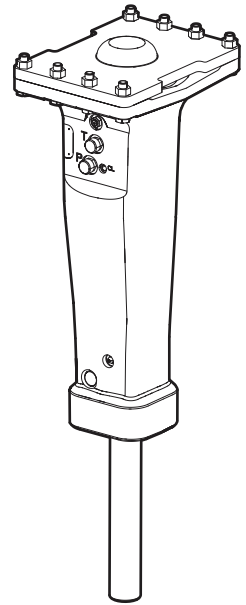


## Safety and operating instructions Hydraulic breakers





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# 1 Introduction

Epiroc is a leading productivity partner for the mining, infrastructure and natural resources industries. With cutting-edge technology, Epiroc develops and produces innovative drill rigs, rock excavation and construction equipment, and provides world-class service and consumables.

The company was founded in Stockholm, Sweden, and has passionate people supporting and collaborating with customers in more than 150 countries.

Construction Tools PC AB

Box 703

391 27 Kalmar

Sweden

## 1.1 About the Safety and operating instructions

The aim of the instructions is to provide you with knowledge of how to use the hydraulic breaker in an efficient, safe way. The instructions also give you advice and tell you how to perform regular maintenance on the hydraulic breaker.

Before using the hydraulic breaker for the first time you must read these instructions carefully and understand all of them.

## 2 Safety instructions

To reduce the risk of serious injury or death to yourself or others, read and understand the Safety and operating instruction before installing, operating, repairing, maintaining, or changing accessories on the machine.

Post this Safety and operating instruction at work locations, provide copies to employees, and make sure that everyone reads the Safety and operating instruction before operating or servicing the machine. For professional use only.

In addition, the operator or the operator's employer must assess the specific risks that may be present as a result of each use of the machine.

Save all warnings and instructions for future reference.

## 2.1 Safety signal words

The safety signal words Danger, Warning and Caution have the following meanings:

<b>DANGER</b>	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
<b>WARNING</b>	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
<b>CAUTION</b>	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

## 2.2 Personal precautions and qualifications

Only qualified and trained persons may operate or maintain the machine. They must be physically able to handle the bulk, weight, and power of the tool. Always use your common sense and good judgement.

### 2.2.1 Transport

Transport of the hydraulic breaker may only be undertaken by persons who:

- are authorised to operate a crane or fork-lift truck in conformity with the applicable national directives,
- are aware of all the relevant national safety instructions and accident prevention instructions
- and have read and understood the safety and transport chapters of this manual.

### 2.2.2 Installation, storage, maintenance and disposal

Installation, storage, maintenance and disposal of the hydraulic breaker may only be undertaken by persons who:

- are aware of all the relevant national safety instructions and accident prevention instructions
- and have read and understood the Safety and operating instructions.

### 2.2.3 Operation

Operation of the hydraulic breaker may only be undertaken by qualified carrier operators. Carrier operators are qualified if they:

- are trained to operate a carrier in conformity with national directives,

- are aware of all the relevant national safety instructions and accident prevention instructions
- and have read and understood the Safety and operating instructions.

### 2.2.4 Testing

Testing of the hydraulic installation must only be carried out by professional technicians. The technicians must be authorised to approve a hydraulic installation in accordance with national directives.

### 2.2.5 Personal protective equipment

Always use approved protective equipment. Operators and all other persons in the working area must wear protective equipment, including at a minimum:

- Protective helmet
- Hearing protection
- Impact resistant eye protection with side protection
- Respiratory protection when appropriate
- Protective gloves
- Proper protective boots
- Appropriate work overall or similar clothing (not loose-fitting) that covers your arms and legs.

### 2.2.6 Drugs, alcohol or medication

#### ▲ WARNING Drugs, alcohol or medication

Drugs, alcohol or medication may impair your judgment and powers of concentration. Poor reactions and incorrect assessments can lead to severe accidents or death.

- ▶ Never use the machine when you are tired or under the influence of drugs, alcohol or medication.
- ▶ No person who is under the influence of drugs, alcohol or medication may operate the machine.

## 2.3 Carrier, precautions

Before using or transporting the carrier with the hydraulic breaker attached, carefully read the carrier manufacturer's safety regulations and operating instructions.

Make sure that the carrier is equipped with adequate protective features, including a protective screen in front of the operator.

The hydraulic breaker must only be mounted on a carrier with sufficient load capacity.

Carriers without sufficient load capacity will not provide the required degree of stability and could even fall over during hydraulic breaker use, causing injury and damage.

## 2.4 Installation, precautions

### 2.4.1 Hydraulic system

#### ▲ DANGER Compressed gas, explosion hazard

The integrated piston accumulator is pressurized even when the hydraulic system is shut off. To dismantle the accumulator without first releasing the nitrogen gas can cause serious personal injury or death.

- ▶ Fill the integrated piston accumulator with nitrogen (N<sub>2</sub>) only.
- ▶ Only authorised personnel are qualified to work with the accumulator.

#### ▲ WARNING Hydraulic oil at high pressure

Thin jets of hydraulic oil under high pressure can penetrate the skin and cause permanent injury.

- ▶ Immediately consult a doctor if hydraulic oil has penetrated the skin.
- ▶ Never use your fingers to check for hydraulic fluid leaks.
- ▶ Keep your face away from any possible leaks.

#### ▲ WARNING Hydraulic oil

Spilled hydraulic oil can cause burns, accidents due to slippery conditions and will also harm the environment.

- ▶ Take care of all spilled oil and handle it according to your safety and environmental regulations.
- ▶ Never dismantle the hydraulic machine when the hydraulic oil is hot.
- ▶ Never run any hydraulic lines for attachment of the hydraulic machine through the drivers cab.

#### ▲ CAUTION Skin eczema

Hydraulic oil can cause eczema if it comes in contact with the skin.

- ▶ Avoid getting hydraulic oil on your hands.
- ▶ Always use protective gloves when working with hydraulic oil.
- ▶ Wash hands after contact with hydraulic oil.

## 2.4.2 Assembly or disassembly

### ▲ WARNING Moving parts

Risk for leaking oil and personal injury, such as crushed hands and fingers.

- ▶ Never check bores or passages with hands or fingers.
- ▶ Any boom movements must only be done in cooperation with the personnel mounting the hydraulic breaker.
- ▶ If the hydraulic breaker is mounted on a quick hitch coupling, make sure it is locked securely and all risks of the hydraulic breaker coming loose are eliminated.

## 2.5 Operation, precautions

### ▲ DANGER Explosion hazard

If a working tool comes into contact with explosives or explosive gases, an explosion could occur. When working on certain materials and when using certain materials in machine parts, sparks and ignition can occur. Explosions will lead to severe injuries or death.

- ▶ Never operate the machine in any explosive environment.
- ▶ Never use the machine near flammable materials, fumes or dust.
- ▶ Make sure that there are no undetected sources of gas or explosives.

### ▲ WARNING Operating pressure

If the maximum operating pressure for the hydraulic machine is exceeded, the accumulator can be over charged which can result in material damage and personal injury.

- ▶ Always run the hydraulic machine with the correct operating pressure. See "Technical data".

### ▲ WARNING Dust and fume hazard

Dusts and/or fumes generated or dispersed when using the machine may cause serious and permanent respiratory disease, illness, or other bodily injury (for example, silicosis or other irreversible lung disease that can be fatal, cancer, birth defects, and/or skin inflammation).

Some dusts and fumes created by drilling, breaking, hammering, sawing, grinding and other construction activities contain substances known to the State of California and other authorities to cause respiratory disease, cancer, birth defects, or other reproductive harm. Some examples of such substances are:

- ▶ Crystalline silica, cement, and other masonry products.
- ▶ Arsenic and chromium from chemically-treated rubber.
- ▶ Lead from lead-based paints.

Dust and fumes in the air can be invisible to the naked eye, so do not rely on eye sight to determine if there is dust or fumes in the air.

To reduce the risk of exposure to dust and fumes, do all of the following:

- ▶ Perform site-specific risk assessment. The risk assessment should include dust and fumes created by the use of the machine and the potential for disturbing existing dust.
- ▶ Use proper engineering controls to minimize the amount of dust and fumes in the air and to minimize build-up on equipment, surfaces, clothing, and body parts. Examples of controls include: exhaust ventilation and dust collection systems, water sprays, and wet drilling. Control dusts and fumes at the source where possible. Make sure that controls are properly installed, maintained and correctly used.
- ▶ Wear, maintain and correctly use respiratory protection as instructed by your employer and as required by occupational health and safety regulations. The respiratory protection must be effective for the type of substance at issue (and if applicable, approved by relevant governmental authority).
- ▶ Work in a well ventilated area.
- ▶ If the machine has an exhaust, direct the exhaust so as to reduce disturbance of dust in a dust filled environment.
- ▶ Operate and maintain the machine as recommended in the operating and safety instructions
- ▶ Select, maintain and replace consumables/ working tools/ other accessories as recommended in the operating and safety instructions. Incorrect selection or lack of maintenance of consumables/ inserted tools/ other accessories may cause an unnecessary increase in dust or fumes.
- ▶ Wear washable or disposable protective clothes at the worksite, and shower and change into clean clothes before leaving the worksite to reduce exposure of dust and fumes to yourself, other persons, cars, homes, and other areas.
- ▶ Avoid eating, drinking, and using tobacco products in areas where there is dust or fumes.
- ▶ Wash your hands and face thoroughly as soon as possible upon leaving the exposure area, and always before eating, drinking, using tobacco products, or making contact with other persons.
- ▶ Comply with all applicable laws and regulations, including occupational health and safety regulations.
- ▶ Participate in air monitoring, medical examination programs, and health and safety training programs provided by your employer or trade organizations and in accordance with occupational health and



safety regulations and recommendations. Consult with physicians experienced with relevant occupational medicine.

- ▶ Work with your employer and trade organization to reduce dust and fume exposure at the worksite and to reduce the risks. Effective health and safety programs, policies and procedures for protecting workers and others against harmful exposure to dust and fumes should be established and implemented based on advice from health and safety experts. Consult with experts.
- ▶ Residues of hazardous substances on the machine can be a risk. Before undertaking any maintenance on the machine, clean it thoroughly.

#### ▲ **WARNING Electric shock**

The hydraulic breaker is not insulated against electric current. If the hydraulic breaker come in contact with electric circuits or other electrical power sources, there is a risk of severe injury or death.

- ▶ Never work in the proximity of electric circuits or other electrical power sources.
- ▶ Make sure there are no hidden electric circuits in your working area.

#### ▲ **WARNING Projectiles**

Failure of the work piece, of accessories, or even of the hydraulic breaker itself may generate high velocity projectiles. During breaking, splinters, or other particles may become projectiles and cause bodily injury by striking the operator or other persons. Also, breakage of the work piece, accessories, or the working tool may generate high velocity projectiles that can cause bodily injury. In addition, objects falling from a height can cause bodily injury. To reduce risks:

- ▶ Close off the working area.
- ▶ Before starting, make sure that no persons are in the danger area, 20 meters both horizontally and vertically from the hydraulic breaker.
- ▶ Immediately switch off the hydraulic breaker when persons are present in the danger area.
- ▶ Press the working tool against the working surface before you start.
- ▶ Never operate unless the working tool is retained in the hydraulic breaker with a proper tool retainer.

#### ▲ **WARNING Noise hazard**

High noise levels can cause permanent and disabling hearing loss and other problems such as tinnitus (ringing, buzzing, whistling, or humming in the ears). To reduce risks and prevent an unnecessary increase in noise levels:

- ▶ Risk assessment of these hazards and implementation of appropriate controls is essential.
- ▶ Operate and maintain the machine as recommended in these instructions.
- ▶ Select, maintain and replace the working tool as recommended in these instructions.
- ▶ If the machine has a silencer, check that it is in place and in good working condition.
- ▶ Always use hearing protection.
- ▶ Use damping material to prevent work pieces from 'ringing'.

## 2.6 Maintenance, precautions

#### ▲ **WARNING Involuntary start**

An involuntary start of the hydraulic breaker can lead to severe injuries.

- ▶ Follow the instructions in the carrier manual to prevent involuntary start of the hydraulic breaker.
- ▶ Installation of a start circuit on the hydraulic breaker must be made in a way that avoids any unintentional starts.
- ▶ A foot pedal on the carrier must be equipped with a protection cover.

#### ▲ **WARNING Hydraulic system under high pressure**

Maintenance work on a hydraulic breaker under pressure can lead to severe injuries. Connections can loosen suddenly, parts can suddenly move and hydraulic oil can be ejected.

- ▶ Depressurise the hydraulic system before performing maintenance on the hydraulic breaker or the carrier.

#### ▲ **WARNING Machine modification**

Any machine modification may result in bodily injuries to yourself or others.

- ▶ Never modify the machine. Modified machines are not covered by warranty or product liability.
- ▶ Always use approved original parts, tools, and accessories.
- ▶ Change damaged parts immediately.
- ▶ Replace worn components in good time.

**▲ WARNING Hot working tool**

The tip of the working tool gets very hot during operation. Touching it may lead to burns.

- ▶ Never touch the hot working tool.
- ▶ If you have to carry out any activities, wait for the working tool to cool down first.

**▲ WARNING Working tool hazards**

Accidental engagement of the start and stop device during maintenance or installation can cause serious injuries, when the power source is connected.

- ▶ Never inspect, clean, install, or remove the working tool while the power source is connected.

## 2.7 Storage, precautions

**▲ WARNING Heavy hydraulic breaker and working tool**

The hydraulic breaker and the working tool are heavy equipment. If the breaker or working tool topple over or fall down from where they are stored, it can result in material damage and personal injury.

- ▶ Store the hydraulic breaker and the working tool so that falling or rolling down is prevented.

### 3 Overview

To reduce the risk of serious injury or death to yourself or others, read the Safety instructions section found on the previous pages of this manual before operating the machine.

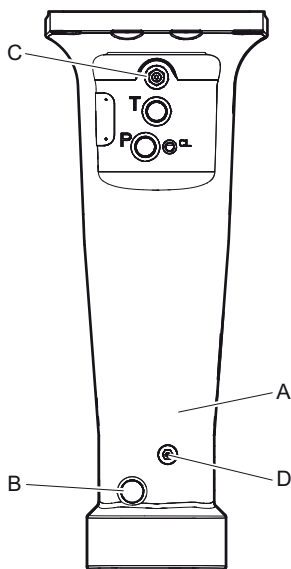
### 3.1 Design and function

EC is a range of rig mounted hydraulic breakers designed for all kinds of demolition works. No other use is permitted.

The hydraulic breaker is operated from the driver's cab of the carrier using the carrier's hydraulic system. The breaker frequency is controlled by the oil flow from the carrier.

To choose the correct working tool, see the Spare parts list.

### 3.2 Main parts

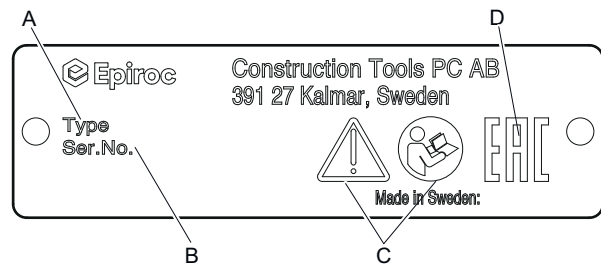


- A. Breaker body
- B. Tool retainer
- C. Gasfilling valve
- D. Lubrication nipple

### 3.3 Labels

The machine is fitted with labels containing important information about personal safety and machine maintenance. The labels must be in such condition that they are easy to read. New labels can be ordered from the spare parts list.

#### 3.3.1 Data plate



- A. Machine type
- B. Serial number
- C. The warning symbol together with the book symbol means that the user must read the safety and operating instructions before the machine is used for the first time.
- D. The EAC symbol means that the machine is EAC approved

#### 3.3.2 Labels on the accumulator



Read through the overhaul instructions carefully before servicing or charging.



The accumulator must only be charged with Nitrogen.

**NOTICE** Only certified personnel are allowed to work with the accumulator.

## 4 Transport

### ▲ WARNING Falling hydraulic breaker

If the hydraulic breaker is tipping over and falling, it may cause serious injury.

- ▶ Place the hydraulic breaker in a safe position where it cannot fall over and cause damage.

### 4.1 Lifting the hydraulic breaker

Carefully check that the carrier is stable enough when transporting, performing maintenance, or other kinds of work with the hydraulic breaker.

The hydraulic breaker is delivered in a box. To lift the hydraulic breaker in a safe way, fit the lifting strap in the manner shown in the illustration below.

### 4.2 Transport using a forklift

When using a forklift. Place the hydraulic breaker at a pallet. Use wedges and strapping to secure it. Slowly lift and transport the hydraulic breaker to its intended destination.

### 4.3 Transport using a lorry

Put the hydraulic breaker on an anti-slip mat at the lorry. Secure the machine to the loading surface with straps.

Observe all the applicable national and regional regulations on securing loads.

## 5 Installation

Before installing the hydraulic breaker on the carrier or operating it, read the operation manual and safety instructions provided by the carrier manufacturer. Follow all instructions.

The carrier must have the appropriate hydraulic system for operation of the breaker.

If the carrier is too large for the hydraulic breaker it may lead to broken working tools and increased wear. See "Technical data" for choosing suitable carrier.

The safety equipment in the hydraulic system must be checked for quality (CE mark, etc.), suitability and functionality by a professional or authorised supervisor before use.

## 5.1 Hoses and connections

### ▲ WARNING Whipping hydraulic hose

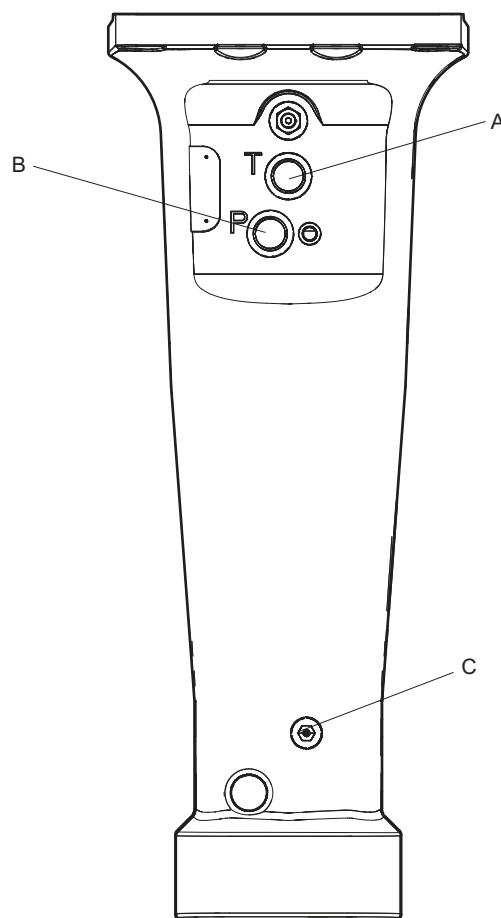
Hydraulic hoses under pressure can whip uncontrollably if screws loosen or are loosened. A whipping hydraulic hose can cause severe injuries.

- ▶ Depressurize the hydraulic system before loosening the connection of a hydraulic hose.
- ▶ Tighten the nuts on the connections of the hydraulic hoses to the required torque.



Type of nipple: ORFS standard nipple. The nipple dimensions can be found in the Spare parts list.

The quality of the hydraulic hoses must be 2SC (according to EN 857) or better when connecting the breaker to the carrier. If quick couplings are to be used, we recommend using the 'Flat Face' quick coupling. This type is sturdy and easy to clean. The quick coupling pressure class must agree with the carrier's working pressure.

Always clean the quick couplings before mounting or dismounting. Always plug hoses and hose nipples with tight and clean end caps when dismounting.



- A. Tank line
- B. Pressure line
- C. Central lubrication point

<b>Hose connections</b>	
Description	Tank, return line
Symbol	
Thread size	M26 x 1.5
Description	Pressure to breaker
Symbol	
Thread size	M26 x 1.5

<b>Tightening torque for pressure and return hose</b>	
ES 60	150 Nm (110 ft lbs)
ES 70	150 Nm (110 ft lbs)
ES 80	210 Nm (155 ft lbs)

**NOTICE** The tightening torques in the table above are valid when the pressure and return hose are mounted directly on the hydraulic breaker's connection nipple. If the pressure and return hose are connected with an additional connection nipple, another tightening torques must be used.

## 5.2 Hydraulic oil

Normally the type of hydraulic oil the carrier is using also works for the hydraulic breaker. When a hydraulic breaker is connected to the carrier, the hydraulic oil will get dirty faster. Check and follow the carrier's instructions for changing oil and oil filter.

It is common to change the oil filter more frequent when a hydraulic breaker is installed.

**NOTICE** When the hydraulic breaker is delivered it contains some mineral based hydraulic oil. Before connecting to the carrier's hydraulic system, check which type of hydraulic oil the carrier is using. Mixing different types of hydraulic oil may destroy the lubrication quality which can lead to machine damage.

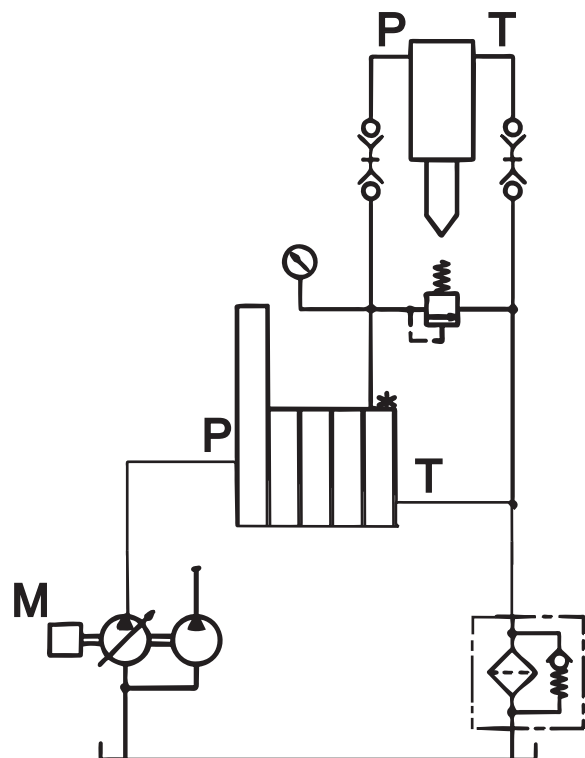
In order to protect the environment we recommend the use of biologically degradable hydraulic oil.

<b>Viscosity</b>	
Viscosity (permitted)	15-100 cSt

**NOTICE** Always use clean oil and filling equipment.

## 5.3 Pressure adjustment

To ensure that the accumulator and hammer are not overloaded, a separate pressure relief valve should be installed, see picture below. It is set at a value of 30 bar (435 psi) over the hammer's maximum operating pressure. If the carrier's breaker circuit is already equipped with a pressure limiting valve, no extra valve is necessary.



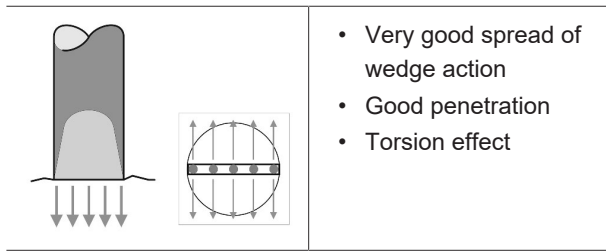
## 5.4 Working tool

### 5.4.1 Selecting the right working tool

#### 5.4.1.1 Conical moil point

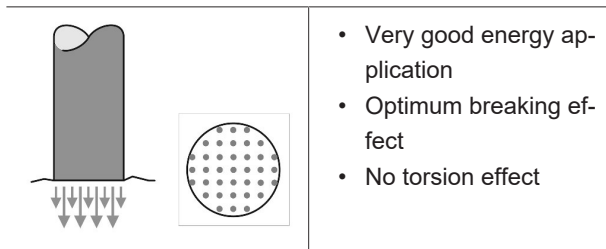
	<ul style="list-style-type: none"> <li>• Very good penetration</li> <li>• Regular spread of wedge action</li> <li>• No torsion effect</li> </ul>
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### 5.4.1.2 Chisels and spades



- Very good spread of wedge action
- Good penetration
- Torsion effect

### 5.4.1.3 Blunt tool



- Very good energy application
- Optimum breaking effect
- No torsion effect

## 5.4.2 Mounting and dismantling the working tool

### ▲ WARNING Running engine

Changing the inserted tool or accessories while the carrier's engine is running can cause serious injury.

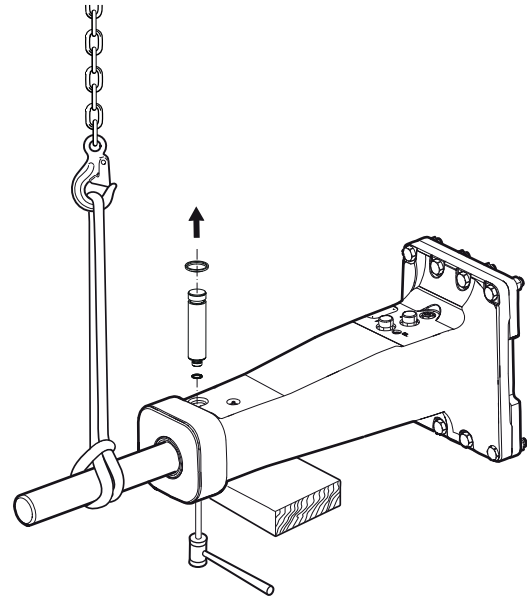
- Secure the carrier against involuntary activation.

Before you start mounting or dismantling the working tool, do the following:

1. Place the hydraulic breaker on timber support blocks. The boring on the back side of the hydraulic breaker has to remain free.
2. Shut off the carrier's engine.
3. Remove the plug from the breaker body, at the retainer pin.

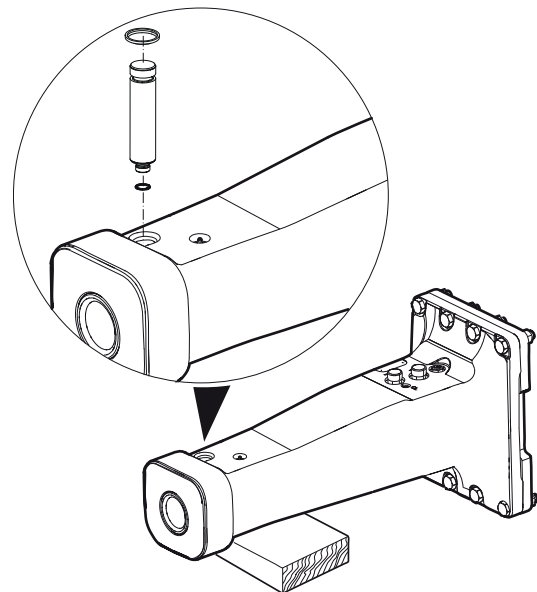
### Dismounting the working tool:

1. Press the retainer pin out from the hole at the back upwards until you can remove it through the hole on the front side.



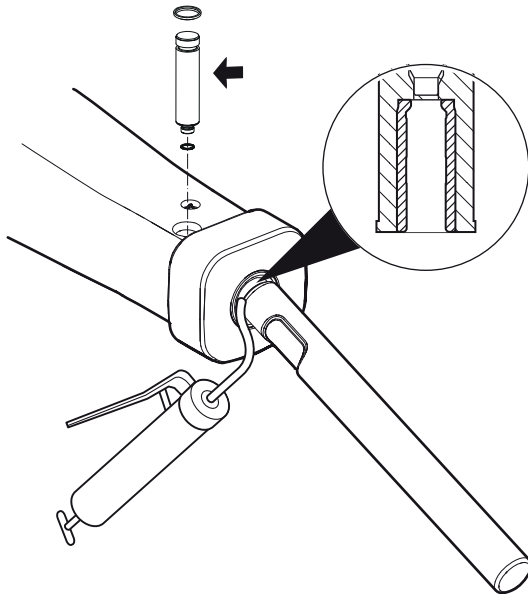
**NOTICE** Dismount the working tool with a lifting strap to reduce the risk of crushed body parts. Some working tools are heavy, therefore lift out the working tool in a safe way.

2. Check that the O-rings and retainer pin are not worn out or damaged. Change if necessary.

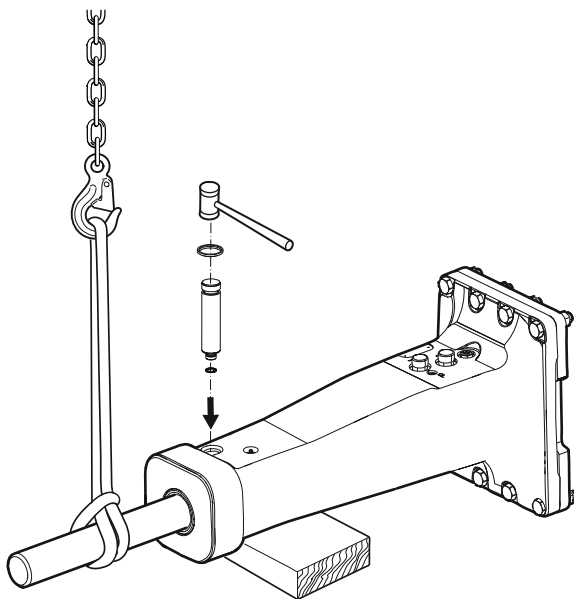


### Mounting the working tool:

1. Clean and lubricate the bushing plentifully. This is especially important when mounting a new working tool.



2. Mount the working tool.
3. Rotate the working tool to spread the grease.
4. Mount the retainer pin, and make sure it remains in position so it not falls through the boring at the back.



## 6 Operation

**NOTICE** The hydraulic breaker or the working tool is not to be used as a lifting device. When lifting heavy components use the hook on the carrier arm.

### 6.1 Preparation before breaking

#### 6.1.1 Operating temperatures

The operating temperatures of the hydraulic breaker are between  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) and  $+80^{\circ}\text{C}$  ( $+176^{\circ}\text{F}$ ).

#### ▲ CAUTION Temperature hazard

The hydraulic breaker and the hydraulic oil system of the carrier can be damaged if the hydraulic breaker is used at higher or lower temperatures.

- ▶ Only start the hydraulic breaker when the hydraulic oil has reached the proper operating temperature.
- ▶ If the ambient temperature is below  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ), you must warm up the working tool and the hydraulic breaker before use.
- ▶ If the oil temperature exceeds  $+80^{\circ}\text{C}$  ( $+176^{\circ}\text{F}$ ), you must not use the hydraulic breaker as the oil quality becomes inadequate which severely shortens the life time of seals and O-rings.

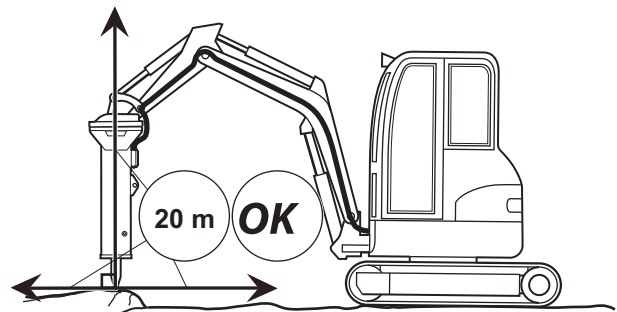
#### 6.1.2 Engine rpm

Too high engine rpm only results in increased fuel consumption and increased oil temperature. Adapt the engine rpm to the recommended value to give the correct operating oil flow.

### 6.2 Operating

#### 6.2.1 Risk area

Before starting the hydraulic breaker, make sure that no persons are in the risk area, 20 meters (66 ft) both horizontally and vertically from the hydraulic breaker.



## 6.2.2 Breaking

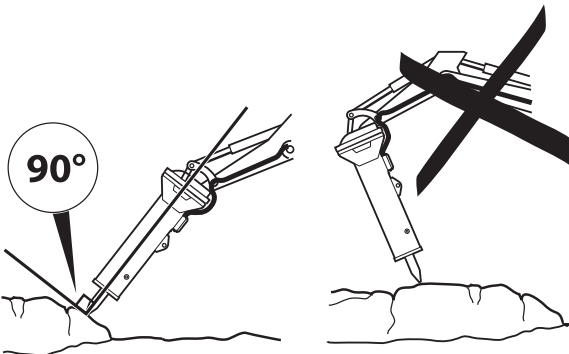
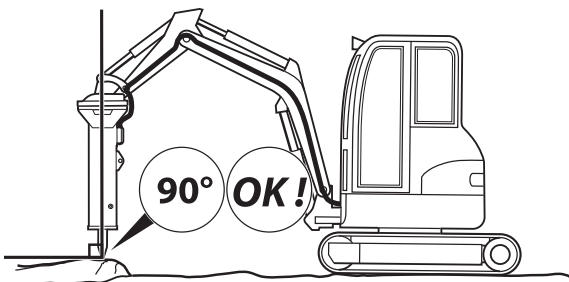
### ▲ CAUTION Machine and tool hazard

Continuous operation at full extension and/or retraction can result in damage to the hydraulic cylinders.

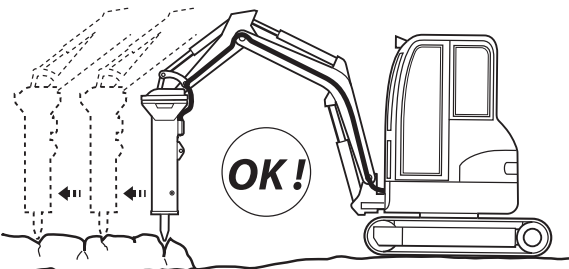
- ▶ Always avoid operating the breaker with the cylinders fully extended or retracted.
- ▶ Reposition the carrier and/or boom to avoid fully extended or retracted cylinders.
- ▶ Pay attention and look at what you are doing.

Never start the hydraulic breaker until both carrier and the hydraulic breaker are in the correct position.

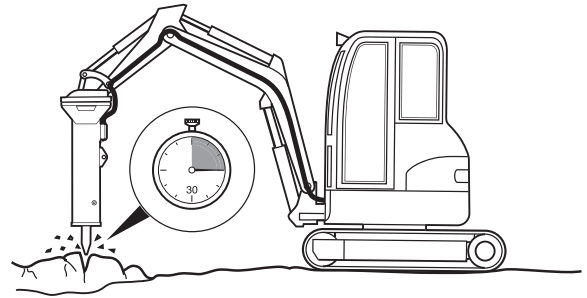
- Direct the hydraulic breaker in a position 90° towards the object.



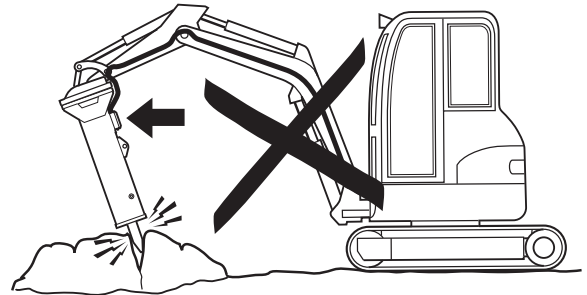
- Start near the edge and work your way in towards the middle. Never start in the middle of large objects.



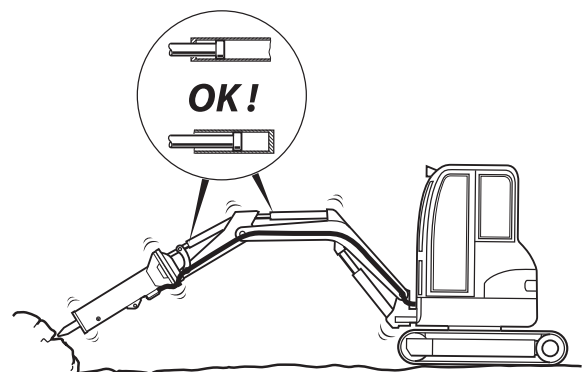
- Never run the hydraulic breaker longer than 15 seconds on the same spot. Move the working tool to a new position if the object does not break.



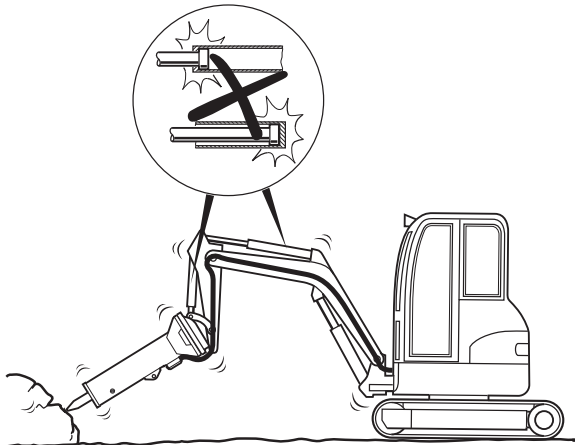
- Never bend with the working tool.



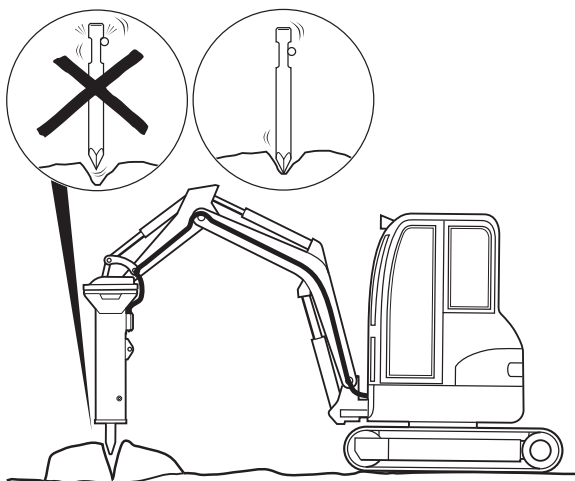
- Use the correct feed pressure. When the feed pressure is correct the hydraulic breaker is working at its best and the vibrations are at a minimum. Also the wear on the bushing and inserted tool is kept to a minimum.
- Listen to the sound from the hydraulic breaker. The sound changes if there is any bending between the working tool and bushing.
- Never run the breaker with the boom cylinders at their end positions. It may cause damage to the carrier.



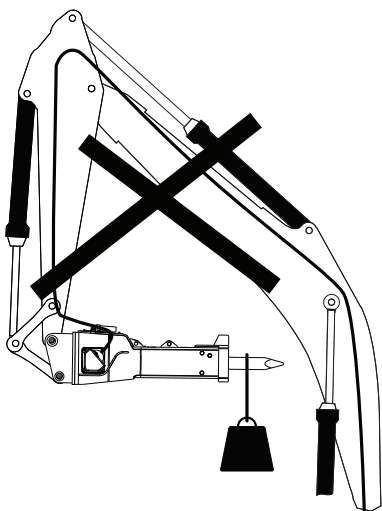




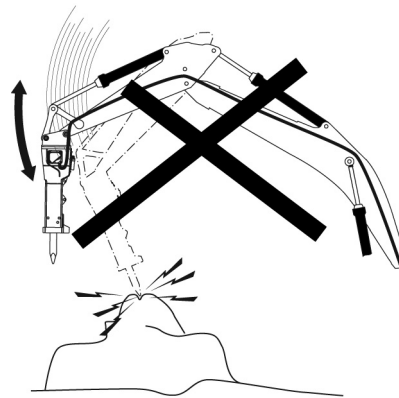
- Avoid idling strokes; it causes wear on both working tool and tool retainers.



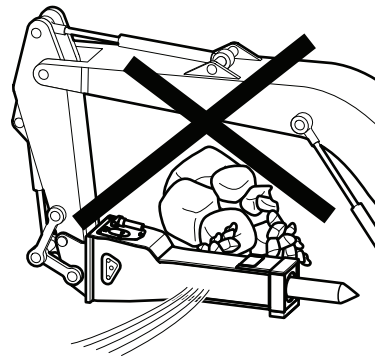
- The hydraulic breaker or the working tool is not to be used as a lifting device. When lifting heavy components use the hook on the carrier arm.



- Never use the hydraulic breaker as a sledge hammer to demolish material.

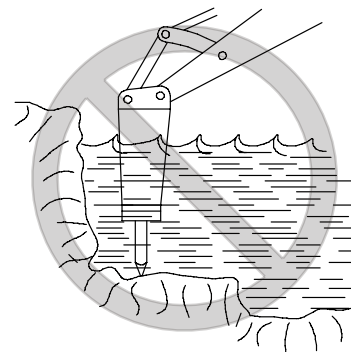


- Never use the hydraulic breaker to move debris.



### 6.2.3 Use under water

- Never use the hydraulic attachment under water. This would seriously damage the hydraulic attachment and may damage the whole hydraulic installation.



## 7 Maintenance

It is essential that regular maintenance is performed to maintain the breakers maximum efficiency.

Equipment that is insufficiently maintained can be dangerous for both the operator and persons near the breaker. Make sure that regular maintenance routines with lubrication are followed to keep the equipment safe and efficient.

### 7.1 Lubrication

Lubricate the chisel shank thoroughly every two hours using high-temperature grease such as genuine chisel grease from your supplier. This also lubricates the bushing and the tool holder; 5-10 pumps of the grease gun is sufficient. Stop when the grease starts to emerge at the chisel holder or between the chisel and the bushing.

#### ▲ WARNING Running engine

If the carrier's engine is running when lubricating the working tool manually there is a risk of severe accidents.

- ▶ Always switch off the carrier's engine to avoid accidents.

During lubrication, the chisel must be pressed against the hammer piston so that the space between piston and the chisel does not fill with grease.

### 7.2 Piston accumulator

#### ▲ WARNING Explosion hazard

Use of other gases than Nitrogen (N<sub>2</sub>) can cause an explosion.

- ▶ Charge the accumulator with Nitrogen (N<sub>2</sub>) only!

As the manufacturer we offer a service box containing all necessary tools and parts required to service the piston accumulator. See the Spare parts list.

If the hammer's performance begins to deteriorate, we recommend that you check the pressure in the piston accumulator.

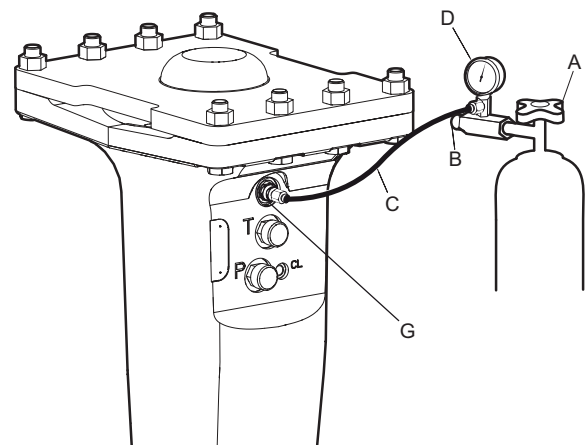
**NOTICE** The pressure must be checked with the hammer at a working temperature between 60-70 °C (140-158 °F).

To measure the pressure, bring down the hammer with no pressure on the chisel. Detach the plug from the charge valve (G) and connect the test pressure gauge.

The piston accumulator only needs to be filled if the pressure falls below the minimum level.

#### Filling

1. Connect pressure relief valve (B) to gas bottle valve (A).
2. Connect gas hose (C) to pressure relief valve (B) as shown in figure.
3. Close pressure relief valve (B).
4. Open gas bottle valve (A).
5. Remove the plug from the charge valve (G).
6. Guide the nozzle of the hose (C) into the charge valve.
7. Carefully open the relief valve (B).
8. Fill the piston accumulator.
9. Read the pressure on the pressure gauge (D).
10. Close the pressure relief valve when the desired pressure has been reached.  
Pull the gas hose out of the charge valve (G) and fit the plug.
11. Close gas bottle valve (A).



#### Checking and reducing the gas pressure

1. Always use the gas hose (C) and the pressure gauge (D) when checking the gas pressure.
2. Connect the gas hose to the pressure gauge.
3. Remove the plug from the charge valve (G).
4. Press the nozzle of the gas hose into the charge valve and read the pressure.
5. Reduce the pressure by repeatedly inserting and removing the nozzle.

**NOTICE** Only the nozzle may be used to reduce the pressure. Never use pins, screwdrivers or other pointed instruments, as these can damage the charge valve.

## 7.3 Every second hour

Regularly lubricate the working tool, the tool retainer and the bushings.

### 7.3.1 Lubricating with a grease gun

#### ▲ **WARNING Hot working tool during operation and a period of time after use**

- ▶ Avoid contact with the working tool.

#### ▲ **WARNING Hot hydraulic breaker during operation and a period of time after use**

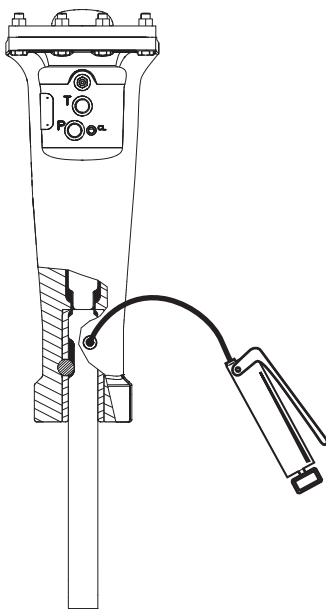
- ▶ Avoid contact with the hydraulic breaker.

#### ▲ **CAUTION Skin eczema**

Grease can cause eczema if it comes in contact with the skin.

- ▶ Avoid getting grease on your hands. Wash thoroughly after contact.

1. Press the working tool all the way into the breaker up to the stop (A). Otherwise the space between the top of the working tool and the piston will be filled with grease, and damage can occur to seals, piston, and cylinder.



2. Lubricate the working tool's shank plentifully during all upward operations. The bushing and the working tool must be lubricated so frequently that dirt cannot penetrate into the hydraulic breaker.

When the working tool is exposed to high pressure and high temperatures a standard type of grease will melt and run. To avoid this always use Epiroc chisel paste.

### 7.3.2 Central lubrication system

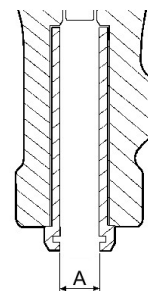
We recommend Epiroc's central lubrication system. When this system is fitted on the carrier, grease is pumped continuously from a lubrication container on the carrier to the hydraulic breaker when the hydraulic breaker is activated. This increases the life of the tool bushings and working tools considerably.

## 7.4 Every day

- Check the tool retainer.
- Check that hoses, couplings and accumulator are in a good condition.
- Check that bolts and connections are free from damage and properly tightened. See tightening torques in the spare parts list.
- Refill the central lubricating system.

## 7.5 Every week

- Clean the hydraulic breaker carefully.
- Check the wear bushing's wear and maximum inner wear limits.



The wear bushing must be replaced when the inner diameter (A) has reached its maximum wear limit, see section "Wear limits" and "Replacing the working tool bushing".

- Check the working tool for wear.

The working tool must be replaced when the outer diameter (B) has reached its minimum wear limit. See section "Wear limits".



Too large clearance can make the working tool break and the piston can be damaged.

- Check the breaker and the adapter plate for cracks and wear.
- Check that the accumulator screws are properly tightened. The correct tightening torque is found in the spare parts list.

**NOTICE** The working tool must never be sharpened by forging. Sharpening must only be performed by milling, grinding, or turning.

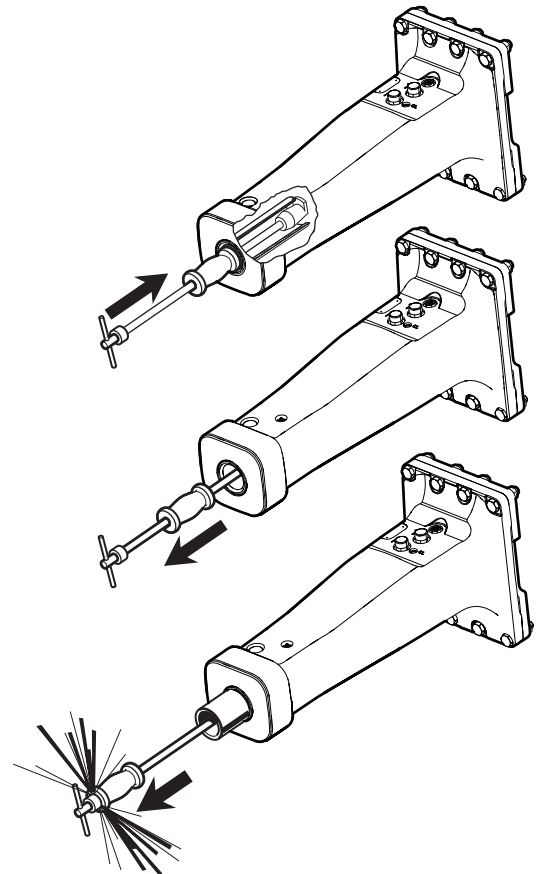
### 7.5.1 Wear limits

	A mm (in.)	B mm (in.)
ES 60	65 (2.56)	59 (2.32)
ES 70	73 (2.87)	67 (2.64)
ES 80	83 (3.27)	77 (3.03)

### 7.5.2 Replacing the wear bushing

The wear bushing is kept in place by the retainer pin. A new wear bushing has a slip fit.

1. If a worn out wear bushing is stuck, use a sliding hammer to remove it.



2. Carefully clean the bore and the wear bushing seat area.
3. Lubricate and mount the wear bushing.
4. Use a plastic sledgehammer to insert the wear bushing.
5. Keep the wear bushing in position with help of the retainer pin.

## 7.6 Every year

Overhauling must be done after one year of continuous operation. Overhauling must for safety reasons be performed by authorised personnel at an authorised workshop.

## 8 Storage

### **▲ WARNING Heavy hydraulic breaker and working tool**

The hydraulic breaker and the working tool are heavy equipment. If the breaker or working tool topple over or fall down from where they are stored, it can result in material damage and personal injury.

- ▶ Store the hydraulic breaker and the working tool so that falling or rolling down is prevented.

If the hydraulic breaker is not used for a long time, the following steps have to be considered to protect the hydraulic breaker from corrosion:

1. Clean the hydraulic breaker carefully.
2. Dismount the working tool and lubricate the front part of the piston, bushing and the tool retainer lock.
3. Store the hydraulic breaker in a dry place.

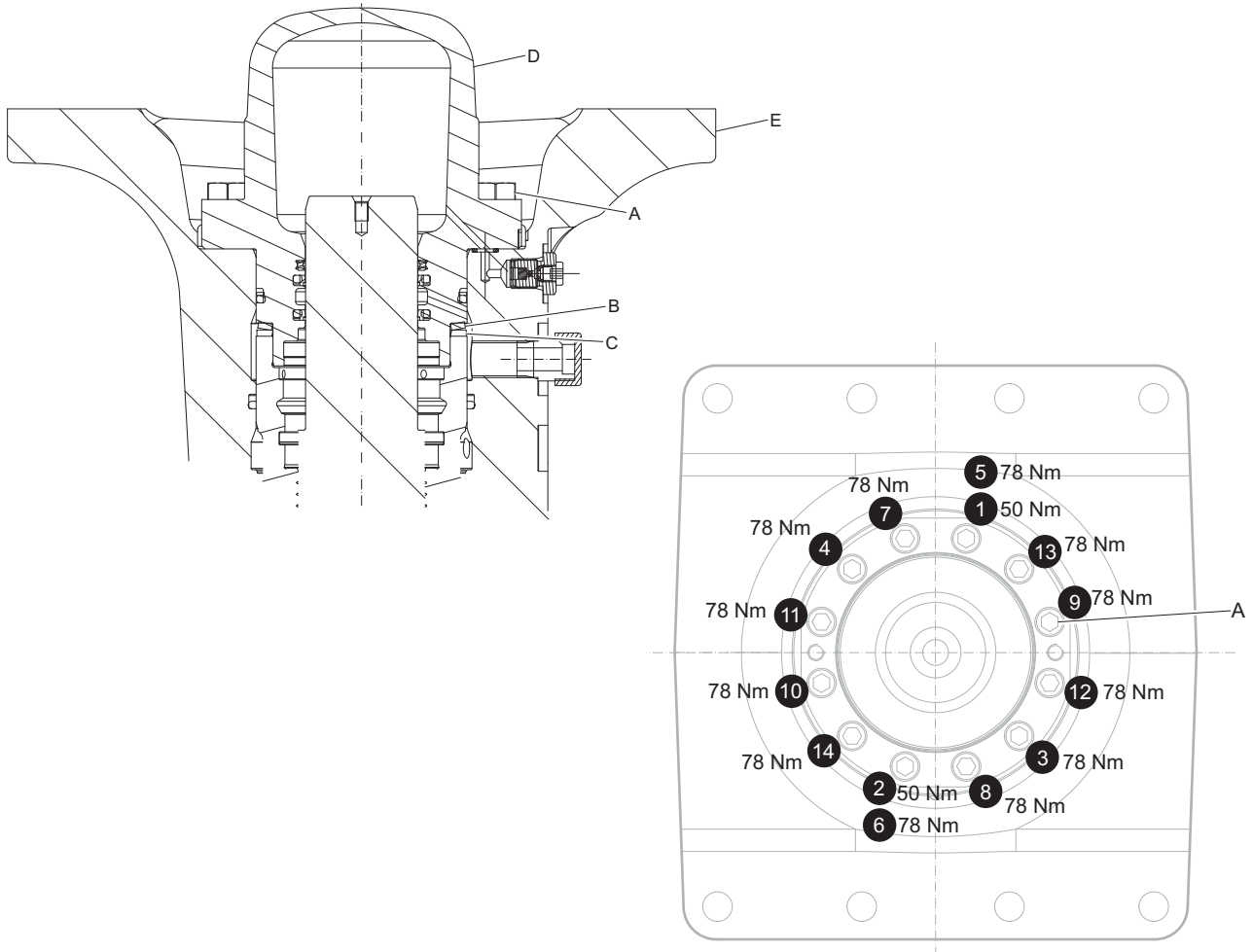
## 9 Disposal

A used machine must be treated and scrapped in such a way that the greatest possible portion of the material can be recycled and any negative influence on the environment is kept as low as possible.

Before a used machine is scrapped it must be emptied and cleaned from all hydraulic oil. The remaining hydraulic oil must be deposited and any negative influence on the environment is to be kept as low as possible.

## 10 Assembly instructions

### 10.1 Mounting the back head



#### Valid for ES 60

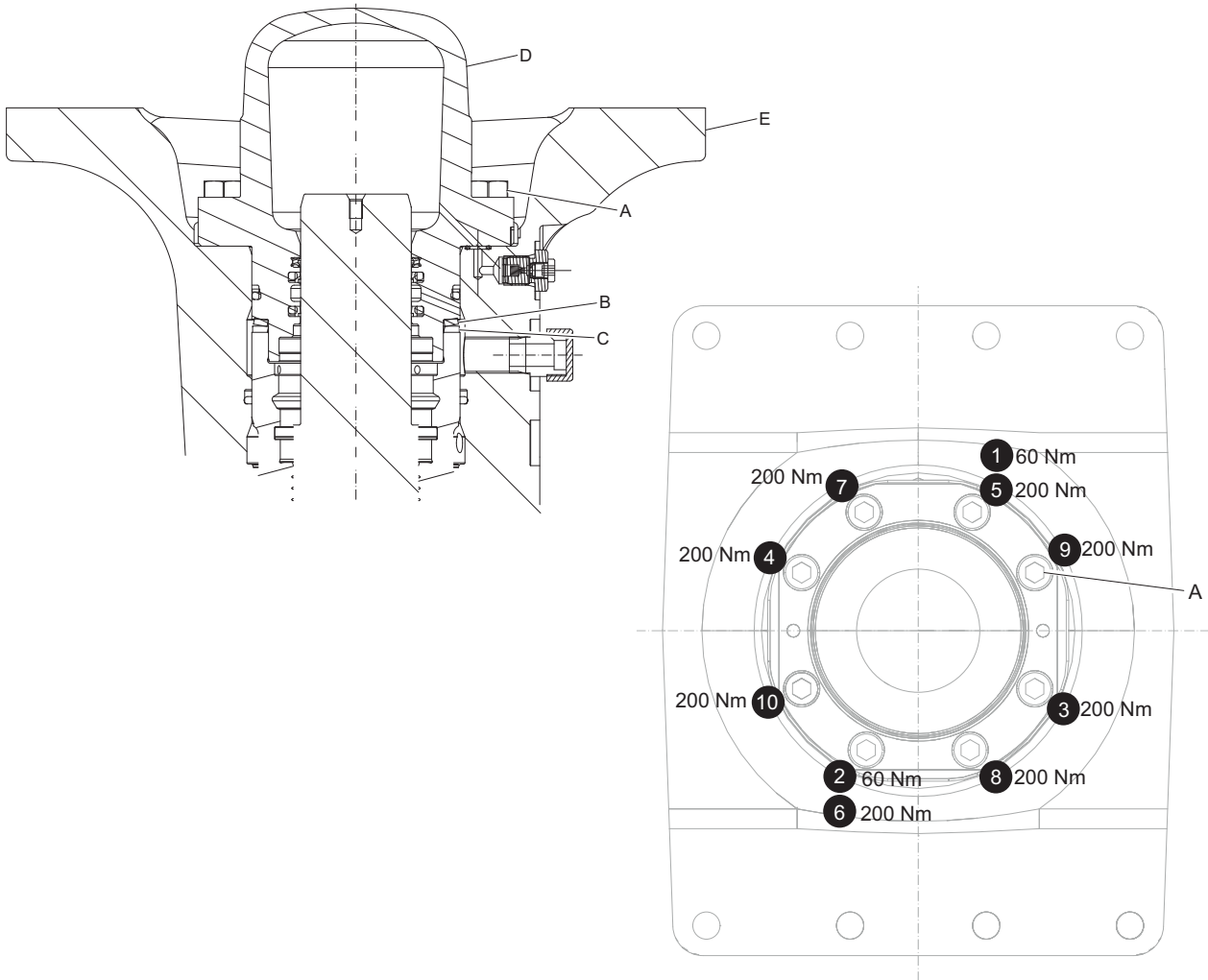
1. Make sure the spring plate (B) and spacer (C) are centered before mounting the back head (D).
2. Press the back head (D) down on the spring plate (B) and spacer (C).
3. Grease the screws (A) with Molykote® 1000 (Molykote is a registered trademark of Dow Corning Corporation), and manually fit them on the back head (D).
4. Torque the first two screws (A) in the order shown in picture above to 50 Nm (37 ft lbs). This will compress the spring plate (B), and fit the back head (D) into the breaker body (E).  
Torque the rest of screws (A) in the order shown in picture above to 78 Nm (58 ft lbs).

**NOTICE** Always start by fitting screws by hands.

**NOTICE** Tighten in two stages

Stage 1: 50 Nm (37 ft lbs)

Stage 2: 78 Nm (58 ft lbs)



**Valid for ES 70 and ES 80**

1. Make sure the spring plate (B) and spacer (C) are centered before mounting the back head (D).
2. Press the back head (D) down on the spring plate (B) and spacer (C).
3. Grease the screws (A) with Molykote® 1000 (Molykote is a registered trademark of Dow Corning Corporation), and manually fit them on the back head (D).
4. Torque the first two screws (A) in the order shown in picture above to 60 Nm (44 ft lbs). This will compress the spring plate (B), and fit the back head (D) into the breaker body (E).  
Torque the rest of screws (A) in the order shown in picture above to 200 Nm (148 ft lbs).

*NOTICE* Always start by fitting screws by hands.

*NOTICE* Tighten in two stages

Stage 1: 60 Nm (44 ft lbs)

Stage 2: 200 Nm (148 ft lbs)

# 11 Troubleshooting

## 11.1 Hydraulic breaker does not start

Cause	Remedy	By
Pressure and tank hoses are mixed up.	Check that the connections of the pressure and tank hoses are correct. See section "Hoses and connection".	Carrier driver
Shut off valve in pressure and/or tank hoses is closed.	Check the shut off valve and open it.	Carrier driver
Defective couplings blocking pressure and tank hoses.	Check couplings and replace defective coupling valves.	Workshop
Operating pressure too low.	Check the carrier engine speed, the pump delivery and the pressure relief valve. Check the operating pressure. Adjust settings and replace defective parts if required. See section "Installation".	Carrier driver or Customer Center / Dealer in your area
Return pressure too high.	Check and lower the return pressure.	Customer Center / Dealer in your area

## 11.2 Impact force too low

Cause	Remedy	By
Gas pressure too low, whipping and pulsing hoses.	Check the gas pressure and fill the accumulator.	Operator

## 11.3 Oil leaks

Cause	Remedy	By
Leaking or damaged seals.	Replace the seals.	Workshop

## 11.4 Hydraulic breaker operates too slow

Cause	Remedy	By
Insufficient hydraulic oil delivery volume.	Check the engine speed and/or mode stage of the carrier and the operation pressure and adjust. Check the carrier's pressure and the size of the restrictor.	Carrier driver
Valve in pressure and/or tank hoses partly closed.	Check the valve and open.	Carrier driver
Flow resistance on oil filter or oil cooler too high.	Check the oil filter and oil cooler, clean or replace them.	Carrier driver
Working tool jams in the lower breaker part.	Correct the direction of the carrier boom. The pressing force must act in the axial direction of the hydraulic breaker. Check the shaft of the working tool and deburr if required. Use the right type, and amount of grease. Always use chisel paste recommended by your manufacturer. Check the working tool and the wear bush for wear and replace if necessary. See section "Working tool".	Carrier driver



<b>Cause</b>	<b>Remedy</b>	<b>By</b>
Inside diameter of tank hose too small.	Check the inside diameter and change if necessary. Observe the minimum inside diameter! See section "Hoses and connections".	Workshop
Return pressure too high.	Check and lower the return pressure.	Customer Center/ Dealer in your area
Hydraulic oil temperature in the tank higher than 80°C (176°F).	Check the oil level in the hydraulic tank and top up if necessary. Check the oil flow. Too high oil flow leads to a higher working pressure and temperature, and that the oil flows over the pressure limiter. Check the cooler function on the carrier. See section "Preparation before breaking".	Carrier driver
Hydraulic oil pressure too low.	Check the pressure, adjust as required. Fit new pressure relief cartridges if necessary, on carrier and breaker. Check the installation, check the restrictor, and check the carrier's pressure. See section "Pressure adjustment".	Workshop

## 11.5 Operating temperature too high

<b>Cause</b>	<b>Remedy</b>	<b>By</b>
Oil level in tank too low.	Check the oil level and top up oil.	Carrier driver or workshop
Operation in high outside temperature without oil cooler.	Check oil temperature and install an oil cooler if necessary.	Workshop or Customer Center /Dealer in your area

## 12 Technical data

### 12.1 Machine data

	ES 60	ES 70	ES 80
Part number	8460 0500 47	8460 0500 48	8460 0500 49
Service weight <sup>*</sup> , kg (lb)	215 (474)	295 (650)	375 (827)
Delivery weight <sup>**</sup> , kg (lb)	170 (375)	237 (522)	305 (672)
Suitable carrier weight class <sup>***</sup> , tonne (lb)	2.9-6.0 (6393-13228)	4.2-9.0 (9259-19841)	5.2-12 (11023-26455)
Working length of working tool in standard version, mm (in.)	360 (14.2)	410 (16.1)	475 (18.7)
Working tool diameter, mm (in.)	62 (2.4)	70 (2.8)	80 (3.1)
Start up mode	Auto Start	Auto Start	Auto Start
Hose inside diameter P, mm (in.)	15 (3/5)	15 (3/5)	15 (3/5)
Hose inside diameter T, mm (in.)	15 (3/5)	15 (3/5)	15 (3/5)

<sup>\*</sup>Breaker with standard adapter, screw kit plus working tool.

<sup>\*\*</sup>Breaker body only (without working tool and adapter).

<sup>\*\*\*</sup>Weights apply to standard carriers only. Any variances must be agreed with Epiroc and/or the carrier manufacturer prior to attachment.

### 12.2 Capacities

	ES 60	ES 70	ES 80
Oil flow, l/min (gpm)	35-60 (9.2-15.9)	45-75 (11.9-19.8)	60-90 (13.2-19.8)
Impact rate, bpm	520-1300	530-1200	530-1000
Operating pressure, bar (psi)	110-140 (1595-2031)	100-140 (1450-2031)	120-150 (1740-2176)
Maximum hydraulic input power, kW (hp)	14	18	23
Pressure relief valve on carrier, bar (psi)	170 (2466)	170 (2466)	180 (2611)
Back pressure acceptance <sup>**</sup> , bar (psi)	15 (218)	25 (363)	30 (435)
Piston accumulator gas pressure, minimum (at operating temperature 60-70°C (140-158°F)) <sup>*</sup> , bar (psi)	14 (203)	11 (160)	12 (174)
Piston accumulator gas pressure, maximum (at operating temperature 60-70°C (140-158°F)) <sup>*</sup> , bar (psi)	19 (276)	15 (218)	16.5 (239)

<sup>\*</sup>Breaker in horizontal position, no pressure applied to working tool.

<sup>\*\*</sup>Back pressure acceptance when breaker still runs regular but at significant reduced performance (oil flow and impact rate).



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