that the hydraulic hoses do not rub against anything in any boom position.
- Replace the hydraulic oil filters of the carrier.

3.3 EVERY 600 HOURS OR YEARLY

Yearly service is recommended to be done by your Rammer dealer after **600 operating hours.**

Contact your Rammer dealer for more information about yearly service.

- Check all hydraulic connections.
- Check that the hydraulic hoses do not rub against anything in any boom position.
- Replace the hydraulic oil filters of the carrier.

3.4 HYDRAULIC OIL

Generally speaking the hydraulic oil originally intended for the carrier can be used in the Rammer hydraulic hammer. However, since working with the hydraulic hammer will heat the oil much more than the usual excavation work, the viscosity of the oil must be checked.

Note !
The maximum oil temperature when using the hammer must not exceed 80 °C (176 °F) when measured from the oil tank of the gauge.

When the hammer is used continuously, the temperature of the hydraulic oil normalizes at a certain level depending on conditions and on the carrier. At this temperature, the viscosity of the hydraulic oil should be 20–40 cSt (2.90–5.35 °E).

The Rammer hydraulic hammer must not be started if the viscosity of the hydraulic oil is above 1000 cSt (131 °E) or operated when the viscosity of the hydraulic oil is below 15 cSt (2.35 °E).

Table 1 shows hydraulic oils recommended for hammer use. The most suitable oil is selected in such way that the temperature of the hydraulic oil in continuous use is in the ideal area on the chart and the hydraulic system is used to best advantage.

Failures due to incorrect hydraulic oil in hammer:

Oil too thick

- Difficult start up
- Stiff operation
- Hammer strikes irregularly and slowly
- Danger of cavitation in the pumps and hydraulic hammer
- Sticky valves
- Filter bypass, impurities in oil not removed

Oil too thin

- Efficiency losses (internal leaks)
- Damage to gaskets and seals, leaks
- Accelerated wearing of parts, because of decreased lubrication efficiency

Note: Rammer strongly recommends different hydraulic oils for use in summer and winter if there is an average temperature difference of more than 35 °C (95 °F). The correct hydraulic oil viscosity would thus be ensured.

Special oils

In some cases special oils (e.g. biological oils and non-inflammable oils) can be used with Rammer hydraulic hammers. Observe following aspects when considering the use of special oils:

- The viscosity range in the special oil must be in the given range (15–1000 cSt)
- The lubrication properties must be good enough

Note: although special oil could be used in carrier, always check suitability with hammer due to the high piston speed in hammer.

- The corrosion resistance properties must be good enough

Contact oil manufacturer or Rammer for more information about special oils.

Hydraulic oil purity

No separate filter is required when the Rammer hammer is installed in the hydraulic circuit. The hydraulic oil filter of the carrier will clean the oil flowing through the hammer.
The purpose of the oil filter is to remove impurities from the hydraulic oil since they cause accelerated component wear, blockages and even seizure. Impurities also cause the oil to heat and deteriorate. Air and water are also impurities in oil. Not all impurities can be seen with the naked eye.

Impurities enter the hydraulic system:

- During hydraulic oil changes and refilling
- When components are repaired or serviced
- When the hammer is being installed on the carrier
- Because of component wear

Oil filter

In hydraulic hammer work, the carrier oil filter must fulfill the following specifications:

- The oil filter must allow maximum particle size of 25 microns (0,025 mm).
- The oil filter material must be man-made fibre cloth or very fine gauge metallic mesh to withstand pressure fluctuations.
- The oil filter must have a volume flow capacity of at least twice the hammer's maximum flow.

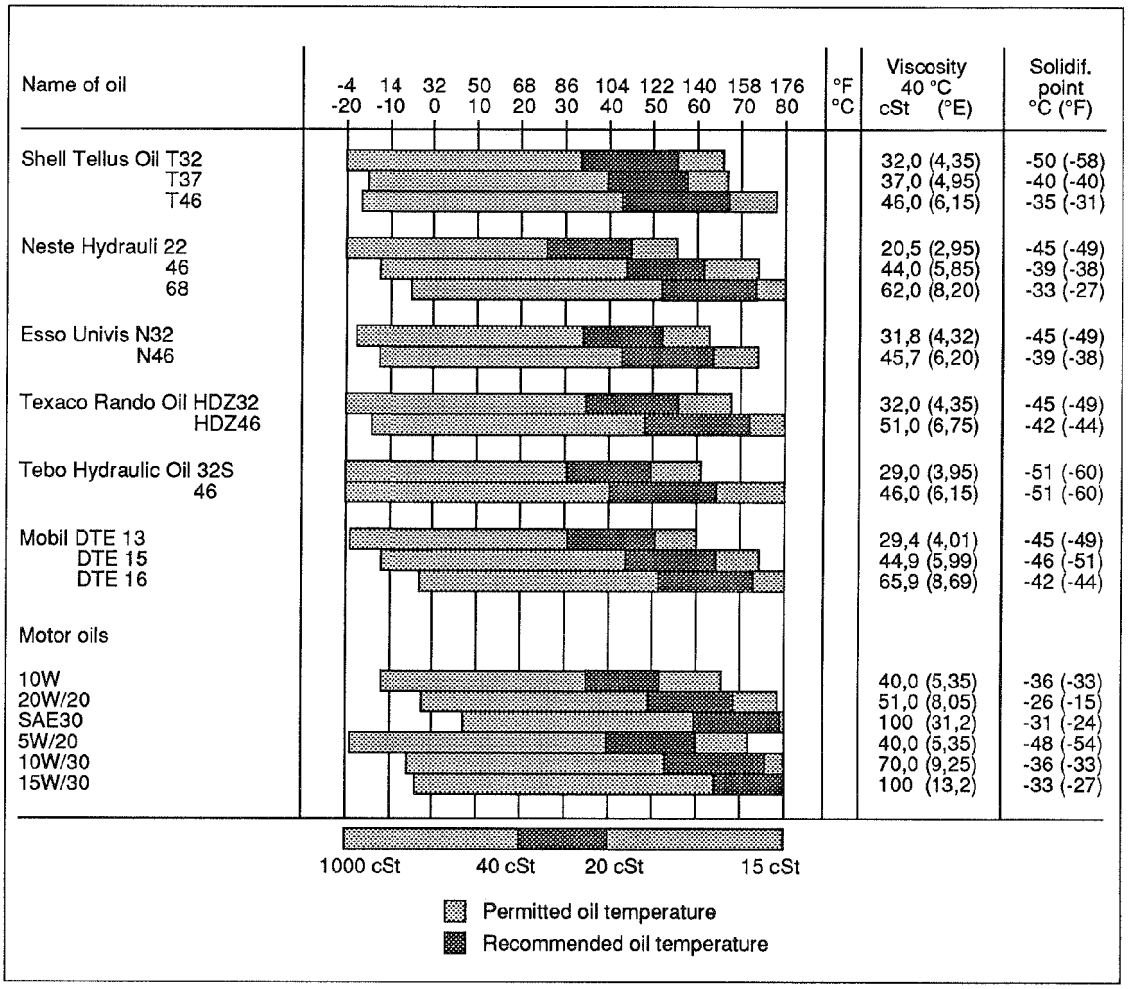
In general, oil companies guarantee new oils to have a particle count of 40 microns maximum. When adding oil to existing tank the oil must be filtered.

Damages caused by hydraulic oil impurity in carrier and hammer circuits:

1. The working life of the pumps is significantly shortened
   - Rapid wear of parts
   - Cavitation

2. Valves do not function properly
   - Spools bind
   - Rapid wear of parts
   - Blocking of small holes

3. Wear of cylinder and gaskets



4. Reduced hammer efficiency
- Rapid wear of moving parts and seals
- Danger of piston seizing up
- Oil leakage

5. Shortened working life and reduced efficiency of hydraulic oil
- Oil overheats
- Oil quality deteriorates
- Electro-chemical changes in hydraulic oil

Note: Component damage is only "a symptom". The trouble will not be cured by removing "the symptom". After any component damage due to impurities in the oil, the entire hydraulic system must be cleaned. The hammer must be dismantled, cleaned and reassembled and the hydraulic oil must be changed.

Hydraulic oil cooling

The maximum permitted hydraulic oil temperature in continuous hammer use is 50–80 °C (120–175 °F) depending on the viscosity of the oil in the system. Therefore, a reliable hydraulic oil thermometer is necessary. If there is no thermometer on the carrier one must be installed. The temperature of the hydraulic oil depends on ambient conditions, the cooling system efficiency of the carrier and on the used capacity of the hammer.
When the hydraulic hammer is used continuously it is necessary to have cooling system with extra cooling capacity compared with normal excavation work.

The oil cooler of the carrier must have a volume flow capacity of at least twice the hammer's maximum volume flow.

The cooler must stand the dynamic pressure of 2 MPa (20 bar, 290 psi).

If the carrier's oil cooler is too small either the original cooler must be replaced with a larger one or an auxiliary cooler must be installed.

The auxiliary hydraulic cooler can be installed:

- In the front of the radiator, in which case a fan is not needed (max. rise of the cooling air is 5 °C, 40 °F).
- Any other suitable place, using a fan either hydraulically or electrically driven.

If the oil temperature is still too high in spite of the coolers, please contact your Rammer dealer.

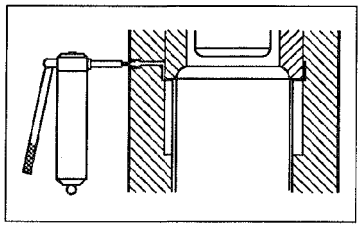
3.5 LUBRICATING

Greasing interval

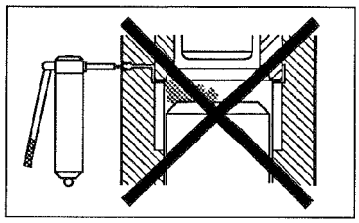
- Every two hours or daily
- The grease fittings for wear plates must be lubricated daily (once in a shift/8 hours)
- 10–15 strokes from grease gun to tool bushings and tool
- Adapt interval and amount of grease to wear rate of tool and working conditions
- Tool shank must be well lubricated before installing the tool

Greasing

- While greasing hammer must be standing upright against the tool to ensure that the grease will penetrate between the tool and the bushing



- Do not fill the space between piston and tool with grease



Insufficient greasing may cause:

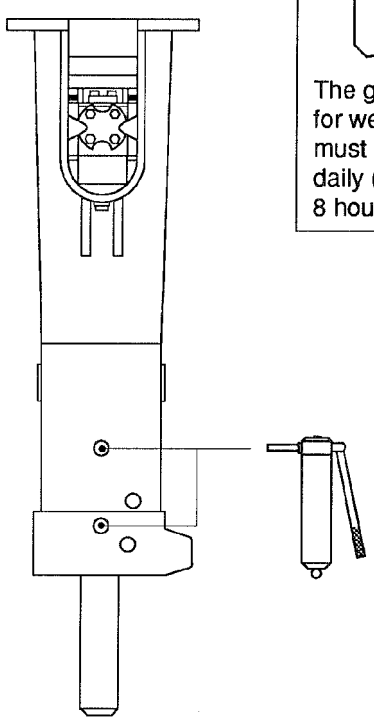
- Abnormal wear of tool bushing and tool
- Tool breakage

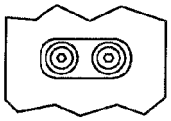
Grease type

- No dropping point (or very high, over 250 °C/480 °F)
- Max. working temperature over 150 °C/300 °F
- Min. working temperature under lowest ambient temperature
- Additives: molybdenum disulphide (MoS_2), graphite or equivalent
- Grade (thickness) NLGI 0–2
- Water resistant

Recommended greases

- ESSO EOL 232, part no. 90 203
- WYNNS GS80
- SHELL Kuggfett
- SHELL Extrema MDS
- KLÜBER Unimoly GB2
- LE 3751/3752





The grease nipples for wear plates (8 pcs) must be lubricated daily (once in a shift/ 8 hours).

Total 10 grease nipples

3.6 LONG TERM STORAGE

Observe following points when the hammer is stored:

- The storage area must be dry
- The tool must be removed
- The lower end of the piston, tool and tool bushings must be well protected with grease.
- Connections must be sealed with clean plugs to prevent oil leakage and dirt from getting into couplings.
- The hammer must be stored in vertical position.
- Make sure the hammer can not fall.

In this way the vital parts of the hammer are protected from rust and the machine is ready to be used whenever necessary.

3.7 WASHING THE HAMMER

When working with hammer and removing it from the carrier, dirt (mud, rock powder etc.) can attach to the hammer. Wash the outside of the hammer with a steam washer before sending it to the workshop. Otherwise dirt can cause difficulties in disassembly and assembly.

CAUTION!

Plug the pressure and return line before washing the hammer. Otherwise dirt can enter the hammer and this may cause damage to the hammer.

3.8 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
1. The hammer does not start.	1. The piston is in its lower hydraulic brake.	Keep the hammer control valve open and push the tool firmly against an object. The tool head lifts the piston out of the brake.
	2. The hammer control valve does not open.	When operating the hammer control valve, check that the pressure line will pulsate (that means the hammer control valve opens). If the valve does not operate, check the operating means: mechanical connections, pilot pressure or electrical control.
	3. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Contact your Rammer dealer.
	4. Leakage from pressure to return in excavator hydraulic circuit.	Check the installation. Check the pump and other hydraulic components.
	5. Too much back pressure.	Check the installation.
	6. Failure in hammer valve or distributor operation.	Contact your Rammer dealer.
	7. Piston failure	Contact your Rammer dealer.
2. The hammer operates irregularly but the blow has full power.	1. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Contact your Rammer dealer.
	2. Failure in hammer valve or distributor operation.	Contact your Rammer dealer.
	3. Not enough feed force from the carrier.	Refer to correct working methods in Chapter 2 *Operation.*

TROUBLE	PROBABLE CAUSE	REMEDY
3. The hammer operates poorly and the blow has no power.	1. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Contact your Rammer dealer.
	2. There is no pressure in the pressure accumulator.	Contact your Rammer dealer.
	3. The working method is not correct.	Refer to correct working methods in Chapter 2 *Operation.*
	4. Failure in hammer valve operation.	Contact your Rammer dealer.
4. Impact rate slows down.	1. Oil has overheated (over + 80°C/176°F)	Check for fault in oil cooling system or internal leak in hammer. Check hydraulic circuit of the carrier. Install extra oil cooler.
	2. Too much back pressure.	Contact your Rammer dealer.
	3. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Contact your Rammer dealer.
	4. Leakage from pressure to return in excavator hydraulic circuit.	Contact your Rammer dealer. Check the pump and other hydraulic components.
	5. Failure in hammer valve or distributor operation.	Contact your Rammer dealer.
	6. There is no pressure in the pressure accumulator.	Contact your Rammer dealer.
	7. Hydraulic oil viscosity is too low.	Check hydraulic oil viscosity.

TROUBLE	PROBABLE CAUSE	REMEDY
5. Oil overheats.	1. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Contact your Rammer dealer.
	2. Leakage from pressure to return in excavator hydraulic circuit.	Contact your Rammer dealer. Check the pump and other hydraulic components.
	3. Internal oil leak in the hammer.	Contact your Rammer dealer.
	4. Hydraulic oil viscosity is too low.	Check hydraulic oil viscosity.
	5. Cooling capacity of the oil cooler is too small.	Install extra oil cooler.

4. DISASSEMBLING AND ASSEMBLING OF S 55

This part of the manual contains detailed information how to disassemble and assemble your Rammer S 55.

⚠ WARNING

Do not disassemble or assemble this equipment before reading through this chapter of the manual first.

4.1 REMOVAL AND INSTALLATION OF TOOLS

Removal

1) Set the hammer on level ground.

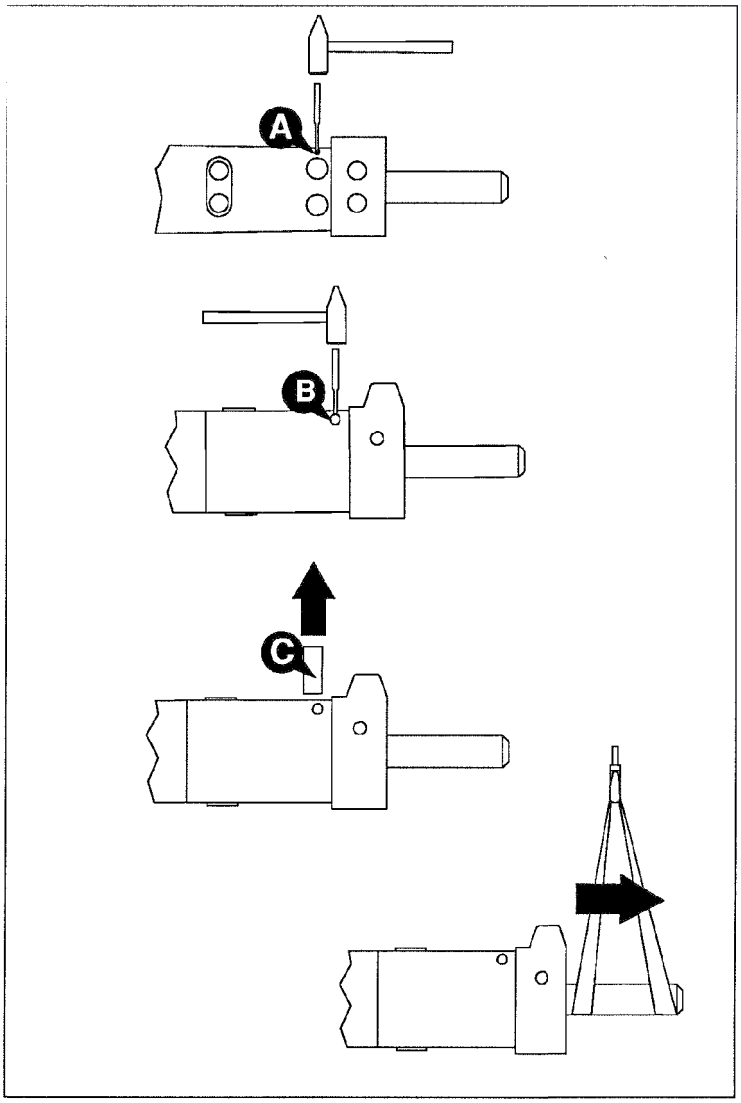
2) Make sure that the carrier's transmission is in neutral and the parking brake is engaged.

3) Stop the engine.

4) Remove split pin **A**

5) Remove the retaining pins **B** and **C** (2 pcs).

6) Remove the tool.



Installation

1) Clean and lubricate the tool and the pins **B** and **C**.

   If you are using old tools, check the tool for wear.

2) Install the tool.

   Align the groove of the tool with the pin bore.

3) Install the retaining pins **B** and **C** (2 pcs).

4) Install split pin **A**

5) Check that the retaining pins **B** and **C** (2 pcs) is secured by the split pin **A**.

4.2 CHANGING LOWER TOOL BUSHING

Removal

1) Set the hammer on level ground.

2) Make sure that the carrier's transmission is in neutral and the parking brake is engaged. Stop the engine.

3) Remove the tool

4) Remove one of the split pins **D** (2 pcs).

5) Remove the pin **E**.

6) Remove the lower tool bushing **F** from the front head.

   Check tool and lower tool bushing for wear.

Installation

1) Clean all parts

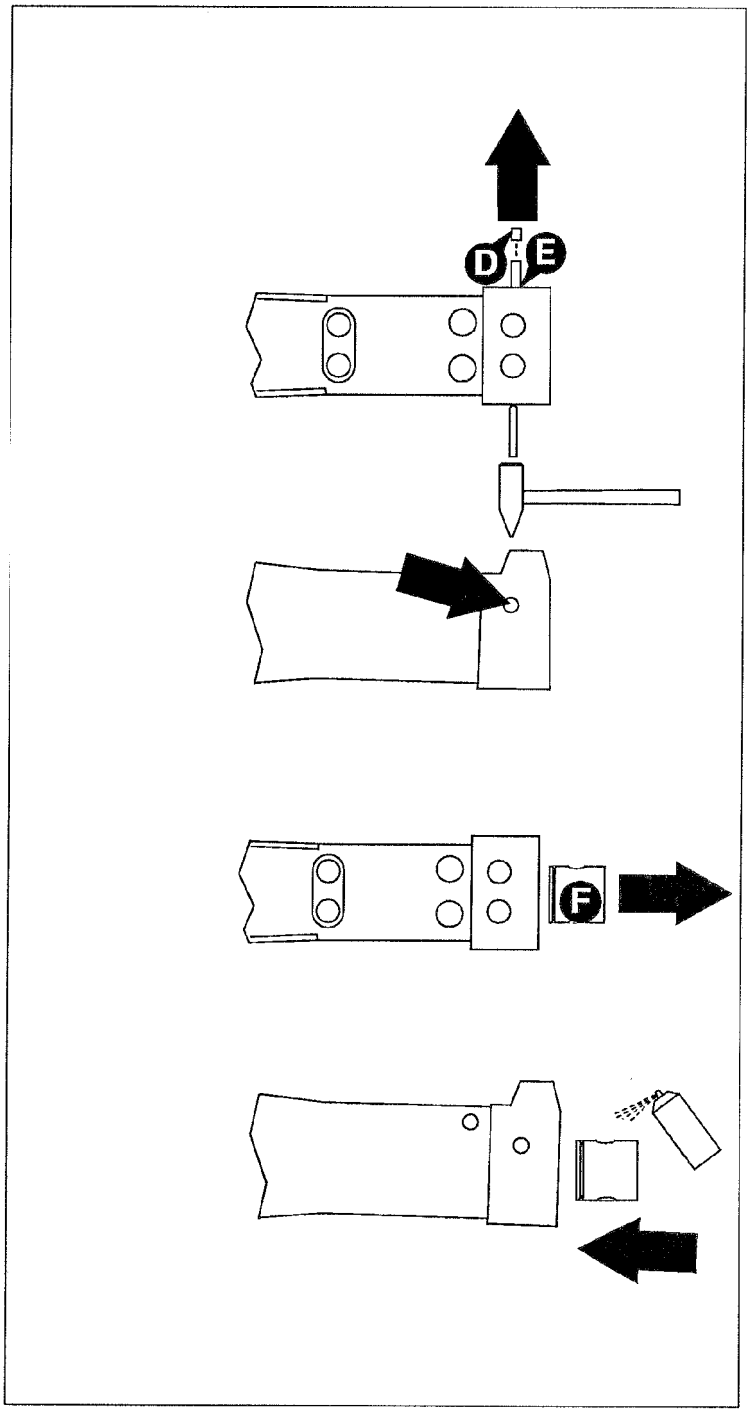
2) Apply MoS_2 spray to the contact surfaces of lower tool bushing and front head.

3) Install lower tool bushing **F**.

4) Install pin **E**.

5) Install split pin **D**.

6) Install the tool



4.3 WEAR LIMITS FOR TOOLS AND LOWER TOOL BUSHING

Check the lower tool bushing and the tool shank for wear every 50 hours of hammer use or monthly.

Tools

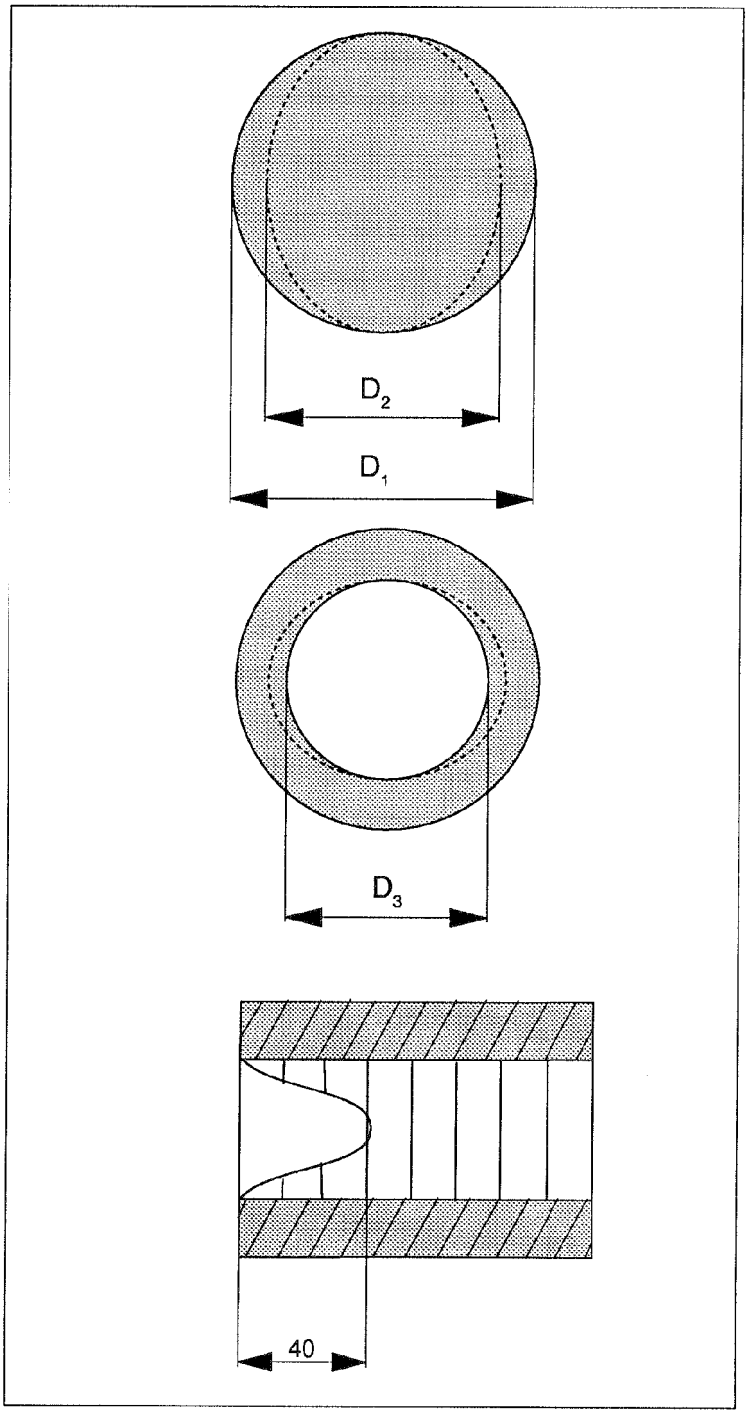
Original diameter (D_1) for tool shank is 115 mm (4.53 in).

Replace the tool if the diameter (D_2) of the tool shank is less than 113 mm (4.44 in).

Lower tool bushing

Original diameter (D_3) for lower tool bushing is 115 mm (4.53 in).

Check that the grease groove of the lower tool bushing has not worn out on the area marked on illustration. If so, replace the bushing.



4.4 REMOVAL AND INSTALLATION OF HAMMER, CHANGING WEARING PLATES

Removal

1) Remove the tool and set the hammer to vertical position on the floor.

   Make sure that the hammer can not fall when the excavator is taken aside.

2) Disconnect the hoses and plug them as well as the hammer inlet and outlet.

3) Open the mounting bracket screws.

4) Remove the mounting bracket **A** by taking the excavator aside.

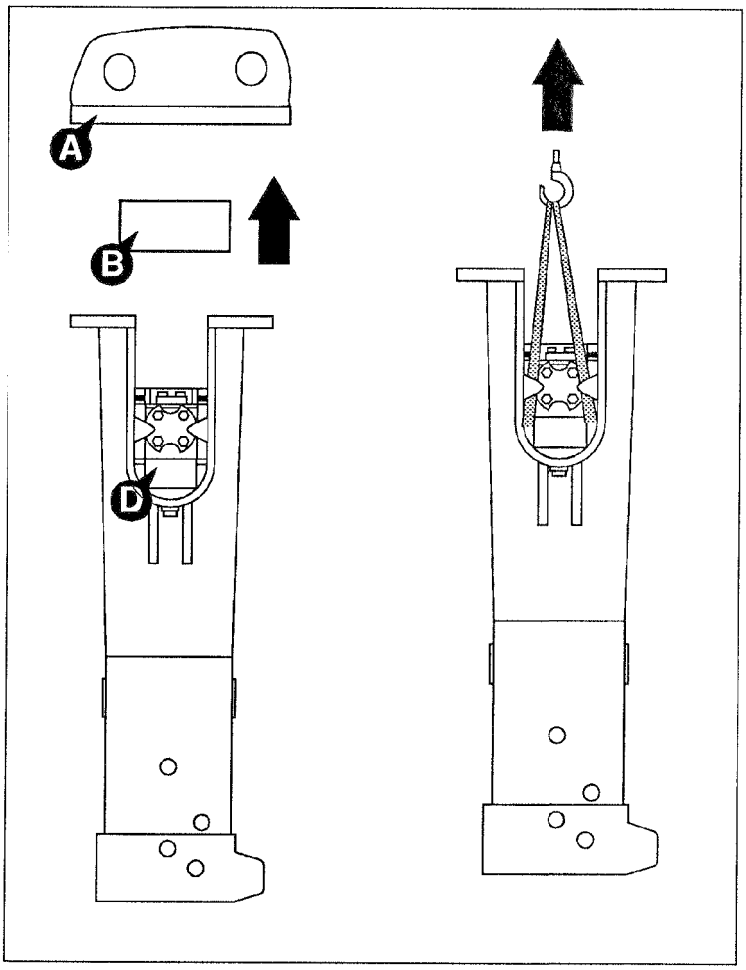
5) Lift buffer **B** out.

6) Fasten a lifting belt round the valve housing shoulders and lift the hammer so that there is 10 mm clearance under the valve housing shoulders.

7) Wag the hammer. If the hammer moves more than ± 10 mm at the level of shoulders, the wearing plates between the hammer front head and the housing are too worn.

8) Lift the hammer out of the housing and if necessary, change the wearing plates.

9) Check the condition of buffers **D** (2 pcs).



Installation

1) After changing the wearing plates set the hammer into the housing and check the clearance by waging the hammer.

2) After placing the hammer into the housing, the buffer system, mounting bracket hoses are put in their places.

3) Install the tool.

Changing of wearing plates
The distance between the wearing plates has to be 261 mm in section **A** and 261 mm in section **B**.

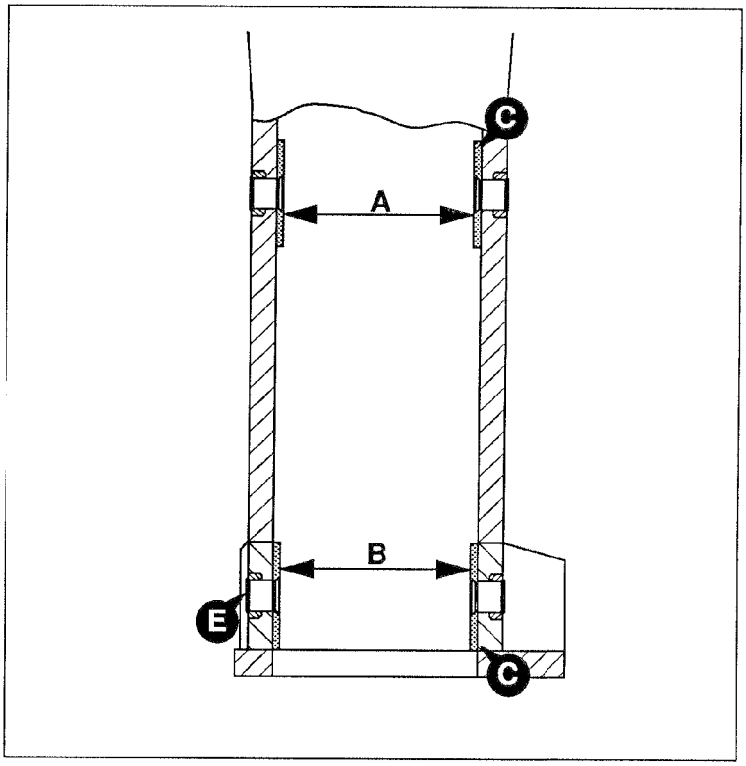
The wearing plates **C** can changed or fitting plates added between the wearing plates and the housing by opening and removing screws **E** (8 pcs).

Plates **C** or fitting plates shall be added so that the hammer lies in the middle of the housing.

The plates will be fastened by tightening the screws and nuts to the torgue of 1500 Nm (150 kpm, 1105 lbf ft).

Lock the screws **E** (8 pcs). (Loctite 270)

Note: Remember to remove / install grease nipples (8 pcs) from screws **E** (8 pcs)before removing / installing wearing plates **C**.



4.5 ASSEMBLING AND INSTALLING OF ACCUMULATOR

Releasing the pressure from the accumulator

1) Remove the hammer from housing.

⚠ WARNING

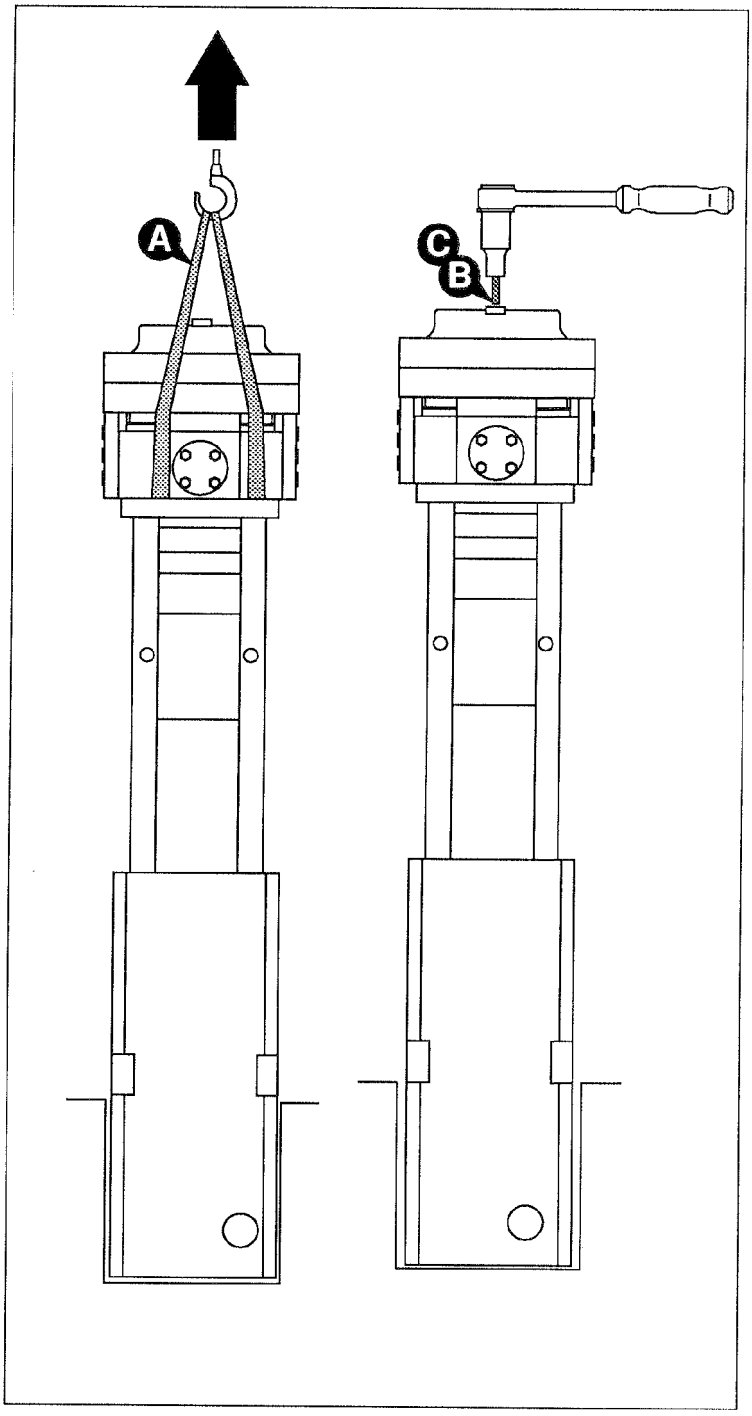
Do not disassemble the hammer before releasing the pressure from the accumulator.

2) Fasten a lifting belt **A** round the valve housing shoulders and lift the hammer into assembly pit .

3) Remove the protective nut from the pressure accumulator.

4) Carefully open the filling plug **B** and let the nitrogen gas to flow out.

   When there is no pressure in the accumulator, remove plug **B** and Usit-ring **C**.



Removal

1) Open the hex. socket screws **D** (8 pcs).

2) Screw the lifting eye M 20 (2 pcs) in the accumulator bottom.

3) Lift the accumulator.

Disassembling

⚠ WARNING

Do not open the screws G (16 pcs) of the cover when the accumulator is charged!

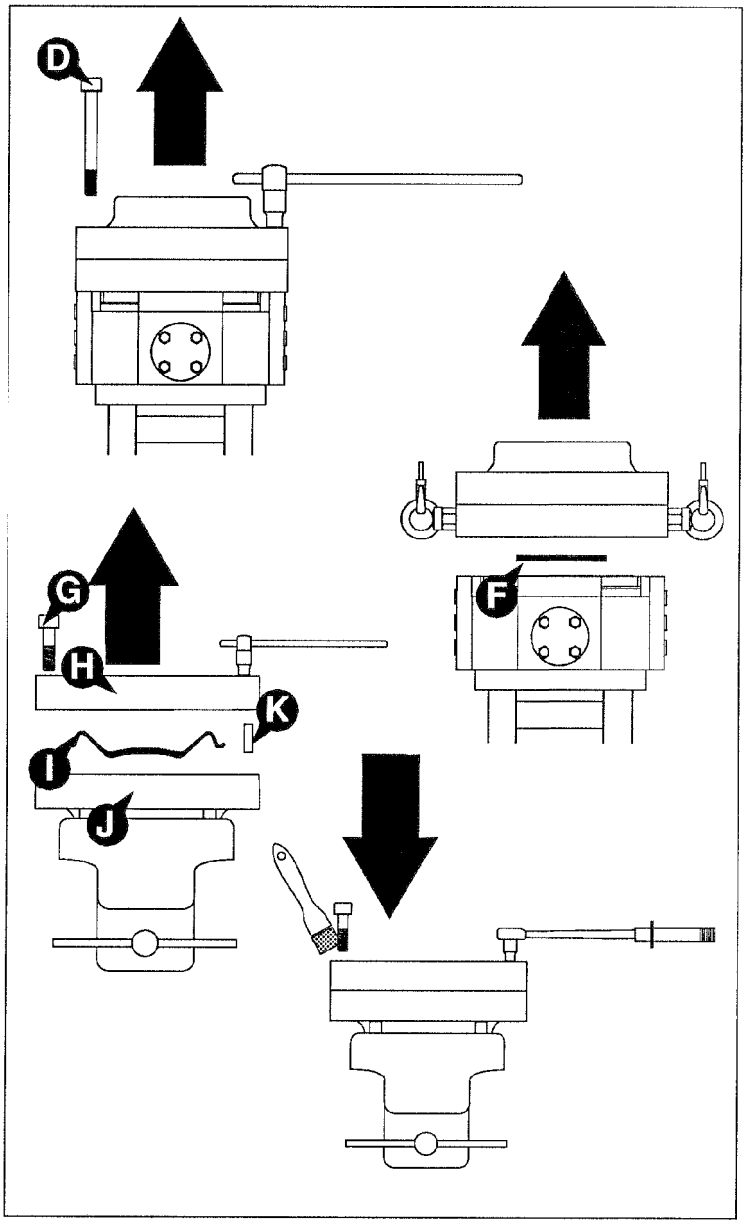
1) Remove the sealing **F**.

2) Set the assembly stand 30 276 on the vice bench.

2) Set the accumulator on the assembly stand.
3) Open the hex. socket screws **G** (16 pcs).

4) Remove the accumulator cover **H** and membrane **I**.

5) Remove guide pins **K** (2 pcs).



Assembling

1) Clean and dry parts carefully.

2) Set the accumulator bottom **J** on the assembly tool.

3) Install the guide pins **K** (2 pcs).
4) Put a new membrane **I** in its place. Apply silicone grease on the gas side of the membrane as well as on the accumulator cover **H** (gas side).

5) Install accumulator cover **H**.

6) Grease the threads of hex. socket screws **G** (16 pcs).

7) Install hex. socket screws **G**.

8) Tighten the screws **G** with a torque wrench first to the torque of 300 Nm (30.0 kpm, 221 lbf ft) and finally to the torque of 500 Nm (50.0 kpm, 370 lbf ft).

Fastening of accumulator

1) Install the sealing **F** into to the groove in the bottom of the accumulator.

   Use some grease to prevent the sealing from falling down during mounting.

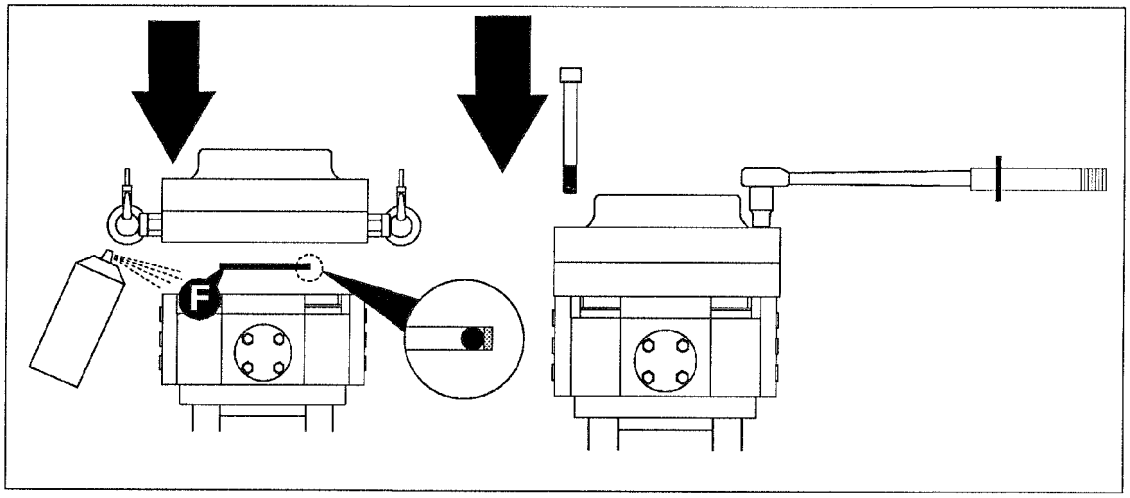
2) Apply MoS_2 spray on the contact surface of valve body **K** and accumulator **L**.

3) Lift the accumulator into its place.

4) Grease the threads of hex. socket screws **D** (8 pcs).

5) Tighten the screws with a torque wrench first to the torque of 300 Nm (30.0 kpm, 221 lbf ft) and finally to the torque of 450 Nm (45.0 kpm, 332 lbf ft).

6) Install protective plug the holes for lifting eyes in the accumulator.



4.6 CHARGING THE ACCUMULATORS

⚠ WARNING

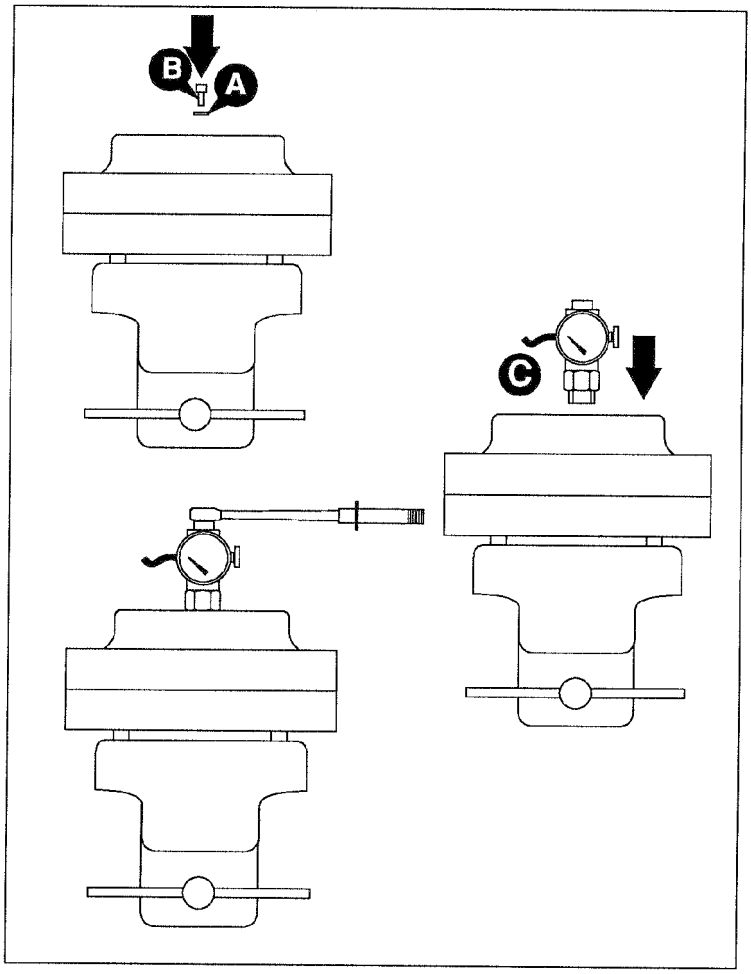
The only gas permitted for charging of the accumulators is nitrogen (N_2). The use of other gas may cause the accumulators to explode.

1) Furnish the accumulator with a **new** Usit-ring **A** and plug **B**.

2) Connect the charging device **C** to the low pressure accumulator.

3) Open the filling plug **B** through the charging device (3 turns).

4) Open the discharge valve of the charging device.



Open carefully the nitrogen gas bottle valve and check that the nitrogen gas flows properly.

Shut the nitrogen gas bottle valve.

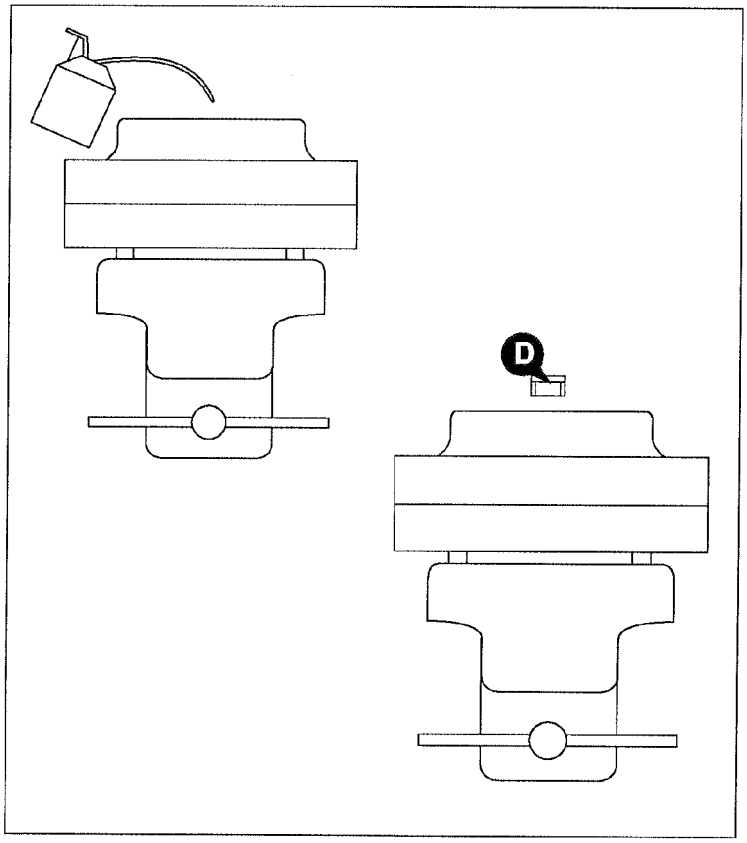
Shut the discharge valve of the charging device.

5) Open carefully nitrogen gas bottle valve and observe the gauge pressure.

CAUTION!

The charging device does not have any pressure relief valve. Shut the gas bottle valve when the pressure is 4.5 MPa (45bar, 656psi) in the pressure accumulator.

6) Shut the nitrogen gas bottle valve when the pressure is 4.5 MPa (45 bar, 656 psi in the pressure accumulator).



Wait 10 minutes (because the temperature changes).

7) Adjust the pressure to 4.0 MPa (40 bar, 580 psi) in the pressure accumulator by carefully opening and closing the discharge valve of the charging device.

   Shut the filling plug **B**, torque 20 Nm (2.0 kpm, 15 lbf ft).

8) Let the pressure out from the hose by opening the discharge valve of the charging device.

   Remove the charging device.

9) Check the gas-tightness by dropping some oil on the filling plug **B**.

10) Insert new plug **D**.

4.7 REMOVAL AND INSTALLATION OF MAIN VALVE

Removal

1) Loosen the hex. screws **A** (14 pcs) of covers **B** and **C**.
2) Use M12 screws to pull the covers out.

3) Push out the spool **D**.

   Take care of small spools E and **F** in the ends of spool **D**.

4) Fasten the puller (40 210) in the holes of screws **A**.

   Put the flange against the main valve bushing **I** and drive the bushing carefully out.

Installation

1) Check the parts carefully.

   If necessary use fine emery cloth or grinding agent . Clean and oil/grease parts.

2) Install new O-rings **G** on the covers **B** and **C**.

3) Install split pin **M** (2pcs) on the main valve bushing **I.**

   Install new O-rings **H** (6 pcs) in the main valve bushing **I.**

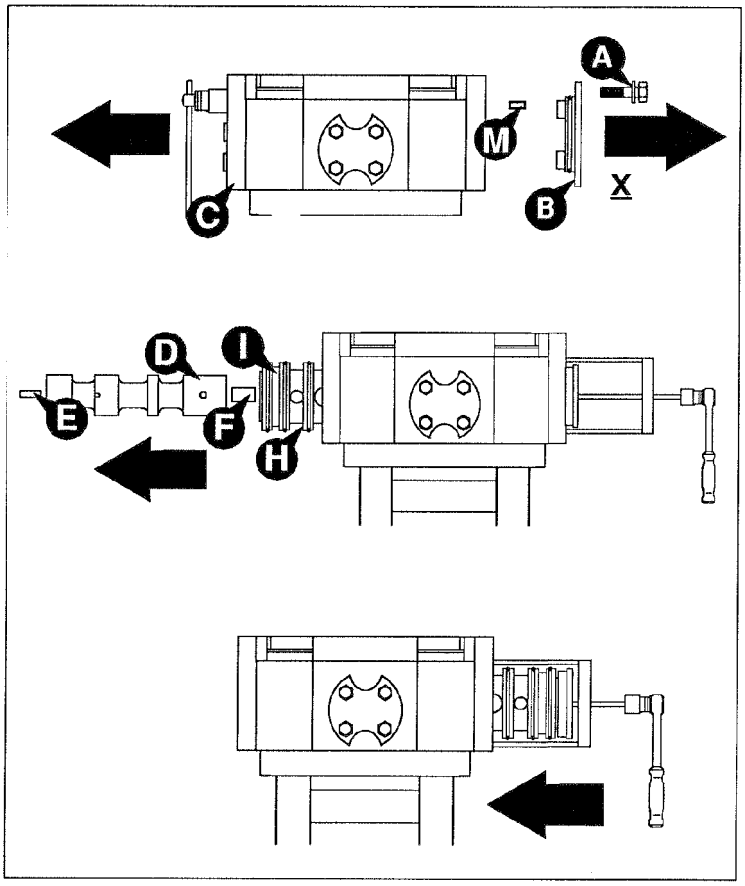
3) Fasten the puller (40 210) on the valve housing side marked with **X**.

   Install the main valve bushing so that **X** on its end comes to the same side with valve housing **X**.

   Using the flange against the bushing drive the bushing in.
4) Install the spool **D** so that **X** on its end will be again on the **X**-side of the valve housing.

   Do not forget the spools **E** and **F**. Check that the spools move freely. Use some oil.

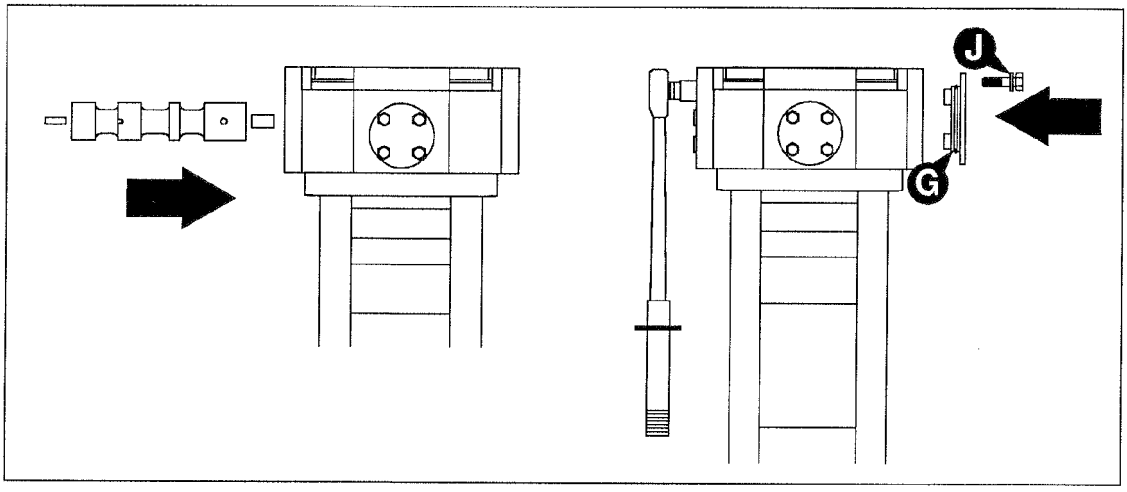
5) Install covers **B** and **C** (cover marked with **X** comes to the same side with valve housing **X**).



6) Grease the threads of hex. screws **A**.

   Install locking washers **J** (14pcs) under hex. screws **A**.

7) Tighten the hex. screws **A** with a torque wrench to the torque of 120 Nm (12.0 kpm, 88.5 lbf ft).



4.8 REMOVAL AND INSTALLATION OF PRESSURE CONTROL VALVE

Removal

1) Open the hex. socket screws **A** (4 pcs).

   The pressure control valve is located in valve body, return side.

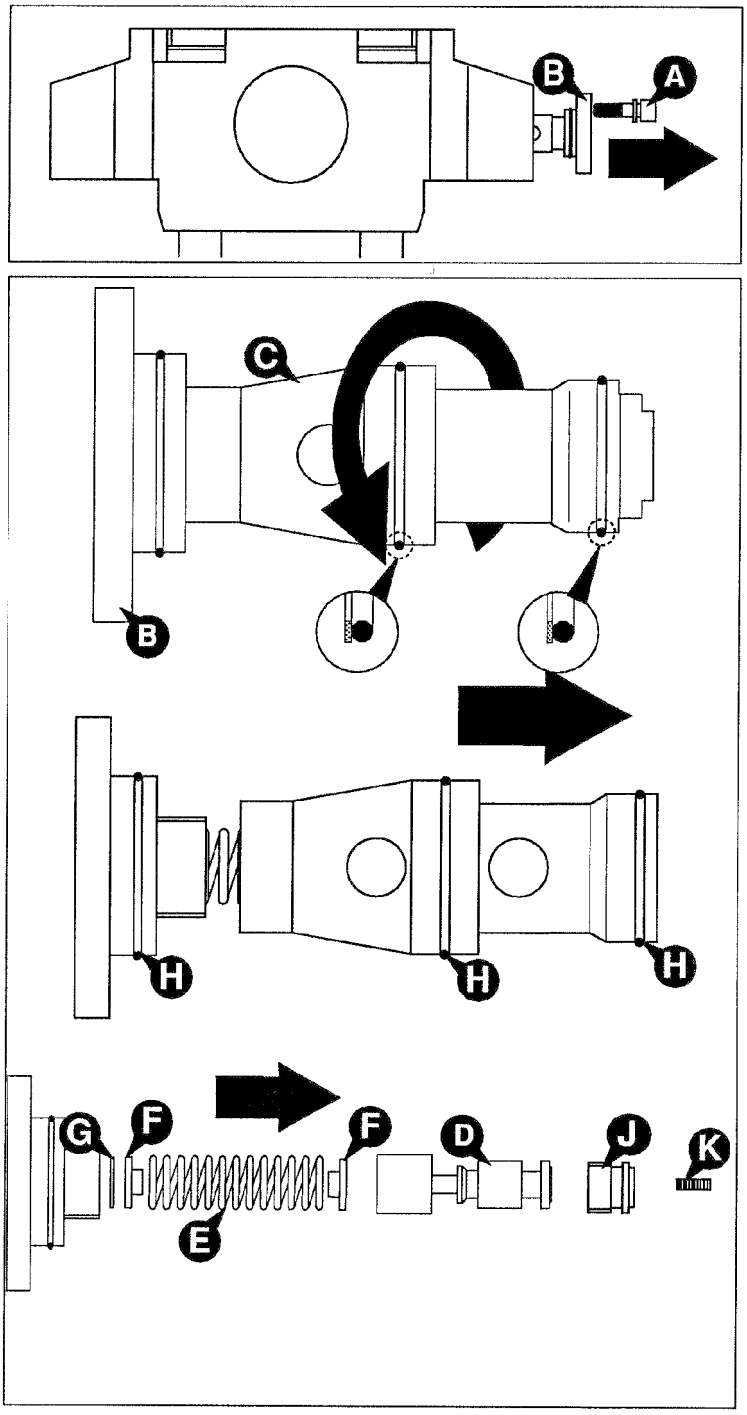
   Use M16 screws to pull the cover **B** out.

2) Use a screwdriver to pry the valve carefully out.

3) Fix the valve cover **B** in valve body or on a bench vise and loosen the guide **C**.

4) Remove the spool **D**, spring **E** , spring guide **F** and adjustment plates **G**.

5) Remove O-rings **H** (3 pcs).



Adjustment

When the pre-load of the spring changes, the operating pressure changes as well.

The correct operating pressure, which is preset at factory, is on the average achieved when the measured height is 135 mm (5.31").

The measure 135 mm is only indicative.
The correct measure of the operating pressure must be checked always with the glyserine dampened pressure gauge when hammer is installed in the carrier.

The operating pressure of the hammer is adjusted by adding or removing the adjustment plates **G** between the cover **B** and spring guide **F**.

Installation

1) Check parts carefully.
   If necessary use fine emery cloth or grinding agent.
   Clean and oil /grease parts.

2) Set new O-ring **H** (3 pcs).

3) Fix the valve cover **B** on a bench vise and install the adjustment plates **G**, spring guide **F** and spring **E** spring guide **F**.

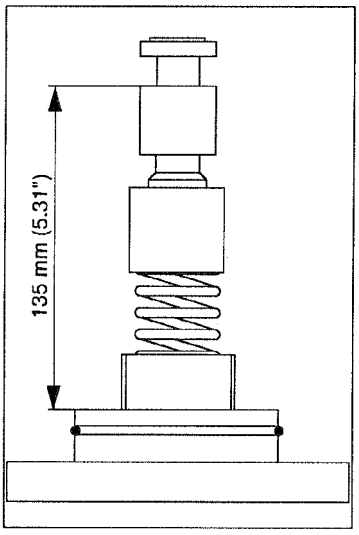
4) Install spool **D**.

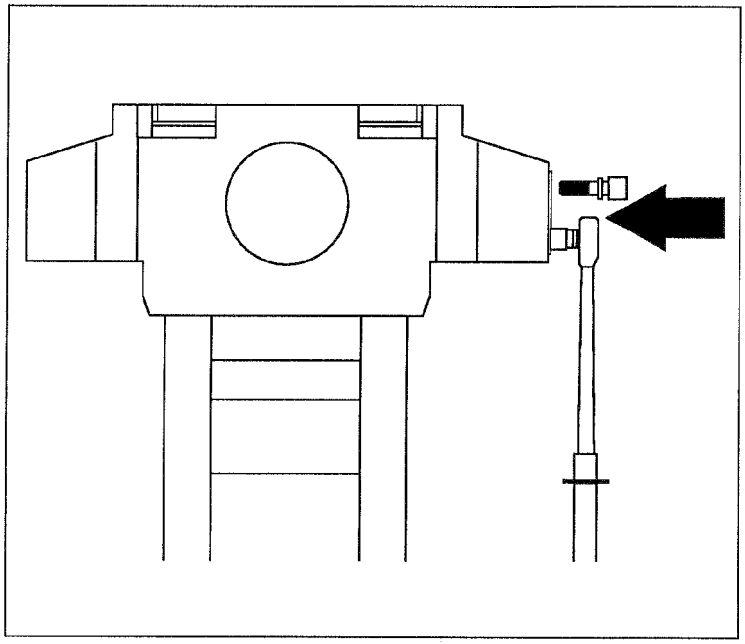
5) Install guide **J.**
6) Install spool **K.**
7) Install guide **C.**

8) Fasten the guide **C**

9) Push the valve into its housing , install locking washers on the hex. sockets.
   Grease the threads of hex. socket screws **A.**

10) Tighten the hex. socket screws **A** with a torque wrench to the torgue of 200 Nm (20 kpm, 147.5 lbf ft).





4.9 REMOVAL AND INSTALLATION OF CHECK VALVE

Removal

1) Remove plug **N**.
2) Loosen the hex. socket screws **A** (4 pcs) and locking washers and pry the valve out using a screwdriver.

   The check valve is located in valve body, pressure side.

3) Push the spring guide **B** in with a screwdriver.
4) Pry out the spring ring **C** with a screwdriver.
5) Remove spring guide **B**.
6) Remove spring **D**.
7) Remove spool **E**.
8) Remove O-rings **F** and **G**.

Installation

1) Check the parts carefully.

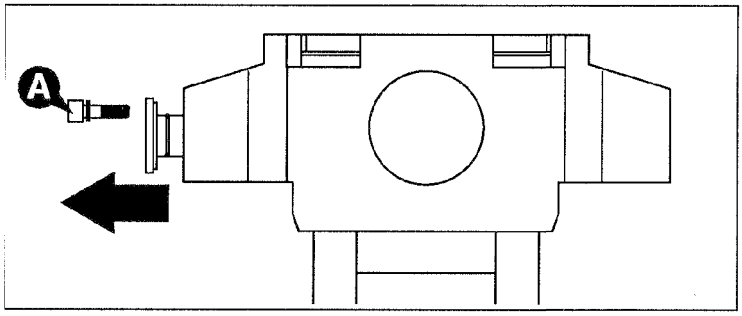
   If necessary use fine emery cloth or grinding agent.

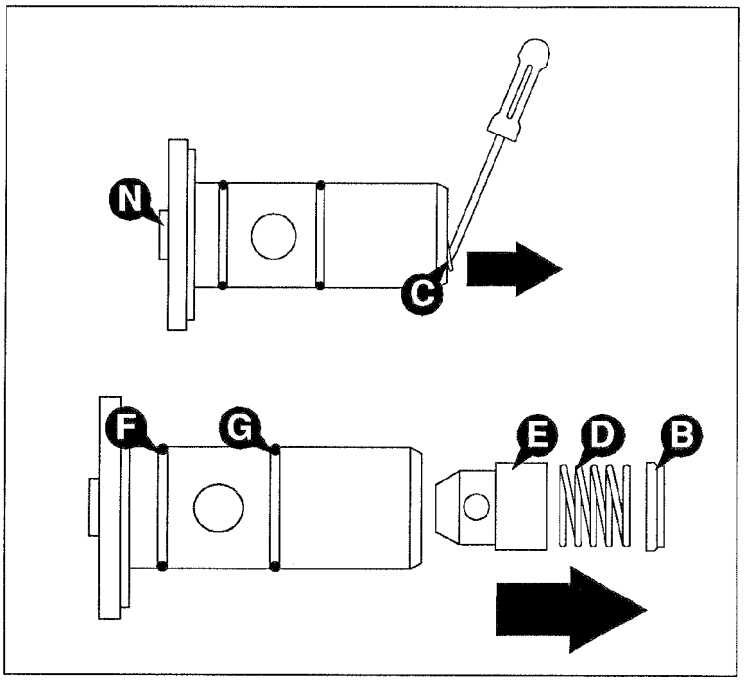
   Clean and oil/grease parts carefully.

2) Install new O-ring **F** and **G**.
3) Install spool **E**.
4) Install spring **D**.
5) Install spring guide **B**.
6) Install the spring ring **C**.

Check that the spool moves properly.

7) Install the check valve into the valve body.
8) Install the locking washers.
9) Grease the threads of hex. socket screws **A**.
10) Tighten the screws A to the torque of 200 Nm (20 kpm, 147.5lbf ft).
11) Tighten the plug **N** to the torque of 33 Nm (3.3 kpm,24 lbf ft).





4.10 LOOSENING AND TIGHTENING OF TIE RODS

LOOSENING

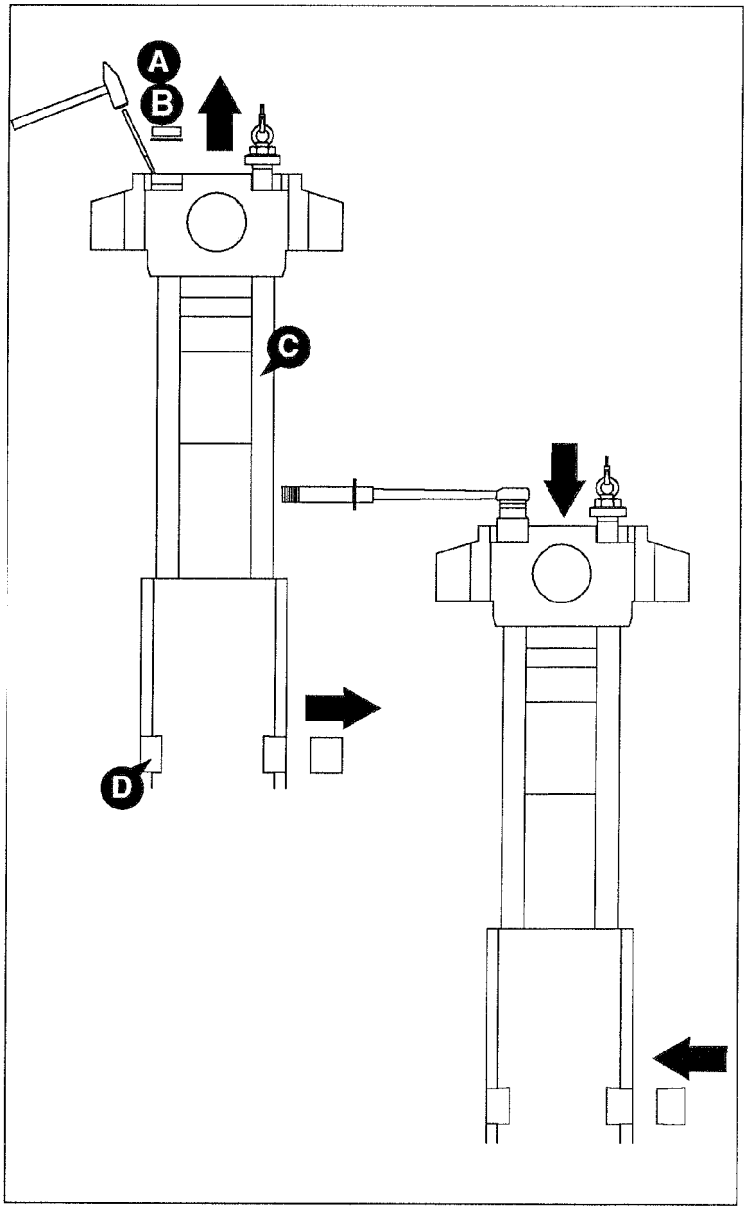
1) Remove the accumulator.

2) Remove the rubber rings **A** (8 pcs) and lock plates **B** (8 pcs).

3) Mark each tie rod **C** and its nut **D** as pairs.

4) Heat the side rods with propane flame so much that the screws can be opened (max. temperature 120 °C).

5) Remove the nuts **D**. Do not turn nuts **D** upside down.



Tightening

1) Use crack detecting equipment to check if there are any cracks on tie rods. If there are, change the tie rod and its nut.

2) Clean the tie rods and grease the screw threads and the contact surface of tie rods and valve body.

3) Spread cold-galvanizing spray on the part of the tie rod which goes inside the front head.

4) Install tie rods **C**.

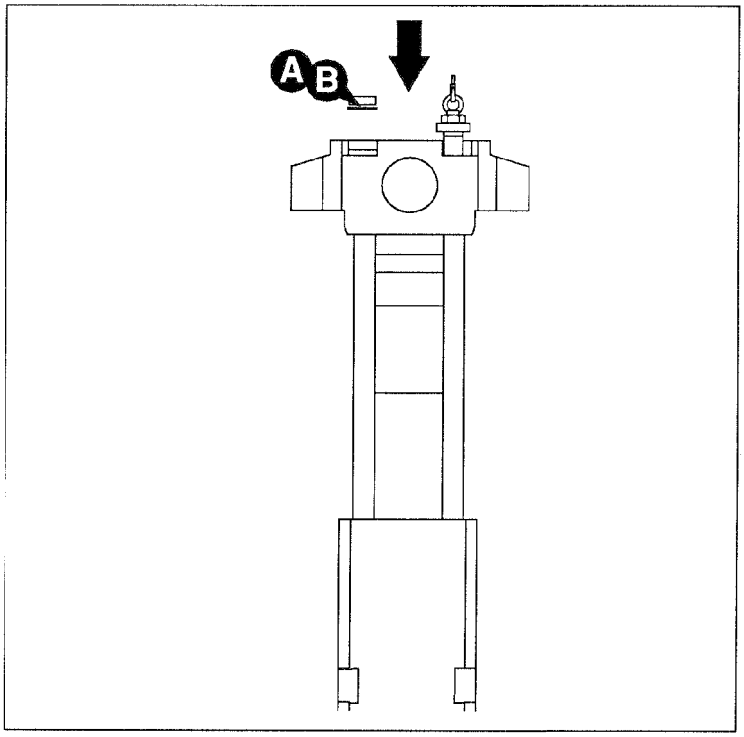
   Check that each tie rod has the right nut as its pair.

   Do not turn nuts **D** upside down.

5) Using a torque wrench tighten the screws first to the torque of 100 Nm (10.0 kpm, 74 lbf ft) then to the torque of 300 Nm (30.0 kpm, 221 lbf ft) and finally to the torque of 500 Nm (50.0 kpm, 369 lbf ft).

6) Heat all tie rods with propane flame so much that all tie rods can be tightened further 120°.

7) Install lock plates **B** (2 pcs) so that the tie rods can not loosen.
Install rubber rings **A**.



WARNING !

Do not heat o-rings in the tie rods.

4.11 DISASSEMBLING AND ASSEMBLING OF CYLINDER

Disassembling

1) Remove accumulator and tie rods.
2) Remove valve body.
3) Remove seal carrier, upper P screw M20 (2 pcs) lifting eyes in the seal carrier upper **P** and lift it carefully out.
4) Screw the lifting eyes M20 into the holes of cylinder side and lift the cylinder out.
5) Screw M 12 lifting eye in the piston **I** head and lift it carefully out.
6) Remove seal carrier **A**.
7) Remove sealings **B**, **C**, **D**,**K** wiper **E**, O-ring **F** and guide pin **G** (2 pcs) and O-ring **N** (2 pcs).
8) Remove from seal carrier guide pin **G**, sealings **J** (2 pcs), **S**, **O**, wiper **M.**

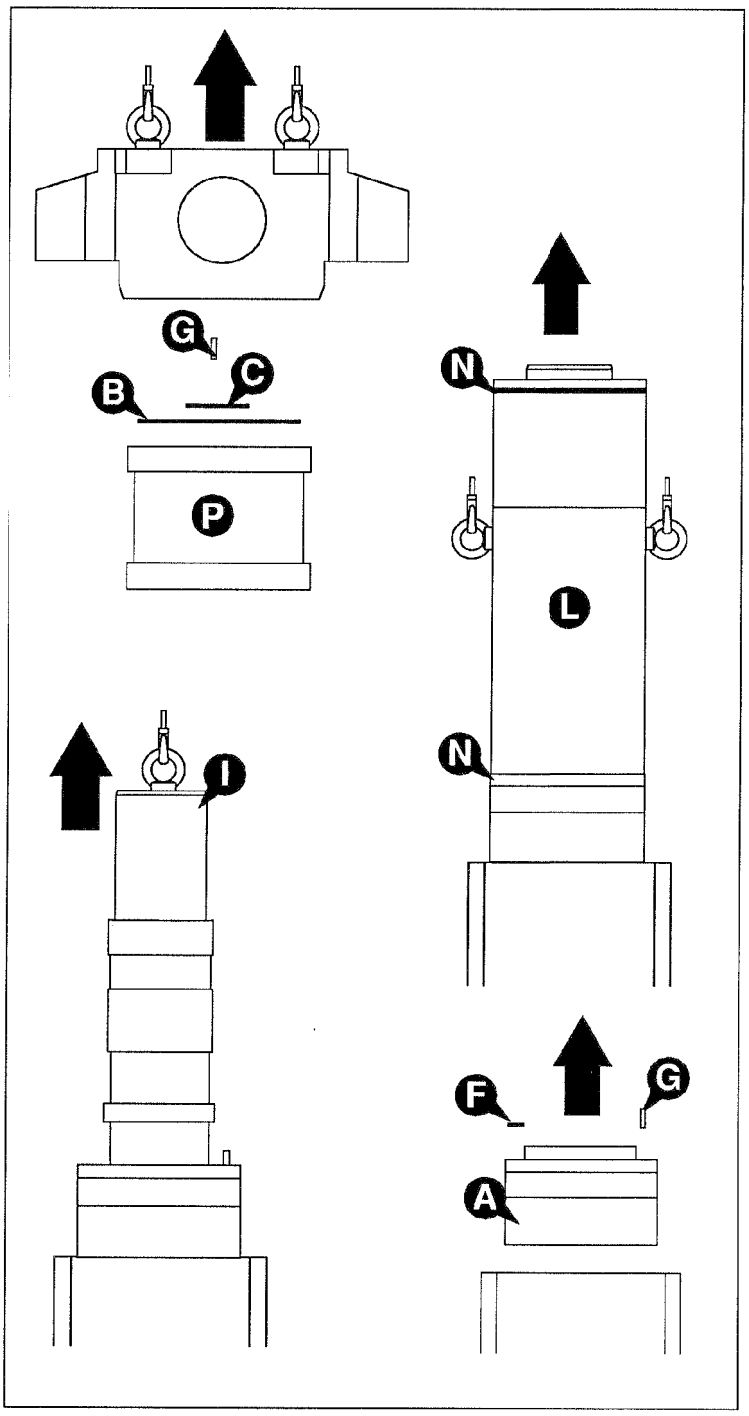
Assembling

1) Check the condition of seal carrier upper **P**, cylinder **L**, piston **I**, seal carrier **A**, and the front end.

   If necessary use fine emery cloth or grinding agent. Clean and oil parts carefully.

2) Install sealing **D**,**K**, wiper **E**, O-ring **F** and guide pin **G**.
3) Install seal carrier **A** on wood pieces.
4) Oil the piston and lift the piston into the seal carrier.

   Hit the piston carefully on its place.
5) Install O-ring **N** (2 pcs).



6) Screw lifting eyes M20 into the cylinder and lift cylinder on the piston.

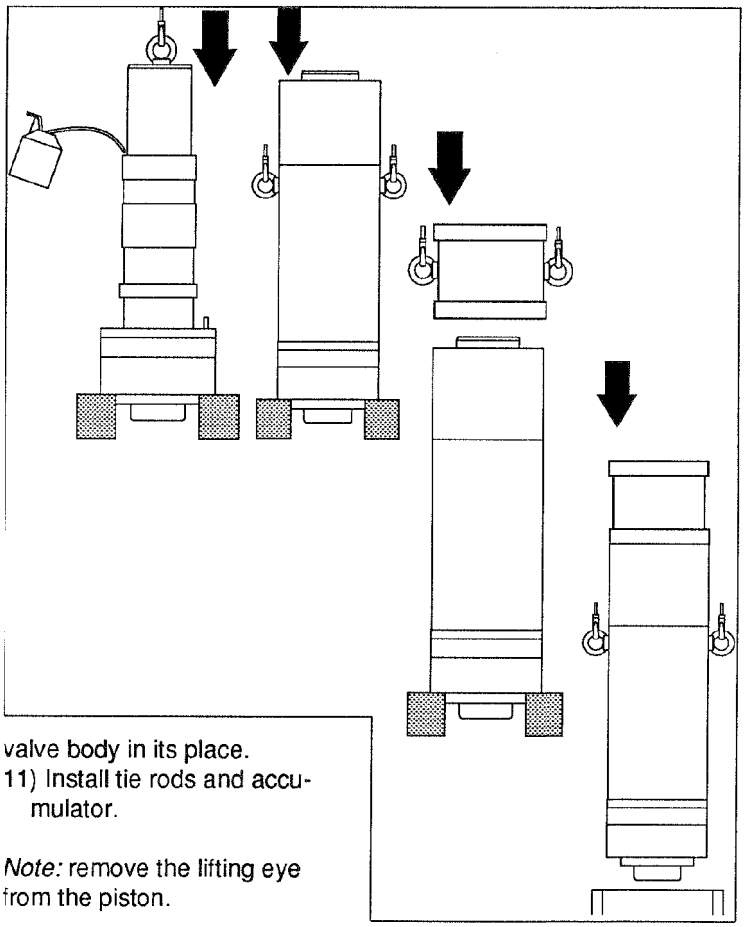
   Apply MoS_2 spray to the contact surfaces of cylinder **L** and seal carrier **A** and seal carrier, upper **P.**

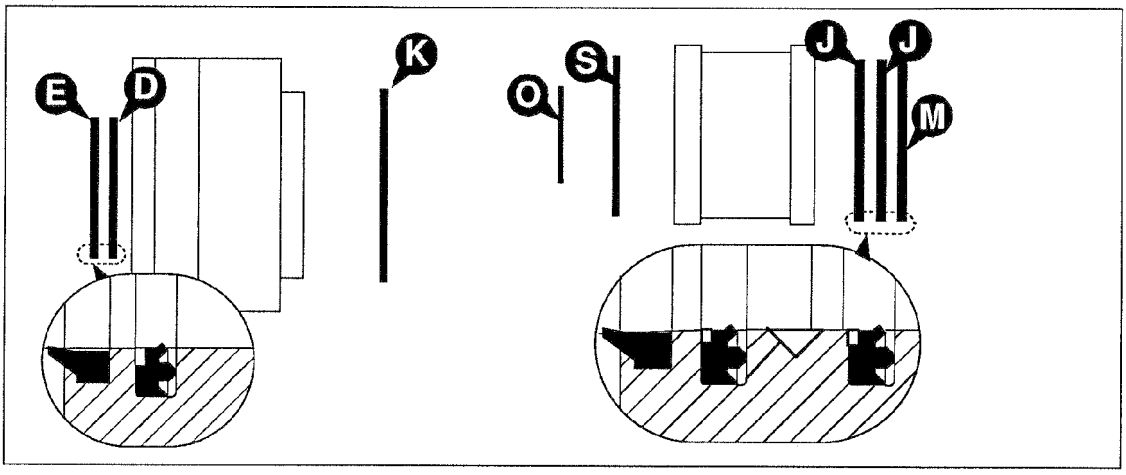
7) If necessary, use mounting screws (90 527) to tighten the seal carrier and cylinder together.
8) Install sealings **J**(2pcs), **S**, **O**, wiper **M**.
8) Lift the seal carrier/piston/ cylinder/seal carrier upper assembly on its place into the front head.

   Take care that the seal carrier does not fall down.

9) Check that opposite surfaces are clean. Put the guide pin **G** on its place in the seal carrier upper **P.**
   Apply MoS_2 spray to the contact surfaces of seal carrier upper and valve body.
10) Screw lifting eyes and put valve body in its place.
11) Install tie rods and accumulator.

Note: remove the lifting eye from the piston.





4.12 DISASSEMBLING AND ASSEMBLING OF FRONT END

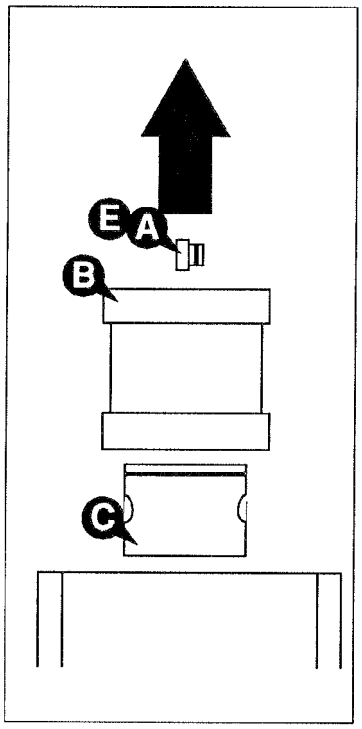
Disassembling

1) Remove accumulator, tie rods, valve body, seal carrier upper, cylinder, piston, seal carrier.

2) Remove the wedge **A** and the thrust ring **B** and the upper tool bushing **C**.

(The bushings **C** will wear only on two sides. If the biggest diameter is more than 117 mm (4.61"), bushing has to be rejected.)

Using sleeve puller, pull the upper tool bushing out. If bushing is tight, warm the under part of the front end.



Assembling

1) Check the parts carefully. If necessary use fine emery cloth or grinding agent.

Clean and oil/grease parts.

2) Heat the front end with propane flame and insert the bushing **C**.

4) Install the bushing **C** so that the grooves are upwards.

5) Install the thrust ring **B**.

7) Install the wedge **A** having O-ring **E**.

8) Install seal carrier, cylinder, piston, seal carrier upper, valve body, tie rods and accumulator.

Left- or right-handed hammer
It is possible to make the hammer either left- or right-handed (the pressure line is either on left hand side or on the right hand side).

When the hammer is shipped from the factory, the pressure line is on the right hand side.

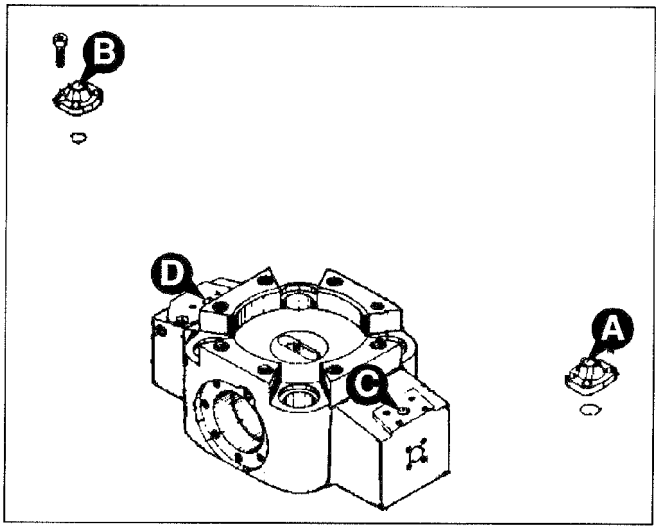
To make the hammer left-handed, install wedge **A** on the opposite side in the front head.

There is a small boring in the front head nearby wedge hole to indicate where to install wedge **A** in order to make the hammer right-handed.

5. SERVICE DATA

5.1 CONNECTIONS

Item	Remarks	Size	Qty
A	Pressure line adapter	(BSP) R 1"-int	1
B	Return line adapter	(BSP) R 1"-int	1
C	IN-port		
D	OUT-port		
E	Pressure measuring port plug in valve body, above check valve cover	R 1/4"	1



5.2 ACCUMULATOR CHARGING PRESSURE (+20 °C)

• High pressure accumulator: 4.0 MPa (40 bar, 580 psi)

5.3 MAIN INSPECTION

During installation inspection or after **50...100 operating hours.**

- Check the operating pressure of the hammer.
- Check the temperature of the hydraulic oil in continuous operation, max. + 80°C (+176°F).
- Check the efficiency of the hammer, impact rate and hammer´s evenness in operation.
- Check the pre-tightening torques of all bolts and tighten all bolts that are otherwise loose.
- Check all hydraulic connections.
- Check that the hydraulic hoses do not rub against anything in any boom position.
- Replace the hydraulic oil filters of the carrier.

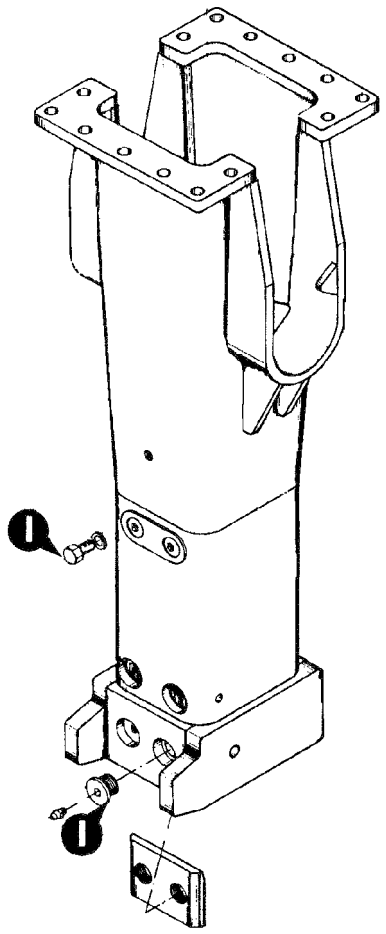
5.4 YEARLY SERVICE

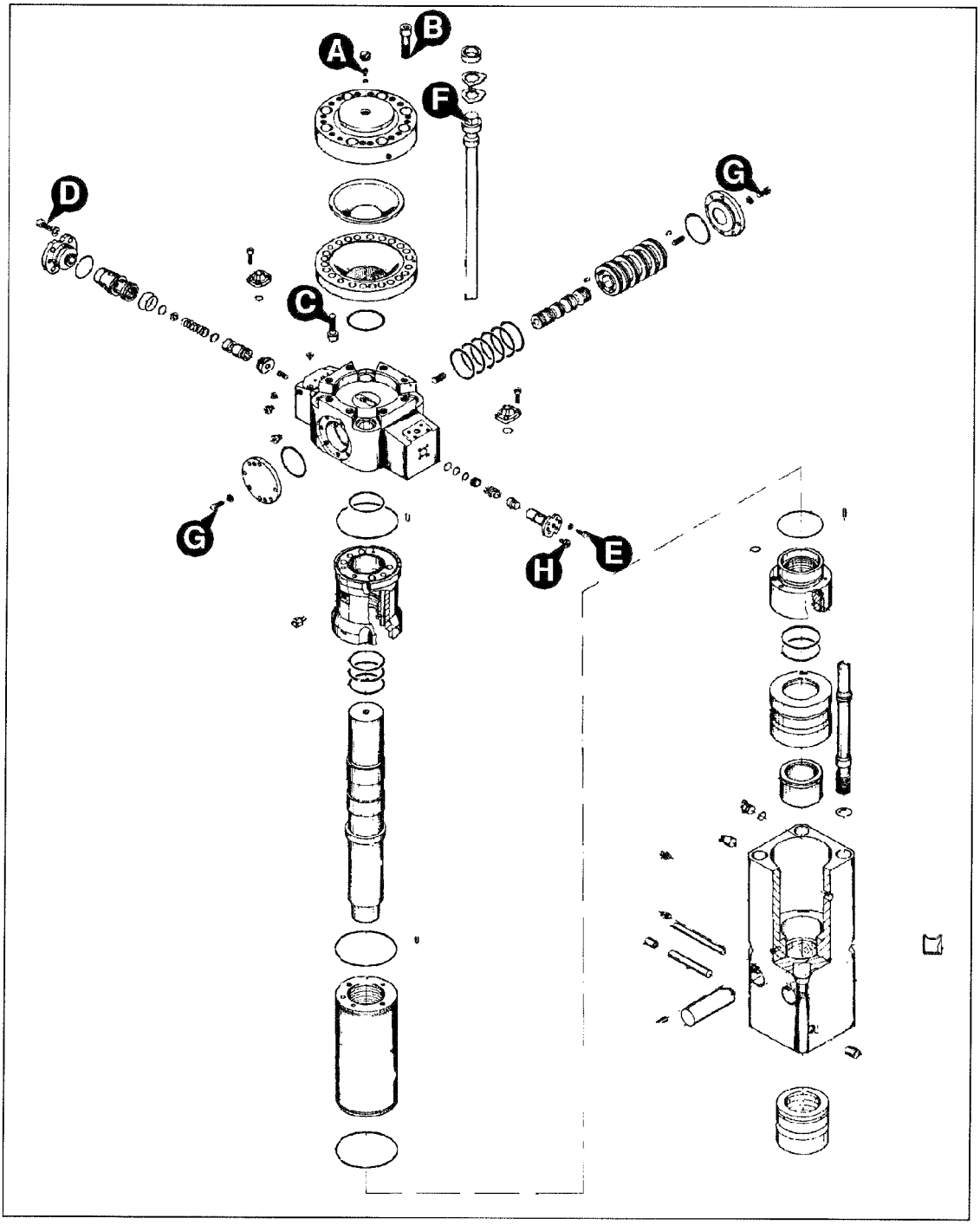
After **600 operating hours.**

- Change all sealings in the hammer and the accumulator membrane.
- Check all hammer parts and either replace or repair damaged parts.
- Measure the oil supply in the hammer circuit, pressure limitation and the back pressure.
- Adjust or repair as necessary.
- Replace the hydraulic oil filters of the carrier.
- Check all hydraulic hoses and replace if necessary.
- Check the hammer´s operation pressure, efficiency, impact rate and evenness of operation as well as the hydraulic oil temperature in continuous operation.
- Replace high pressure warning label, flying debris warning label, high noise level warning label and greasing labels in the hammer.

5.5 TIGHTENING TORQUES

Item	Nm	kpm	lbf ft	Remarks	Qty
A	20	2.0	15	Accumulator filling plug	1
B	450	45	332	Accumulator mounting screws	8
C	500	50	368	Accumulator cover mounting screws	16
D	200	20	147.5	Pressure control valve cover mount. screws	4
E	200	20	147.5	Check valve cover mounting screws	4
F	500*	50.0*	368*	Tierods *tighten further 120°	4
G	120	12	88	Main valve cover screws	14
H	33	3.3	24	Pressure measuring plug	1
I	1500	150	1105	Wearing plate screws	8

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B
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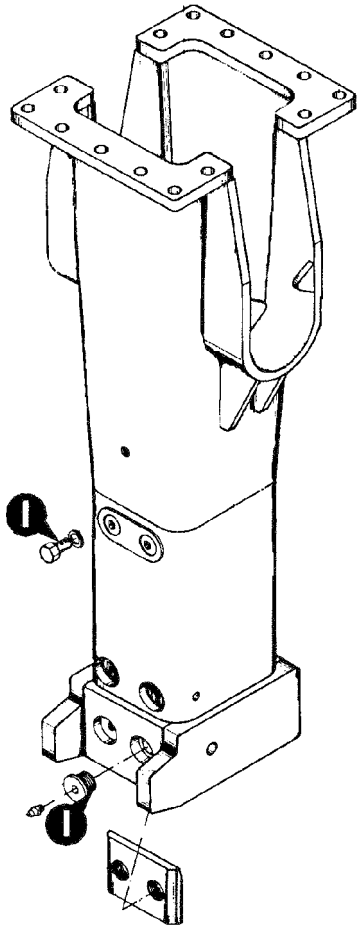
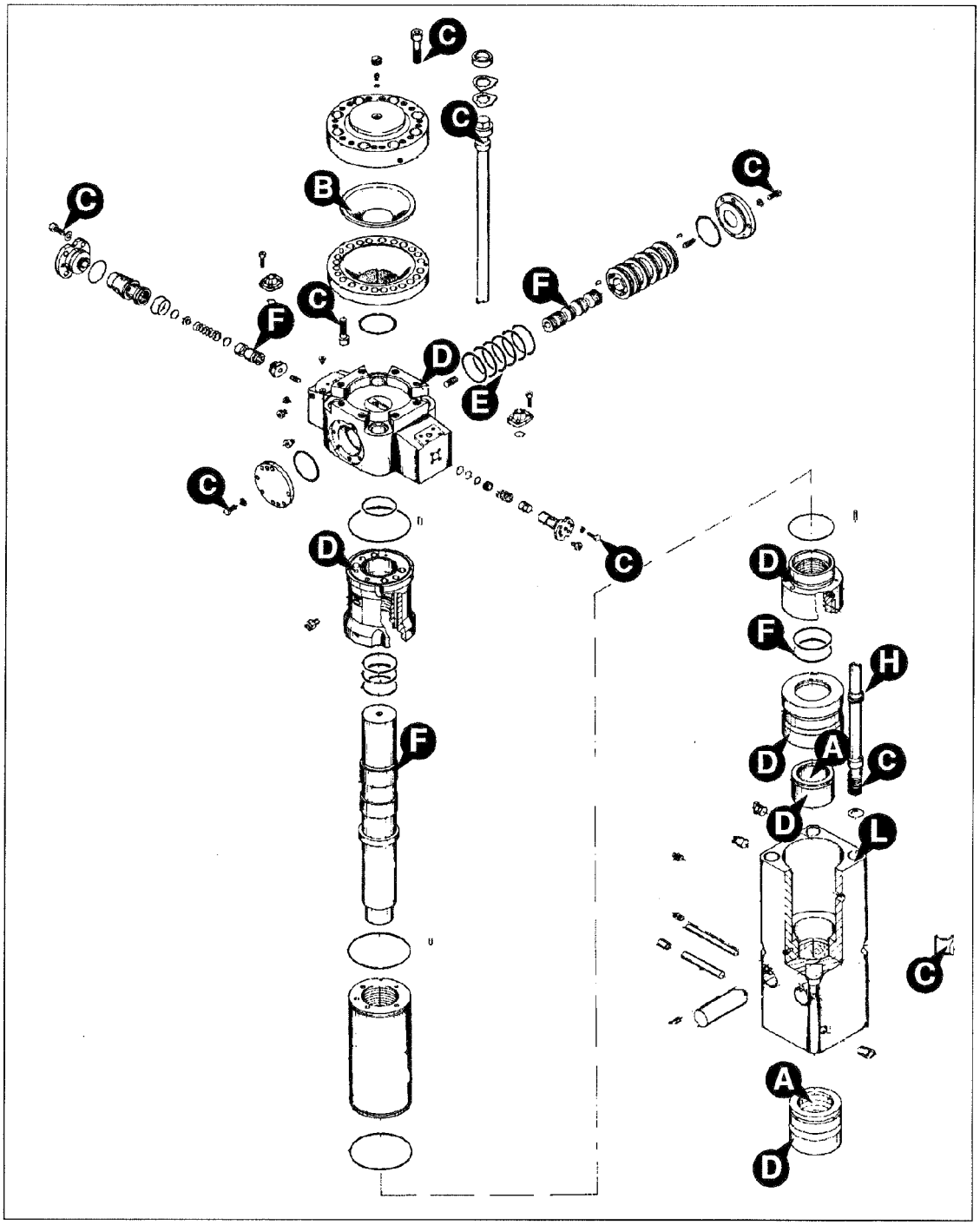
D
G
C
G
H
E

5.6 APPLICATION AREAS FOR SPRAYS AND GREASES

Item	Remarks
A	Tool grease (tool and inside tool bushings, wearing plates)
B	Silicon grease (gas side of the membranes)
C	Thread grease, e.g. ROCOL J 166 and MOLYKOTE BR2+
D	Molybdenum disulphide spray (MoS_2)
E	O-ring grease, e.g. SHELL ALVAANIA GREASE R2 and ESSO BEAGON 2 (all O-rings)
F	Oil (all sealings)
H	Cold-galvanizing spray, e.g. LPS cold-galvanizing spray
I	Locking fluid: LOCTITE 270
J	Locking fluid: medium locking force, e.g. LOCTITE 242 and TRULOC 375
K	Locking fluid: high locking force, e.g. LOCTITE 275, 270 and TRULOC 397, 360 [1]
L	Silicone compound (the groove between the front head and tie rods)

[1] All plugs except pressure measuring plug

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5.7 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
1. The hammer does not start.	1. The piston is in its lower hydraulic brake.	Keep the hammer control valve open and push the tool strongly against an object. The tool head lifts the piston out of the brake.
	2. The hammer control valve does not open.	When operating the hammer control valve, check that the pressure line will pulsate (that means the hammer control valve opens). If the valve does not operate, check the operating means: mechanical connections, pilot pressure or electrical control.
	3. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Check the installation. Check the relief valve operation. Measure the pressure of the high pressure line in the hammer. Adjust the relief valve in hydraulic circuit.
	4. Leakage from pressure to return in excavator hydraulic circuit.	Check the installation. Check the pump and other hydraulic components.
	5. Too much back pressure.	Check the installation.
	6. Failure in hammer valve operation.	Disassemble the hammer. Check main valve and pressure control valve.
	7. Piston failure	Disassemble the hammer.
2. The hammer operates irregularly but the blow has full power.	1. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Check the installation. Check the relief valve operation. Measure the pressure of the high pressure line in the hammer. Adjust the relief valve in hydraulic circuit.
	2. Failure in hammer valve operation.	Disassemble the hammer. Check main valve and pressure control valve.

TROUBLE	PROBABLE CAUSE	REMEDY
	3. Not enough feed force from the carrier.	Refer to correct working methods in Chapter 2 *Operation.*
3. The hammer operates poorly and the blow has no power.	1. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Check the installation. Check the relief valve operation. Measure the pressure of the high pressure line in the hammer. Adjust the relief valve in hydraulic circuit.
	2. There is no pressure in the pressure accumulator.	Disassemble the accumulator. Check the membrane. Charge accumulator.
	3. The working method is not correct.	Refer to correct working methods in Chapter 2 *Operation.*
	4. Failure in hammer valve operation.	Disassemble the hammer. Check main valve and pressure control valve.
4. Impact rate slows down.	1. Oil has overheated (over + 80°C)	Check for fault in oil cooling system or internal leak in hammer. Check hydraulic circuit of the carrier. Assemble extra oil cooler. Check relief valve operation in the carrier. Check the line size.
	2. Too much back pressure.	Check the installation. Check the line size in the return line.
	3. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Check the installation. Check the relief valve operation. Measure the pressure of the high pressure line in the hammer. Adjust the relief valve in hydraulic circuit.
	4. Leakage from pressure to return in excavator hydraulic circuit.	Check the pump and other hydraulic components.

TROUBLE	PROBABLE CAUSE	REMEDY
	5. Failure in hammer valve operation.	Disassemble the hammer. Check main valve and pressure control valve.
	6. There is no pressure in the pressure accumulator.	Disassemble the accumulator. Check the membrane. Charge accumulator.
	7. Hydraulic oil viscosity is too low.	Check hydraulic oil viscosity.
5. Oil overheats.	1. The relief valve in hydraulic circuit opens at too low pressure. The hammer operating pressure is not reached.	Check the installation. Check the relief valve operation. Measure the pressure of the high pressure line in the hammer. Adjust the relief valve in hydraulic circuit.
	2. Leakage from pressure to return in excavator hydraulic circuit.	Check the pump and other hydraulic components.
	3. Internal oil leak in the hammer.	Disassemble the hammer. Locate the oil leak. Change all O-rings and sealings.
	4. Hydraulic oil viscosity is too low.	Check hydraulic oil viscosity.
	5. Cooling capacity of the oil cooler is too small.	Assemble extra oil cooler.

5.8 SERVICE TOOLS FOR RAMMER S 55

DESCRIPTION	PART.NO.	QTY (PCS)
SPECIAL SERVICE TOOLS		
1. Accumulator charging device (complete)	40 633	1
2. Adapter (for N_2 - bottle) • French • British • American	 41 631 41 632 41 633	 1 1 1
3. Pressure gauge • 250 bar	 41 738	 1
4. Acc. assembly stand	30 276	1
5. Lifting eye • M24 x 2 • M24 • M20 • M12	 40 212 90 605 90 624 90 607	 2 2 2 2
6. Sleeve puller	40 210	1
7. Hook spanner 45/50 mm	90 621	1
8. Drift pin		2
9. Assembly stand (S54, S55, S56, S82, S84, S86)	30 905	1
10. Mounting screws M10 x 140	90 527	3
11. Punch Ø 11 mm 12. Punch Ø 12 mm 13. Punch Ø 25 mm	400368 400366 400367	1 1 1

5.8 SERVICE TOOLS FOR RAMMER S 55

DESCRIPTION		PART.NO.	QTY (PCS)
STANDARD SERVICE TOOLS			
1. Torque wrench • 150-700 Nm • 70 Nm	 3/4" 1/2"	 90 610 90 697	 1 1
2. Torque converter 1650 Nm		90 634	1
3. Ratchet handle	1/2"	90 660	1
4. Adapter • 3/4" - 1/2"		90 681	1
5. Hex. socket • 46 mm	3/4"		1
7. Allen type screw socket • 19 mm • 17 mm	3/4"	 90 699 90 612	 1 1
8. Allen type screw socket • 6 mm	1/2"	 90 683	 1
9. Sliding T-handle • 3/4"		 90 625	 1
10. Jigger 11. Lifting chain 12. Hammer,plastic 13. Hammer,ball headed 14. Screwdriver 15. Oil can 16. Tool box 17. Grease gun 18. Tool grease ESSO EOL232	 1000 g 680 g 6 x 150 mm 0,5 l 400 g	90 608 40 645 90 662 90 652 90 655 90 654 90 665 90 202 90 203	1 1 1 1 1 1 1 1 1

6. INSTALLATION

CAUTION!

Faulty installation can cause premature and possible damage to the hammer and to the carrier. Do not install Rammer hammers if you are unsure. Contact your Rammer distributor, Rammer or your local carrier dealer for more information.

6.1 INSTALLING THE HAMMER

Rammer S 55 can be installed on any carrier which meets the necessary hydraulic and mechanical installation requirements.

Observe the following general points when installing the hammer:

1) Ensure that the Rammer S 55 is positioned on firm, level ground before installing/ removing it.

2) If the hammer has to be in vertical position for installing/ removing, ensure that the hammer is supported safely.

3) make the carrier safe: e.g. parking brake engaged, engine stopped, hydraulic pressure released from S 55 supply hoses.

Hoses and pipes

When selecting line components check:

- correct line size
- max. working pressure
- suitability for high vibrations
- suitability to hammer's hose connector

Line size

- Oil flow 90...160 l/min:
  - pressure line: 25 mm (Inner diameter)
  - return line:25 mm (Inner diameter)
- too small line size causes:
  - increased back pressure
  - increased operating pressure
  - irregular blows
  - overheating of oil
- if line is too big
  - more expensive components

When installing the S 55, following hoses and pipes are recommended to be used to ensure that the oil flows correctly and the pressures are in correct limits.

Hoses

Pressure hose SAE 100 R9-16 (1")

Return hose SAE 100 R9-16 (1 ")

Pressure and return pipes

- check max. working pressure
- seamless precision steel pipes
- size according to recommended line size

6.2 HYDRAULIC INSTALLATION

The most important factor in the hydraulic system of the hydraulic hammer is a suitable oil supply in every condition.

Increasing the flow causes an increase in the operating pressure.

In addition to this, operating pressure increases by a value almost equal to **the return line counter pressure**.

Flow control valve

The hammer needs a **flow control valve** if the **output of the pump is more than the maximum allowed** for the hammer.

The oil flow controls the impact rate of the hammer.

Pressure relief valve

The pressure relief valve is a safety device which is used to protect the hammer when the pressure rises in the hydraulic circuit.

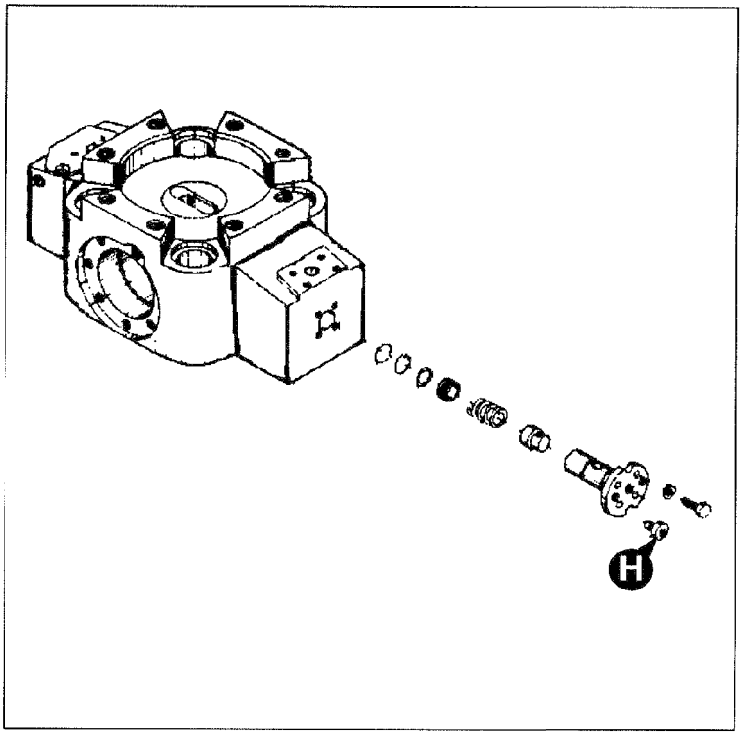
The operating pressure of the hammer determines the setting of the pressure relief valve in the pressure line.

The pressure relief valve setting should be approx. 50 bar higher

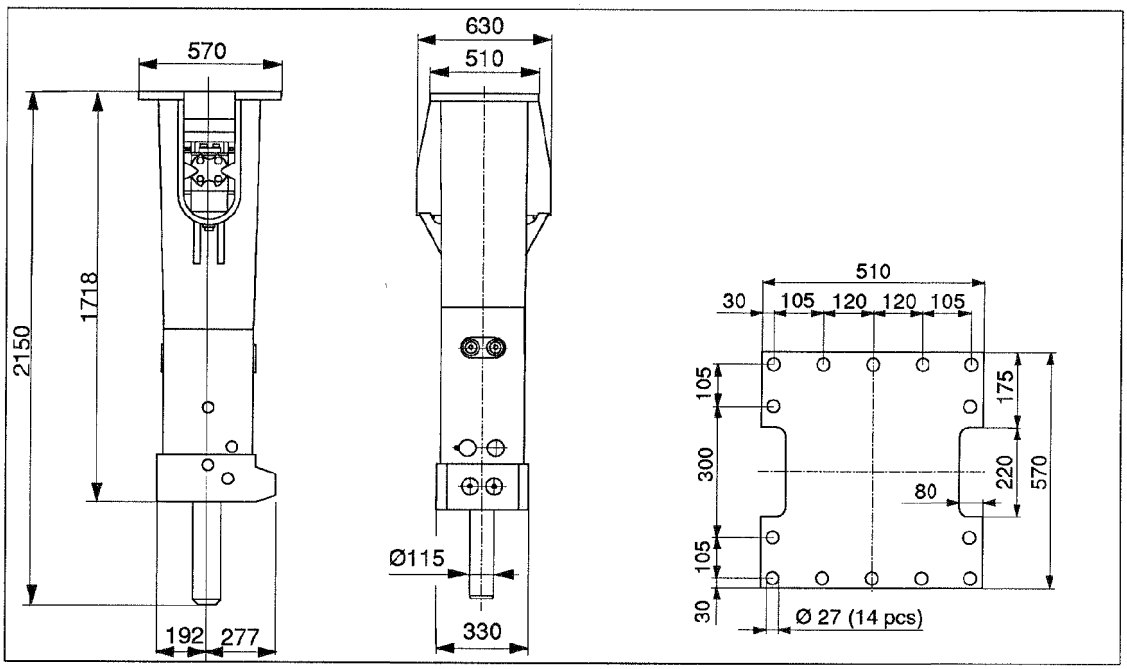
6.3 MEASURING HAMMER OPERATING PRESSURE

Operating pressure

- Stop the carrier engine.
- Assemble the high pressure gauge (250 bar) to the high pressure measuring port (R1/4") **H.** .
- Place the tool of the hammer e.g. on a thick steel plate.
- Adjust operating engine revolutions and start to operate the hammer.
- Read the average pressure from the high pressure gauge = operating pressure.
- Operating pressure is preadjusted at the factory and there should be no reason to adjust it.
- Stop the carrier and remove the gauges. Tighten the plug of the pressure measuring point, torque 33 Nm (3,3 kpm, 24 lbf ft).



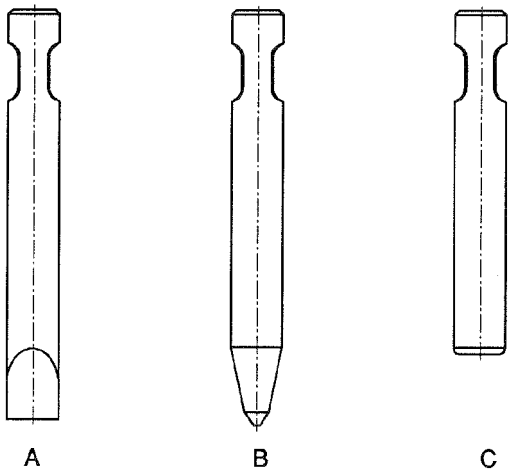
RAMMER S 55
TECHNICAL SPECIFICATION



Working weight (with mounting bracket and tool)	1270	kg
Impact energy	2800	J
Impact rate	315...600	1/min
Operating pressure	140	bar
Pressure relief (min)	190	bar
Pressure relief (max)	200	bar
Oil flow	90...160	l/min
Back pressure (max)	9	bar

Tool shank diameter	115	mm
Connections for hoses:		
• pressure line	(BSP) R 1"-int	
• return line	(BSP) R 1"-int	
Line size (min. inner dia.)		
• pressure line	25	mm
• return line	25	mm
Oil temperature	-20...+80	°C
Hydraulic oil viscosity	1000...15	cSt
Carrier weight	16...24	ton

RAMMER S 55
TOOLS



	Standard tools		
	A	B	C
Name	Chisel tool	Moil point	Blunt tool
Prod. no.	551	553	554
Length, mm (in)	1050 (41 3/8)	1050 (41 3/8)	850 (33 1/2)
Weight, kg (lb)	77 (169.8)	76 (167.6)	66.5 (146.6)
Diameter, mm (in)	115 (4 1/2)	115 (4 1/2)	115 (4 1/2)
Note			