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1820, 1820 PB, 2320, 2320 PB, 3220, 3220 PB, 4220, 4220 PB

Safety and operating instructions Demolition pulverizer

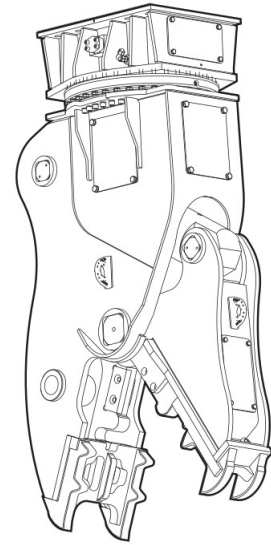


Table of Contents

1	Introduction	7
1.1	About these Safety and Operating Instructions	7
2	Safety instructions	8
2.1	Signal words	8
2.2	Qualification	9
2.3	Intended use	9
2.4	Use other than intended	9
2.5	Protective equipment	9
2.6	Carrier, precautions	10
2.7	Transport, precautions	10
2.8	Hydraulic installation, precautions	11
2.9	Media/consumables, precautions	11
2.10	Explosion and fire, precautions	12
2.11	Electrical shock, precautions	12
2.12	Falling stones, precautions	12
2.13	Emissions, precautions	13
2.14	Handling machines, precautions	13
2.15	Changes to the hydraulic attachment, precautions	13
2.16	Environmental pollution, precautions	13
3	Overview	14
3.1	Equipment description	14
3.2	Function	14
3.3	Signs / labels	15
3.3.1	Name plate	15
3.3.2	Labels	15
3.4	Applications	15
3.5	Guarantee	16
3.6	Removing the packaging	16
3.7	Scope of delivery	16
4	Transport	17
4.1	Transport using a crane	17
4.2	Transport using a forklift truck	18
4.3	Transport using a truck	18
5	Installation	19
5.1	Media/consumables	19
5.1.1	Mineral hydraulic oil	19
5.1.2	Non-mineral hydraulic oil	19
5.1.3	Grease	20
5.2	Manufacturing the adapter plate	20
5.3	Installing the adapter plate	20

5.4 Attaching the hydraulic attachment to the carrier.....	21
5.4.1 Mechanical mounting aspects	21
5.4.2 Making the hydraulic connections	22
5.5 Removing the hydraulic attachment from the carrier	23
5.5.1 Dismantling the hydraulic connections	23
5.5.2 Mechanical disassembly	23
5.6 Removing the adapter plate.....	24
5.7 Valve block	24
6 Operation	25
6.1 Preparations before starting.....	25
6.2 Switching the hydraulic pulverizer on and off	26
6.3 Warm-up Procedure	26
6.4 Functional test	26
6.5 Correct operation.....	27
6.5.1 Demolishing concrete ceilings or walls.....	27
6.5.2 Nipping out concrete elements.....	27
6.5.3 High ambient temperature.....	27
6.5.4 Low ambient temperature.....	27
6.6 Prohibited operation.....	28
6.6.1 Unsafe base	28
6.6.2 Non-load bearing suspended ceilings	28
6.6.3 Working position	28
6.6.4 Use over the chain	28
6.6.5 Levering.....	29
6.6.6 Moving the carrier.....	29
6.6.7 Moving the boom.....	29
6.6.8 Turning the hydraulic attachment	29
6.6.9 Extending the bucket cylinder	30
6.6.10 Pulling.....	30
6.6.11 Lifting/Transporting.....	30
6.6.12 Impacting/chopping	30
6.6.13 Moving objects	31
6.6.14 Use under water	31
6.6.15 Cylinder end positions	31
7 Maintenance	32
7.1 Maintenance schedule	33
7.2 Depressurising the hydraulic system.....	34
7.3 Cleaning.....	34
7.3.1 Preparations	34
7.3.2 Procedure	34
7.4 Lubrication	35
7.4.1 Lubricating the hydraulic pulverizer.....	35
7.4.2 Lubricating the four point bearing.....	35
7.5 Checking the hydraulic pulverizer and adapter plate for cracks	36
7.6 Checking hydraulic pulverizer for wear.....	36
7.7 Checking hydraulic lines	36
7.8 Checking bolted connections.....	36
7.9 Checking the adapter plate bolts for wear	36
7.10 Checking and cleaning the hydraulic oil filter of the carrier	36
7.11 Turning or changing the cutter blades	36

7.11.1 Removing the cutter blades.....	37
7.11.2 Checking the blade seat.....	37
7.11.3 Checking cutter blades.....	37
7.11.4 Fitting cutter blades.....	38
7.12 Checking and correcting the blade clearance	38
7.12.1 Checking the blade clearance	38
7.12.2 Correcting the blade clearance	38
7.13 Changing the body jaws tooth plate	39
7.14 Changing the pulverizer jaws tooth plate.....	40
7.15 Bolt connections / Tightening torques DP 1820, DP 2320	41
7.16 Bolt connections / Tightening torques DP 3220, DP 4220	42
8 Troubleshooting	43
8.1 Hydraulic pulverizer does not work.....	43
8.2 Insufficient breaking force.....	43
8.3 Hydraulic pulverizer does not cut.....	43
8.4 Hydraulic pulverizer cannot be rotated	43
8.5 Operating temperature too high.....	44
8.6 Oil leaks from hydraulic ports	44
8.7 Oil leak at parts of the hydraulic pulverizer installation (bolted connections, hoses etc.)	44
8.8 Insufficient lubrication	44
8.9 Automatic turning of hydraulic pulverizer	44
9 Repair.....	45
9.1 Sending in the hydraulic attachment for repairs	45
9.2 Welding.....	45
9.2.1 Hard facing the pulverizer jaws	46
10 Storage	47
10.1 Hydraulic pulverizer	47
10.2 Grease cartridges	47
11 Disposal.....	47
11.1 Hydraulic pulverizer	47
11.2 Hydraulic hoses	47
11.3 Hydraulic oil	47
11.4 Cutter grease and grease cartridges	47
12 Technical specifications	48
12.1 Technical specifications DP 1820, DP 1820 PB	48
12.2 Technical specifications DP 2320, DP 2320 PB	49
12.3 Technical specifications DP 3220, DP 3220 PB	50
12.4 Technical specifications DP 4220, DP 4220 PB	51
13 EC Declaration of Conformity (EC Directive 2006/42/EC)	52

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.

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1.1 About these Safety and Operating Instructions

The aim of these Instructions is to familiarise you with the safe and effective operation of the hydraulic attachment. You will also find instructions for regular maintenance activities for the hydraulic attachment in this document.

Please read these Instructions carefully prior to the first attachment and use of the hydraulic attachment.

The different designation of the texts means as follows:

	Action step in a safety instruction
	Action step
1. 2.	Established operation process
A B C	Explanation of the elements of a drawing
• • •	Listing

Symbols used in illustrations have the following meanings:

	permitted operation
	prohibited operation

2 Safety instructions

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	Read these Safety and operating instructions and specifically all safety instructions before using the hydraulic attachment. This will: • prevent the risk of injuries and fatal accidents for yourself and others, • protect the environment against environmental damage. • protect the hydraulic attachment and other property against material damage,

Follow all instructions in these Safety and operating instructions.

Store these Safety and operating instructions in the document compartment of the carrier cab.

Anyone

- transporting,
- installing or removing,
- operating,
- maintaining,
- repairing,
- storing or
- disposing of

the hydraulic attachment must have read and understood these Safety and operating instructions.

These Safety and operating instructions belong to the hydraulic attachment. Keep it for the life of the product. Ensure, if applicable, that any received amendment is incorporated in the instructions. Hand over the Safety and operating instructions if ever you lend, rent out or sell the hydraulic attachment.

All safety regulations listed in this manual comply with the laws and regulations of the European Union. Also observe the additional national/regional regulations.

Hydraulic attachment operation outside the European Union is subject to the laws and regulations valid in the country of use. Please observe any other, more stringent regional regulations and legislation.

Read the carrier manufacturer's Safety and operating Instructions before attaching the hydraulic attachment to the carrier and operating it. Observe all instructions.

2.1 Signal words

The signal words Danger, Warning, Caution, and Notice are used as follows in these Safety and operating instructions:

DANGER	indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	The signal word NOTICE is used to address practices related to possible property damage but not related to personal injury.

2.2 Qualification

Transporting the hydraulic attachment is only permitted if carried out by people who:

- are authorised to operate a crane or a forklift truck according to the applicable national provisions,
- know all the relevant national/regional safety provisions and accident prevention rules,
- have read and understood the safety and transport chapter of these Safety and operating instructions.

Installing, maintaining, storing and disposing of the hydraulic attachment are only permitted if carried out by people who:

- know all the relevant national/regional safety provisions and accident prevention rules,
- have read and understood these Safety and operating instructions.

Welding of the hydraulic attachment is only permitted if carried out by qualified welders who:

- have been trained to operate MIG welding equipment according to the national regulations,
- know all the relevant national/regional safety provisions and accident prevention rules,
- have read and understood these Safety and operating instructions.

Operating the hydraulic attachment is only permitted if carried out by qualified carrier drivers. Carrier drivers are qualified if they:

- have been trained to operate a carrier according to the national regulations,
- know all the relevant national/regional safety provisions and accident prevention rules,
- have read and understood these Safety and operating instructions.

Testing the hydraulic installation is only permitted if carried out by professionals. Professionals are people who are authorised to approve a hydraulic installation for operation according to the national regulations.

Repairing the hydraulic attachment is only permitted if carried out by professionals trained by Construction Tools GmbH. These professionals must have read and understood these Safety and operating instructions. Otherwise the operational safety of the hydraulic attachment is not guaranteed.

2.3 Intended use

Only attach the hydraulic pulverizer to a hydraulic carrier of a suitable load-bearing capacity. Read the carrier manufacturer's Safety and operating instructions before attaching the hydraulic pulverizer to the carrier and operating it. Observe all instructions.

Only use the hydraulic pulverizer for following operations:

- Primary demolition of light to medium concrete structures with light to medium reinforcement
- Secondary breaking of concrete elements
- Breaking lightly reinforced concrete elements
- Light to medium-duty demolition of buildings
- Separating concrete and rebars

Intended use also implies observing all instructions in these Safety and Operating Instructions.

2.4 Use other than intended

Never use the hydraulic pulverizer:

- to cut reinforcements with a tensile strength > 500 N/mm². This may damage the hydraulic pulverizer.
- to pull/tear at girders, braces and walls. This damages the hydraulic pulverizer and adapter plate. The carrier may lose stability.
- to hit or chop. This destroys the hydraulic pulverizer.
- as a crowbar. This destroys the hydraulic pulverizer.
- to push debris aside. This destroys the hydraulic pulverizer.
- to move the carrier supported by the hydraulic pulverizer. This damages the hydraulic pulverizer.
- to lift or transport loads with attachments. This damages the hydraulic pulverizer.
- under water. This destroys the hydraulic pulverizer.
- in explosion-hazard environments. Explosions cause serious injury or death.

2.5 Protective equipment

Personal protective equipment must comply with the applicable health and safety regulations.

Always wear the following personal protective equipment:

- protective helmet
- safety glasses with side protectors
- protective gloves
- protective shoes
- warning vest

2.6 Carrier, precautions

▲ **WARNING** Falling carrier

If the load-bearing capacity of the carrier used is insufficient, the carrier will not be stable. It can topple over and cause injuries and damage.

Using a carrier whose load-bearing capacity is too high will greatly burden the hydraulic attachment causing it to wear faster.

- ▶ Only attach the hydraulic attachment to a hydraulic carrier of a suitable load-bearing capacity.
- ▶ The carrier must remain stable at all times.
- ▶ Read the carrier manufacturer's Safety and operating Instructions before attaching the hydraulic attachment to the carrier and operating it. Observe all instructions.

NOTICE Damage to the hydraulic attachment

Working with a hydraulic attachment mounted to a long reach boom may cause damage to the hydraulic attachment.

- ▶ Before working with a hydraulic attachment mounted to a long reach boom consult the Epiroc Customer Center / Dealer in your area.

2.7 Transport, precautions

▲ **WARNING** Risk of death due to suspended loads

When lifting loads these can swing out and fall. This can result in serious injuries or even death.

- ▶ Never stand underneath or in the swinging range of suspended loads.
- ▶ Only move loads under supervision.
- ▶ Only use approved lifting equipment and lifting gear with sufficient load bearing capacity.
- ▶ Do not use worn lifting gear (ropes, belts, chains, shackles etc.).
- ▶ Do not place lifting gear such as ropes and belts on sharp edges or corners, do not knot these or twist them.
- ▶ When leaving the workplace, set down the load.

▲ **WARNING** Injury due to swivelling load

When transporting the load by crane it can swivel and cause severe injuries and considerable damage to property.

- ▶ Ensure that no personnel, objects or obstacles are located in the swivel range of the load.

NOTICE Air freight restrictions

HATCON contains an activated SIM card (radio transmitting device) and an encased lithium ion battery after activation step has been finalized. Both parts are regulated for air transport.

- ▶ Consult your forwarder or local customer center/ dealer about any restrictions for air freight.

2.8 Hydraulic installation, precautions

▲ WARNING Hydraulic pressure too high

If the hydraulic pressure is too high, the parts of the hydraulic attachment will be exposed to excessively high loads. Parts can break loose or burst causing serious injuries.

- ▶ Lay the drain line of the pressure relief valve directly in the tank to ensure the safe functioning of the pressure relief valve!
- ▶ The pressure relief valve must be set at the maximum static pressure.
- ▶ The pressure relief valve setting must be checked to ensure that the maximum static pressure (see chapter **Technical specifications**) of the hydraulic installation is not exceeded at any time. Attach a lead seal to the pressure relief valve.
- ▶ Prior to their first use, the safety facilities on the hydraulic installation must be checked by a professional/authorised monitoring body for their quality (CE mark etc.), suitability and proper functioning.
- ▶ If any significant changes are made to the hydraulic installation, a new acceptance inspection is to be carried out in accordance with the relevant national safety provisions.

▲ WARNING Hot hydraulic oil squirting out

The hydraulic system is under high pressure. Hydraulic lines may spring a leak or burst. Hydraulic oil squirting out can lead to serious injury.

- ▶ When attaching the hydraulic attachment do not lay any hydraulic lines through the carrier's cab.
- ▶ Only use hydraulic lines which comply with the following quality requirements:
 - For the function open and close
 - Hydraulic hoses with 4 reinforcement steel wires according to DIN EN 856 4SH,
 - Hydraulic pipes, seamless cold-drawn steel pipes according to DIN EN 10305
 - For the function turn
 - Hydraulic hoses with 2 steel plaitings according to DIN EN 853 2SN,
 - Hydraulic pipes, seamless cold-drawn steel pipes according to DIN EN 10305.

2.9 Media/consumables, precautions

▲ WARNING Hot hydraulic oil under high pressure

Hydraulic oil will squirt out under high pressure if there is a leakage. The jet of oil might penetrate people's skin and cause permanent damage. Hot hydraulic oil can cause burns.

- ▶ Never use your hands to find leaks.
- ▶ Always keep your face away from a possible leak.
- ▶ If hydraulic oil has penetrated your skin consult a doctor immediately.

▲ WARNING Hydraulic oil spills

Spilt hydraulic oil can make a floor slippery. If people slip they can be injured. Hydraulic oil is environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- ▶ Make sure not to spill any hydraulic oil.
- ▶ Immediately clean the floor if you have spilt hydraulic oil.
- ▶ Observe all safety and environmental protection provisions when handling hydraulic oil.

▲ WARNING Skin infections/diseases due to oil and grease

Hydraulic oil and grease can cause rashes (or even eczema) if they come into contact with the skin.

- ▶ Avoid all skin contact with hydraulic oil and grease.
- ▶ Use a suitable skin protection product.
- ▶ Always wear safety gloves when working with hydraulic oil or grease.
- ▶ Immediately clean any skin that has been contaminated by oil or grease with water and soap.

2.10 Explosion and fire, precautions

▲ DANGER Explosion and fire

Explosions cause serious injury or death. Explosives being cut by the hydraulic attachment may lead to an explosion.

- ▶ Never operate the hydraulic attachment in the direct vicinity of explosives.
- ▶ Make sure that no explosives are hidden in the concrete.
- ▶ Check gas line position plans of the complete construction area.

▲ DANGER Explosion and fire

Operating the hydraulic attachment may create sparks which ignite highly flammable gases.

This may lead to fire or an explosion.

- ▶ Never work in an environment with highly flammable substances.
- ▶ Make sure that there are no hidden sources of gas in the work area.
- ▶ Check gas line position plans of the complete construction area.

▲ DANGER Explosion and fire

Dust-rich air can form an explosive atmosphere which may ignite when operating the hydraulic attachment.

This may lead to fire or an explosion.

- ▶ Never operate the hydraulic attachment in an explosion-hazard atmosphere.
- ▶ Always provide sufficient ventilation when working in buildings or in a confined area.

▲ WARNING Risk of explosion

If the hydraulic attachment is equipped with HATCON explosion may occur when the contained lithium batteries are penetrated by pieces of steel or reinforcing bars.

- ▶ Avoid impact of reinforcement, flying rocks or even explosives on HATCON.
- ▶ Check the HATCON before operating.

2.11 Electrical shock, precautions

▲ DANGER Electrical shock

Any contact of the hydraulic attachment with electric circuits or other sources of electricity will lead to an electric shock, resulting in serious injury or death. The hydraulic attachment is not electrically insulated.

- ▶ Never work in the vicinity of electric circuits or other sources of electricity.
- ▶ Make sure that there are no hidden circuits in the work area.
- ▶ Check wiring diagrams.

2.12 Falling stones, precautions

▲ WARNING Fragments flying around

Fragments of material which come loose while operating the hydraulic attachment may be flung away and can cause serious injury if people are hit by them. Small objects falling from a great height can also cause serious damage.

During hydraulic attachment operation the danger zone is considerably greater than during the excavation operation due to fragments of stone and pieces of steel flying around, and for this reason the danger zone must, depending on the type of material to be worked on, be enlarged correspondingly, or secured in a suitable manner through corresponding measures.

- ▶ Secure the danger zone.
- ▶ Stop the hydraulic attachment immediately if anyone enters the danger zone.
- ▶ Close the windscreen and the side windows of the driver's cab.

2.13 Emissions, precautions

▲ WARNING Lung disease

Dust may be generated when operating the hydraulic attachment. If dust from rocks or silica dust, produced when operating the hydraulic attachment on rocks, concrete, asphalt or other such materials, is inhaled this may lead to silicosis (dust lungs, a severe lung disease). Silicosis is a chronic disease which may lead cancer and death.

- ▶ Wear a suitable breathing mask.

2.14 Handling machines, precautions

▲ WARNING Narcotics, alcohol and drugs

Narcotics, alcohol and medicinal drugs make their users less alert and affect their ability to concentrate. Negligence and incorrectly assessing a situation can result in serious injury or death.

- ▶ Never work on or with the hydraulic attachment when under the influence of narcotics, alcohol or drugs which affect your alertness.
- ▶ Never allow other people who are under the influence of narcotics, alcohol or drugs which affect their alertness to work on or with the hydraulic attachment.

2.15 Changes to the hydraulic attachment, precautions

▲ WARNING Changes to the hydraulic attachment

Changes to the hydraulic attachment or the adapter plate may lead to serious injury.

- ▶ Never carry out any changes to the hydraulic attachment or the adapter plate.
- ▶ Only use original parts or accessories approved by Epiroc.
- ▶ Modifications that entail new hazards may require a new procedure for assessing conformity.

2.16 Environmental pollution, precautions

NOTICE Environmental pollution due to hydraulic oil

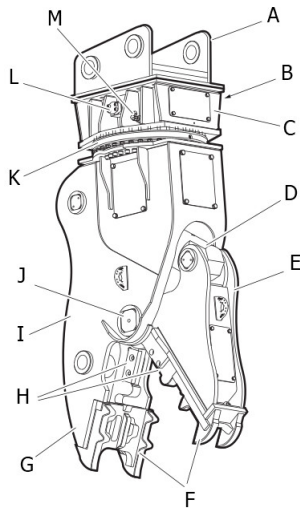
Hydraulic oil is permanently environmentally harmful. Escaped hydraulic oil will lead to groundwater and soil contamination. Organisms may die.

- ▶ Collect any hydraulic oil which escapes to avoid environmental pollution. For minor volumes use an absorbing medium (in case of an emergency use soil). In case of major leakages contain the hydraulic oil. It must not drain off and penetrate the ground or enter the water table or water supplies.
- ▶ Collect contaminated absorbing medium or soil in a watertight box/container and close it tight.
- ▶ Contact an authorized waste management company.
- ▶ Dispose of all contaminated material in accordance with the applicable environmental regulations.

3 Overview

3.1 Equipment description

The illustration gives an overview of the main parts and components of the hydraulic attachment. Actual details may differ.



- A. Adapter plate (not supplied with the hydraulic pulverizer)
- B. Port »B« function »Close«
- C. Upper part
- D. Hydraulic cylinder
- E. Pulverizer jaw
- F. Tooth plate
- G. Body jaw
- H. Cutter blade
- I. Body
- J. Main bearing pin
- K. Four-point bearing
- L. Port »A« function »Open«
- M. Port function »Turn«

3.2 Function

The operation of a hydraulic pulverizer is described in a simplified version below:

Closing the hydraulic pulverizer

The carrier driver operates the pulverizer valve, via a switch on the floor or via a joystick in the carrier, for the function »Close«. Line »B« is connected to the rapid movement valve. The rapid movement valve feeds oil to the hydraulic cylinder. The hydraulic cylinder extends the piston rod in fast traverse. The pulverizer jaw grip the debris. Once the debris has generated a force in the pulverizer jaw, the rapid movement valve switches to power movement. The hydraulic cylinder extends the piston rod in power movement. The debris is broken. The piston rod reach the end position.

Opening hydraulic pulverizer

The carrier driver operates the pulverizer valve, via a switch on the floor or via a joystick in the carrier, for the function »Open«. Oil is fed to the hydraulic cylinder via line »A«. The piston rod retracts. The pulverizer jaw opens.

Hydraulically turning the hydraulic pulverizer

The carrier driver activates the carrier function »Turn«. Oil is fed to the hydraulic motor. The hydraulic motor, located in the upper part of the hydraulic pulverizer, causes the the body to turn. To achieve endless turning of the body, there is a rotary transmission between the upper part and body. The oil flows for the functions »Open« and »Close« are transmitted through the rotary transmission.

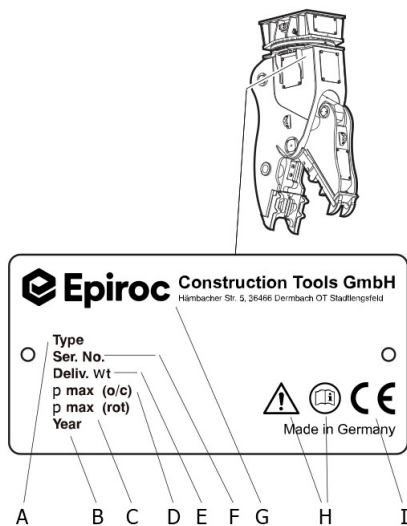
3.3 Signs / labels

▲ WARNING Missing warnings

The name plate and the labels on the hydraulic attachment contain important information about the hydraulic attachment and for personal safety. A missing warning can lead to overlooking or misinterpretation of possible risks and cause personal hazards. The signs and labels must always be clearly legible.

- ▶ Immediately replace any defective name plates and labels.
- ▶ Consult your local customer center/dealer.

3.3.1 Name plate



- A. Model
- B. Year of construction of hydraulic attachment
- C. Max. permissible operating pressure »Turn«
- D. Max. permissible operating pressure »Open / Close«
- E. Weight of hydraulic attachment
- F. Serial number
- G. Name and address of manufacturer
- H. The warning symbol and the book symbol indicate that the Safety and Operating Instructions must be read prior to use of the hydraulic tool and in particular the chapter on Safety.
- I. The CE symbol indicates that the hydraulic attachment was produced in conformity with the CE. You can find further information about this in the enclosed EC Declaration of Conformity.

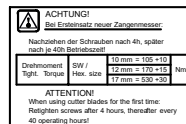
3.3.2 Labels

Danger zone



No persons should be within the danger zone. Fragments of material which come loose while operating the hydraulic attachment may be flung away and can cause serious injury if people are hit by them. Small objects falling from a great height can also cause serious damage.

Tightening torque



The label states the tightening torque depending on the screw size.

3.4 Applications

Field	Type of application
Demolition work	Primary demolition of light to medium concrete structures with light to medium reinforcement
	Breaking lightly reinforced concrete elements
	Light to medium-duty demolition of buildings
Recycling	Separating concrete and rebars
	Secondary breaking of concrete elements

3.5 Guarantee

The guarantee or product liability will be invalidated by the following:

- Damage of the Performance -Booster cylinder due to incorrect warm-up procedure.
- Use other than intended
- Maintenance work not being carried out or being carried out incorrectly
- The use of incorrect consumables
- The use of non-approved parts
- Damage due to wear
- Damage due to improper storage
- Changes not carried out by or in consultation with the manufacturer

3.6 Removing the packaging

- Remove all the packaging material.
- Dispose of it in accordance with the applicable provisions.
- Check that the delivery is complete.
- Check the delivery for visual damage.
- If any defects are found, consult the Epiroc Customer Center / dealer in your area.

3.7 Scope of delivery

The hydraulic pulverizer is delivered complete with:

- Hydraulic pulverizer
- Safety and operating instructions
- EC Declaration of Conformity

Accessories as ordered:

- Hoses

Special accessories as ordered:

- e.g. adapter plate with Allen screws and pairs of lock washers
- e.g. base plate to construct an adapter plate with Allen screws and pairs of lock washers
- e.g. hydraulic fittings for the carrier

4 Transport

▲ WARNING Hoist tipping over / hydraulic attachment falling

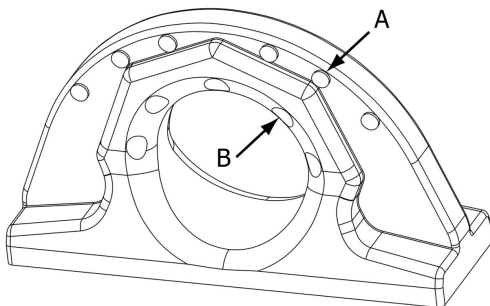
The hydraulic attachment is heavy. The hoist/lifting equipment and/or hydraulic attachment tipping over or falling may cause serious injury and material damage.

- ▶ Only transport the hydraulic attachment with lifting equipment with the right load-bearing capacity for the weight of the hydraulic attachment.
- ▶ Only lift and secure the hydraulic attachment with lifting gear (ropes, chains, shackles etc.) with the right load-bearing capacity for the weight to be lifted.
- ▶ Make sure that there is nobody near or under the suspended hydraulic attachment.

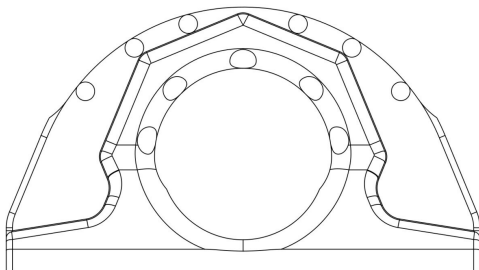
▲ WARNING Hydraulic attachment falling

The lifting eye may fail and cause the hydraulic attachment to fall. This may cause serious injury and material damage.

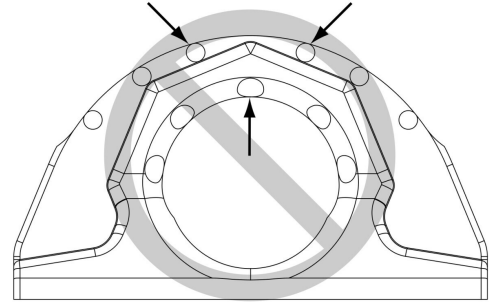
- ▶ Check the lifting eye before you lift the hydraulic attachment. Never lift the hydraulic attachment with the lifting eye if:
 - the checkpoints (A) are worn and not protruding anymore or the checkpoints (B) are worn and not recessed anymore.



- the material is worn up to the checkpoints (A, B).



Use permitted



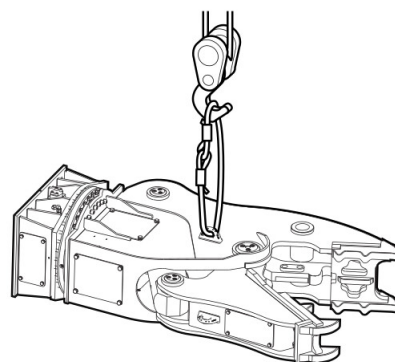
Use prohibited

- the lifting eye is bent.
- you detect cracks in the lifting eye or the weld seam.
- ▶ Contact the Epiroc Customer Center / Dealer in your area if the lifting eye is worn in any way.
- Transport the hydraulic pulverizer with the pulverizer jaw open.

There is less oil in the hydraulic pulverizer if transported with open pulverizer jaw. In the event of a leak, less oil is lost and the environmental damage is lower.
- Open the hydraulic pulverizer before transporting it.
- If the hydraulic pulverizer is transported with a forklift truck or lorry, secure the pulverizer jaw to the pallet with suitable strapping.

4.1 Transport using a crane

- Secure the hydraulic attachment with ropes or chains as shown in the following illustration.



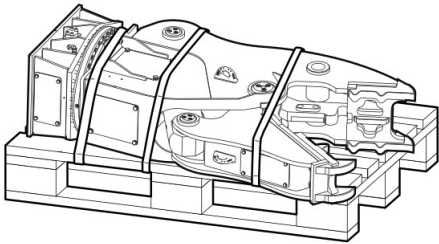
- Slowly lift the hydraulic attachment.
- Place the hydraulic attachment on a pallet.

4.2 Transport using a forklift truck

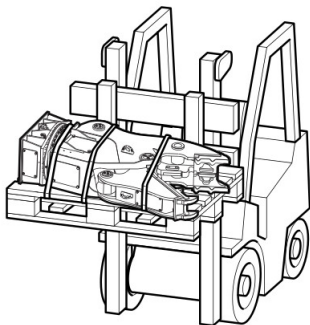
▲ WARNING Hydraulic attachment tipping over

The hydraulic attachment tipping off the fork of the forklift truck or the pallet may cause serious injury.

- ▶ Place the hydraulic attachment on a pallet.
- ▶ Strap the hydraulic attachment to the pallet using suitable strapping, as shown in the illustration below.
- ▶ Move the fork of the forklift truck under the pallet so that the centre of gravity is between the prongs.



- Move the fork of the forklift truck under the pallet so that the hydraulic attachment cannot tip over.



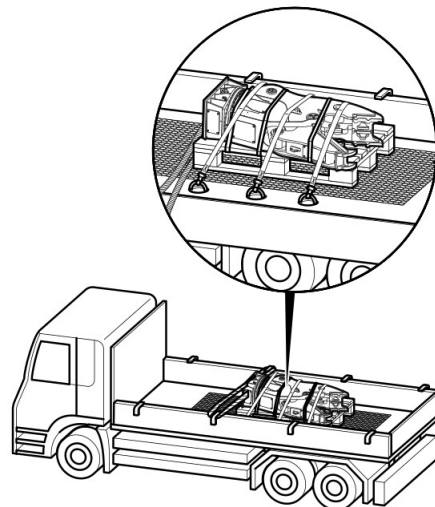
- Slowly lift the pallet with the hydraulic attachment.
- Transport the pallet with the hydraulic attachment to the location provided for.

4.3 Transport using a truck

▲ WARNING Hydraulic attachment tipping over / slipping

The hydraulic attachment slipping or tipping over and falling from the loading area of a lorry may cause serious injury.

- ▶ Place the hydraulic attachment on a pallet.
- ▶ Strap the hydraulic attachment to the pallet using suitable strapping (see illustration in chapter **Transport using a forklift truck**).
- ▶ Place the pallet with the hydraulic attachment on an anti-slip mat.
- ▶ Secure the hydraulic attachment to the loading area with ropes or chains; use any available transport lugs.
- Secure the hydraulic attachment on the pallet and the loading surface as shown in the following illustration.
- Observe all the applicable national/regional regulations on securing loads.



5 Installation

▲ WARNING Hot hydraulic oil squirting out

The hydraulic system is under high pressure. If hydraulic connections come loose or are disconnected, hydraulic oil will squirt out under high pressure. Hydraulic oil squirting out can lead to serious injury.

- Depressurise the hydraulic system before connecting or disconnecting the hydraulic circuits of the hydraulic attachment (see chapter **Depressurising the hydraulic system**).

NOTICE Environmental damage due to hydraulic oil

Hydraulic oil is environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- Collect any hydraulic oil which escapes.
- Dispose of it in accordance with the applicable environmental regulations.

NOTICE Damage to the hydraulic attachment

Working with a hydraulic attachment mounted to a long reach boom may cause damage to the hydraulic attachment.

- Before working with a hydraulic attachment mounted to a long reach boom consult the Epiroc Customer Center / Dealer in your area.

5.1 Media/consumables

The following consumables are used when operating the hydraulic attachment:

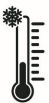
5.1.1 Mineral hydraulic oil

All hydraulic oil brands prescribed by the carrier manufacturer are also suitable for use when operating the hydraulic attachment.

However, the oil should comply with viscosity class HLP 32 or higher.

Furthermore, the regulations for all components that are operated with the oil must be observed. This includes, for example, the carrier device or quick coupler.

The viscosity of the hydraulic oil is given in ISO VG. The lower the value, the thinner the oil and the higher the value, the thicker the oil. As standard, we recommend an ISO VG 46 for hydraulic oils. Based on this, a thinner ISO VG 32 oil should be used at lower temperatures, while a thicker ISO VG 68 should be used at higher temperatures. The optimal viscosity range is between 30 - 60 cSt. The corresponding oil temperatures can be seen in the following figure:

Oil temperatur		
cold	warm	hot
 ISO VG 32	ISO VG 46	ISO VG 68 
27 °C - 41 °C (81 °F - 106 °F)	34 °C - 49 °C (93 °F - 120 °F)	42 °C - 60 °C (108 °F - 140 °F)

Note:

If the oil temperature cannot be kept below 80 °C (176 °F) during operation, the use of oil coolers is recommended.

At oil temperatures above 80 °C (176 °F), seals can age or become damaged more quickly.

If the oil is used outside the optimal viscosity range, the following problems may arise during operation.

Effects when leaving the optimal viscosity range of the hydraulic oil

Too thick:	Too thin:
Troubled starting	Increased leakage Result: reduced performance
Excessive operating pressure	Damage to seals Result: leakage
Malfunction of valves	Risk of cavitation erosion
the bypass of the filter opens and oil impurities are not separated	

Special conditions apply to using the hydraulic attachment at low temperatures (see chapter **Low ambient temperature**).

- Check the oil filter!

An oil filter must be integrated in the tank line of the hydraulic system. The maximum mesh width allowed for the oil filter is 50 microns; it must have a magnetic separator.

5.1.2 Non-mineral hydraulic oil

NOTICE Mixed hydraulic oil

Never mix mineral and non-mineral hydraulic oils! Even small traces of mineral oil mixed in with non-mineral oil can result in damage to both the hydraulic attachment and the carrier. Non-mineral oil loses its biodegradability.

- Only use one type of hydraulic oil.

If you are using non-mineral oil it is imperative that the name of the oil in use be indicated when returning the hydraulic attachment for repair.

In order to protect the environment or on technical grounds, hydraulic oils are currently being used which are not classified as HLP mineral oils.

Before using hydraulic oils of this kind it is imperative to ask the carrier manufacturer whether operations with such fluids are possible.

Our hydraulic attachments are basically designed for use with mineral oils. Consult the Epiroc Customer Center / Dealer in your area before using other hydraulic oils approved by the carrier manufacturer. Following initial assembly and after any workshop repairs, our hydraulic attachments are subjected to a test run on a test bed powered by **mineral oil**.

5.1.3 Grease

- When handling oils and greases observe the safety instructions that apply to these products.

Use STABYL MO 500 or a comparable grease.

5.2 Manufacturing the adapter plate

Construction Tools GmbH also supplies base plates to manufacture adapter plates alternatively to the adapter plates supplied.

NOTICE Adapter plate cracking

The adapter plate may crack if it is not designed for the high load.

- Take not only the weight of the hydraulic attachment but also the crowd force of the carrier, possible vibration etc. into account when dimensioning the adapter plate.
- Ensure that the design conforms to the state of the art.
- Have the web plates welded to the adapter plate base plate by a qualified welding specialist.

The base plate is made of the material EN10025-S355 J2G3.

- Have the web plates designed and manufactured or procure web plates to fit your carrier.
- Ensure that the web plates are welded to the base plate side marked "TOP".

The adapter plate must not strike in any position during operation of the hydraulic attachment.

Construction Tools GmbH does not design, manufacture or sell web plates for adapter plates.

5.3 Installing the adapter plate

NOTICE The adapter plate can come loose

The adapter plate can come loose if the fastening screws are not designed for local high loads.

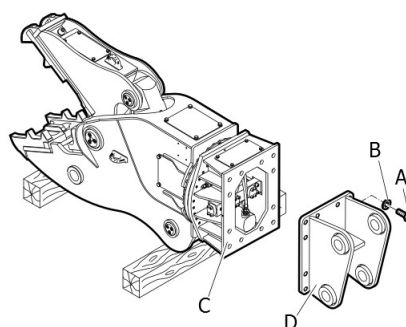
- Only use the Allen screws of strength category 8.8 and the pairs of lock washers included in the delivery to attach the adapter plate or the base plate.
- Place the hydraulic pulverizer on timber support blocks within the range of the carrier.
- Apply anti-seize compound to the Allen screw threads (A) before inserting them.

The contact faces of the screw head and the lock washers (B) must not be lubricated.

▲ WARNING Hands and fingers being cut off or hurt

Bores and surfaces can act like a pair of scissors and cut off or hurt parts of your body.

- Never use your fingers to check bores or fitting surfaces.
- Align the adapter plate (D) to the connection plate (C) or the upper part of the hydraulic pulverizer.



- Fit a pair of lock washers (B) onto every screw.
- Tighten the Allen screws (A) with an Allen key.
- Tighten the Allen screws (A) with the required tightening torque.

Type	Key size	Tightening torque
DP 1820	22 mm (0.89 in.)	1500 Nm (1106 ft lbs)
DP 2320	22 mm (0.89 in.)	1500 Nm (1106 ft lbs)

Type	Key size	Tightening torque
DP 3220	22 mm (0.89 in.)	1500 Nm (1106 ft lbs)
DP 4220	27 mm (1.06 in.)	2600 Nm (1918 ft lbs)

5.4 Attaching the hydraulic attachment to the carrier

5.4.1 Mechanical mounting aspects

You need an assistant to attach the hydraulic attachment to the carrier.

- Agree on hand signals with your assistant, to enable him to help you place the carrier in the proper position to attach the hydraulic attachment.
- Lower the stick of the carrier into the holder provided on the adapter plate.

▲ WARNING Injury by impacts

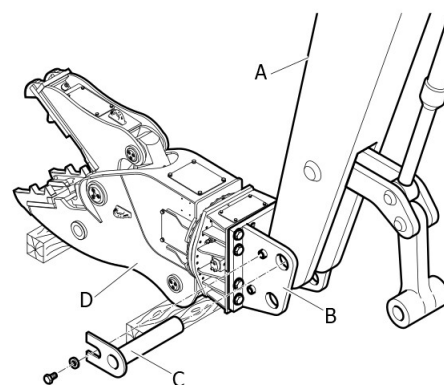
A sudden movement of the carrier may cause your assistant to be hit and injured by the boom or the hydraulic attachment.

- ▶ Only move the boom very slowly and in a controlled manner while an assistant is within the danger zone.
- ▶ Always keep sight of your assistant.

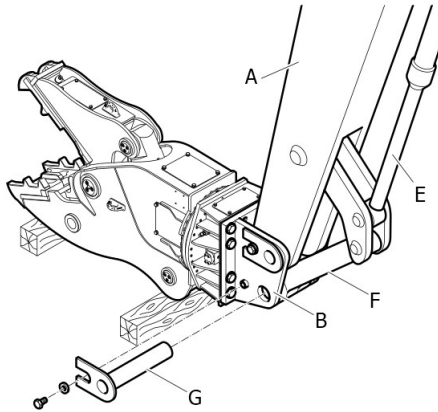
▲ WARNING Hands and fingers being cut off or hurt

Bores and surfaces can act like a pair of scissors and cut off or hurt parts of your body.

- ▶ Never use your fingers to check bores or fitting surfaces.
- Let your assistant instruct you until the bores in the adapter plate (B) and in the stick (A) are properly aligned.
- Install the stick bolt (C) and lock it.



- Lift the hydraulic attachment (D).



- Extend the bucket cylinder (E) until the bore in the linkage (F) aligns with the bore in the adapter plate (B).
- Install the linkage bolt (G) and lock it.
- Carefully move the bucket cylinder (E) into both end positions.

The adapter plate must not be stopped by the mechanical stops in either position. Consult the Epiroc Customer Center / Dealer in your area if the adapter plate is stopped by a mechanical stop.

5.4.2 Making the hydraulic connections

NOTICE Faulty hydraulic installation

The carrier must have a suitable hydraulic installation to operate the hydraulic attachment. Improperly installed lines and incorrectly rated sizes may cause the oil to heat up and the hydraulic attachment to be damaged.

- ▶ Only use hydraulic lines of the rated sizes as instructed (see chapter **Technical Specifications**).
- ▶ Check the rated size of the hydraulic lines on existing hydraulic installations! All supply and return lines for the hydraulic oil must have a sufficient inside diameter and wall thickness.
- ▶ Route all hydraulic hoses in a torsion-free manner.
- Switch off the carrier.
- Depressurise the hydraulic system according to the manufacturer's safety and operating instructions for the carrier.
- Close all shut-off valves in the installation at the boom, if no quick couplings are used.

NOTICE Damage to hydraulic parts

Polluted hydraulic lines and connections may enable sand, fragments of material and dirt to penetrate the hydraulic attachment and damage the hydraulic parts.

- ▶ Clean the hydraulic lines and connections prior to connecting the hydraulic lines.
- ▶ Have dirty hydraulic lines rinsed through by a specialist company.
- ▶ Clean dirty hydraulic line connections with a suitable grease-dissolving universal cleaner.
- ▶ Observe the cleaner manufacturer's information on safety and use.

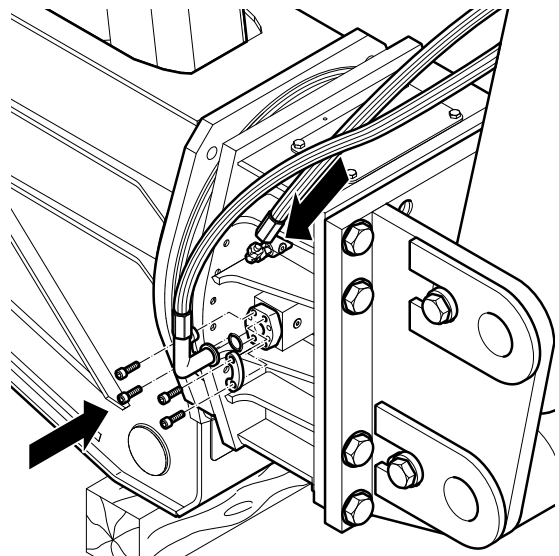
Connecting hydraulic hoses for the functions

»Open / Close«

- Remove the caps/blank flange from port »A« and »B« and keep them in a safe place.

The connection of function »Open« is marked with an »A«, the connection of function »Close« with a »B«.

- Check that the connections are not damaged.
- Change any damaged connections.
- If the two input lines of the boom have the same operating pressure, connect them torsion-free to port »A« and »B«.
- If the two input lines of the boom have different operating pressures, connect the hose with the higher operating pressure torsion-free to port »B«, connect the hose with the lower operating pressure torsion-free to port »A«.
- Grease the flange O-rings with Parker O-Lube and insert them.



- Position the flanges of the hoses on port »A« and »B«.
- Fix the flange halves with the fixing screws.

▲ WARNING Hydraulic hose flailing about

Pressurised hydraulic hoses will flail about if a bolted connection comes loose or becomes loosened. A hydraulic hose flailing about may cause serious injuries.

- ▶ Tighten the fastening screws with the right tightening torque.

Tightening torque (see chapter **Bolt connections / Tightening torques**).

Connecting hydraulic hoses for the function »Turn«

- Remove the cap nuts and plugs from the »Turn« connections and save them for future use.
- Check that the connections are not damaged.
- Replace damaged connections.
- Fix the hoses to the connection for function »Turn«.
- Connect both hoses for the function »Turn« at the boom, torsion-free.

▲ WARNING Hydraulic hose flailing about

Pressurised hydraulic hoses will flail about if a bolted connection comes loose or becomes loosened. A hydraulic hose flailing about may cause serious injuries.

- ▶ Tighten the fastening screws with the right tightening torque.

Tightening torque (see chapter **Bolt connections / Tightening torques**).

5.5 Removing the hydraulic attachment from the carrier

- Place the hydraulic attachment on timber support blocks.

5.5.1 Dismantling the hydraulic connections

▲ WARNING Unexpected movement

Sudden movements of the carrier may cause serious injury.

- ▶ Secure the carrier such that it cannot move unexpectedly.
- ▶ Observe the carrier manufacturer's instructions.

▲ WARNING Hydraulic hose flailing about

Pressurised hydraulic hoses will flail about when bolted connections have come loose or have been loosened. A hydraulic hose flailing about may cause serious injuries.

- ▶ Depressurise the hydraulic system before disconnecting a hydraulic hose (see chapter **Depressurising the hydraulic system**).

▲ WARNING Hot parts

The hydraulic cylinder, hoses, pipes and fittings become very hot during operation. Touching them may lead to burns.

- ▶ Never touch hot parts.
- ▶ If you have to carry out activities where you have to touch the parts, wait for them to cool down first.
- Close all shut-off valves in the installation at the boom if no quick couplings are used.
- Disconnect the hose lines to and from the hydraulic attachment at the boom side.
- Close off all open hose ends.

5.5.2 Mechanical disassembly

- You need an assistant to remove the hydraulic attachment.
- Agree on hand signals with your assistant, to enable him to help you move the boom.

▲ WARNING Injury by impacts

A sudden movement of the carrier may cause your assistant to be hit and injured by the boom or the hydraulic attachment.

- ▶ Only move the boom very slowly and in a controlled manner while an assistant is within the danger zone.
- ▶ Always keep sight of your assistant.

▲ WARNING Metal chips shooting off

When hammering out bolts, chips may shoot off and cause serious eye injuries.

- ▶ Wear safety glasses when hammering out the bolts.
- Remove the bolt locks from the stick and linkage bolts.
- Drive out the linkage bolt with a steel arbor and a hammer.
- Switch on the carrier.
- Retract the bucket cylinder.

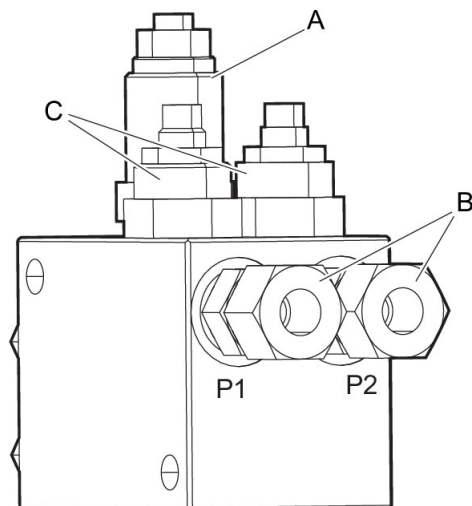
- Drive out the stick bolt with a steel arbor and a hammer.
- Move the carrier stick out of the adapter plate.

5.6 Removing the adapter plate

- Loosen the fastening screws of the adapter plate.
- Lift the adapter plate with a suitable lifting equipment and put it down on timber support blocks.
- Save the fastening screws and the pairs of lock washers for future use.

5.7 Valve block

The valve block is located in the upper part of the hydraulic attachment (rotating). It comprises a pressure relief valve and two throttle valves. The pressure relief valve setting for the function »Turn« is fixed at 170 bar (2500 psi). The throttle valves are set so that an oil flow of a maximum 35 - 50 l/min (9 - 13.2 gal/min) and speed 20 rpm is not exceeded. The throttle valve values setting may not be changed.



- A. Pressure relief valve
- B. Connections pressure, turn hydraulic attachment right/left
- C. Throttle valve

6 Operation

▲ **WARNING Hot hydraulic oil squirting out**

The hydraulic system is under high pressure. If hydraulic connections come loose, hydraulic oil will squirt out under high pressure. Hydraulic oil squirting out can lead to serious injury.

- ▶ Immediately switch off the hydraulic attachment and the carrier if you detect any leaks in the hydraulic circuits.
- ▶ Depressurise the hydraulic system (see chapter **Depressurising the hydraulic system**).
- ▶ Repair any leaks before operating the hydraulic attachment again.

▲ **WARNING Hot parts**

The hydraulic cylinder, hoses, pipes and fittings become very hot during operation. Touching them may lead to burns.

- ▶ Never touch hot parts.
- ▶ If you have to carry out activities where you have to touch the parts, wait for them to cool down first.

▲ **WARNING Risk of explosion**

If the hydraulic attachment is equipped with HATCON explosion may occur when the contained lithium batteries are penetrated by pieces of steel or reinforcing bars.

- ▶ Avoid impact of reinforcement, flying rocks or even explosives on HATCON.
- ▶ Check the HATCON before operating.

NOTICE Environmental damage due to hydraulic oil

Hydraulic oil is environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- ▶ Collect any hydraulic oil which escapes.
- ▶ Dispose of it in accordance with the applicable environmental regulations.

NOTICE Hydraulic oil too hot

The temperature of the hydraulic oil must not exceed 80 °C (176 °F). Higher temperature will damage the seals of the hydraulic parts.

- ▶ Monitor the oil temperature.
- ▶ Shut off the hydraulic attachment and the carrier if you measure an increased temperature in the tank.
- ▶ Check the hydraulic installation and the pressure relief valve.

NOTICE Damage to Performance-Booster cylinder

If the Performance-Booster cylinder is not warmed up like required, damage to the Performance-Booster cylinder will occur and the warranty expires.

- ▶ Before starting work, always warm up the Performance-Booster cylinder as described in the Warm-up procedure.

6.1 Preparations before starting

▲ **WARNING Falling carrier**

A carrier falling or tipping over due to the surface not being level may cause serious injury and material damage.

- ▶ Always observe great care when moving the carrier.
- ▶ Do not use the hydraulic attachment until the carrier is positioned stably.

▲ **WARNING Fragments flying around**

Fragments of material which come loose while operating the hydraulic attachment may be flung away and can cause serious injury if people are hit by them. Small objects falling from a great height can also cause serious damage.

During hydraulic attachment operation the danger zone is considerably greater than during the excavation operation due to fragments of stone and pieces of steel flying around, and for this reason the danger zone must, depending on the type of material to be worked on, be enlarged correspondingly, or secured in a suitable manner through corresponding measures.

- ▶ Secure the danger zone.
- ▶ Stop the hydraulic attachment immediately if anyone enters the danger zone.
- ▶ Close the windscreen and the side windows of the driver's cab.

■ Before starting the hydraulic pulverizer, ensure that

- the hydraulic pulverizer is complete,
- the hydraulic pulverizer and adapter plate do not have any cracks,
- the blade clearance is within tolerance
- and none of the hydraulic line connections leak.

The preparations required prior to starting the hydraulic pulverizer depend on the ambient temperature:

- Ambient temperature below 0 °C (32 °F) (see chapter **Low ambient temperature**).
- Ambient temperature above 30 °C (86 °F) (see chapter **High ambient temperature**).

The oil temperature in the hydraulic pulverizer must be between 0 °C (32 °F) and +80 °C (176 °F) during operation.

The full capacity of the hydraulic pulverizer can be achieved when the oil temperature is approx. 60 °C (140 °F).

Before starting the hydraulic pulverizer, a warm-up procedure of the Performance Booster cylinder is strongly recommended (see chapter **Warm-up Procedure**)

- Make sure that there are no people in the danger zone.
- Start the carrier as instructed by the carrier manufacturer.
- Let the carrier warm up until the operating temperature prescribed by the carrier manufacturer has been reached.
- Put the carrier in its working position.

6.2 Switching the hydraulic pulverizer on and off

After properly attaching the hydraulic attachment to the carrier, the hydraulic attachment can be operated using the carrier's hydraulic system. All functions for normal carrier operation remain intact.

The hydraulic attachment is switched on and off using electrical and hydraulic signals. If you have any questions about electric / hydraulic commands, consult the carrier manufacturer and/or the Epiroc Customer Center / Dealer in your area.

- Switch the hydraulic attachment on and off, as described in the carrier's operating instructions.
- When leaving the driver's cab, set the safety switch/ lever for the electrical / hydraulic attachment installation to the "OFF" position.

Carry out the above actions to prevent any unintended start-up of the hydraulic attachment.

6.3 Warm-up Procedure

NOTICE Damage to Performance-Booster cylinder

If the Performance-Booster cylinder is not warmed up like required, damage to the Performance-Booster cylinder will occur and the warranty expires.

- Before starting work, always warm up the Performance-Booster cylinder as described in the Warm-up procedure.

Warm-up procedure

The warm-up procedure ensures that any air that has accidentally entered and/or remains in the Performance-Booster cylinder is released.

- At each start of the work shift carry out 4 to 5 full open/close cycles of the pulverizer jaw.
- Make sure that the flow rate is reduced to 40 l/min (11 gal/min) and low pressure to 50 to 70 bar (725 - 1015 psi) without any external load applied.

Then the Performance -Booster cylinder is ready to be operated.

6.4 Functional test

Always carry out a functional test before putting the hydraulic pulverizer into use. Check that all hydraulic lines and connections are tight and that the hydraulic pulverizer works without any problem.

- Prepare the hydraulic pulverizer so that you can start using it (see chapter **Preparations before to starting**).
- Lift the hydraulic pulverizer with the carrier boom function so that it hangs vertically.
- Close and open the pulverizer jaw.
- Turn the hydraulic pulverizer via the connected carrier function »Turn« left and right.
- Observe the hydraulic lines and whether the hydraulic pulverizer works properly.
- Switch the hydraulic pulverizer off immediately if oil leaks from the hydraulic lines or other malfunctions occur.
- Depressurise the hydraulic system (see chapter **Depressurising the hydraulic system**).
- Only take the hydraulic pulverizer back into operation once all leaks or malfunctions have been remedied.

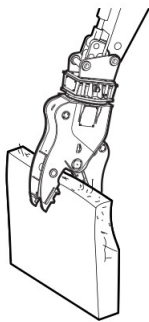
6.5 Correct operation



NOTE: During operation the Performance-Booster cylinder makes an oscillating noise when changing from speed mode to force mode. To reach the maximum force, the operator has to go on closing the demolition pulverizer. The oscillating noise is indicating that the force mode is working.

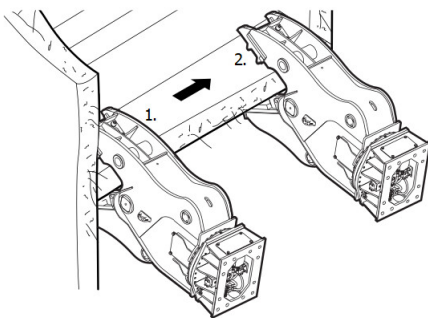
6.5.1 Demolishing concrete ceilings or walls

- Encompass the concrete ceilings and walls as far as possible with the pulverizer jaw.
- First break the concrete with the pulverizer jaw.
- Then separate the reinforcements.



6.5.2 Nipping out concrete elements

- Nip concrete elements off at both sides.



6.5.3 High ambient temperature

- Only use hydraulic oils of sufficient viscosity.
In summer and in tropical climates, the minimum requirement is a hydraulic oil of type HLP 68.

6.5.4 Low ambient temperature

Ambient temperature below -20 °C (-4 °F):

You must heat up the hydraulic attachment and the carrier when working in ambient temperatures of below -20 °C (-4 °F).

Preferably park the carrier and the hydraulic attachment in a heated, sheltered space while not using it.

NOTICE Hydraulic oil too cold

Operating the hydraulic attachment while hydraulic oil is still cold will damage the seals of the hydraulic parts.

- Do not operate the hydraulic attachment until the temperature of the hydraulic oil is at least 0 °C (32 °F).
- Start the carrier as instructed by the carrier manufacturer.
- Let the carrier warm up until the operating temperature required by the manufacturer has been reached.
- Lift the hydraulic attachment using the boom function so that it hangs vertically.
- Close, open and turn the hydraulic attachment during the carrier warming-up phase.

NOTICE Damage to hydraulic parts

Hot hydraulic oil causes damage to subcooled hydraulic attachments.

- Do not fill the hydraulic system with hot hydraulic oil.

The temperature of the hydraulic oil of the carrier must be at least 0 °C (32 °F).

- Start the hydraulic attachment, once the temperature has reached 0 °C (32 °F).
- During operations, leave the carrier engine and pumps running even during breaks.

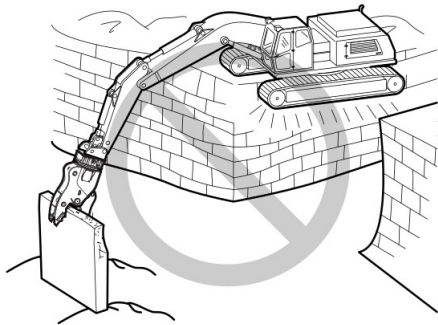
6.6 Prohibited operation

6.6.1 Unsafe base

▲ WARNING Danger of tipping

The carrier can topple over and cause injuries and damage.

- Only work with the hydraulic attachment when the carrier is on a safe base.

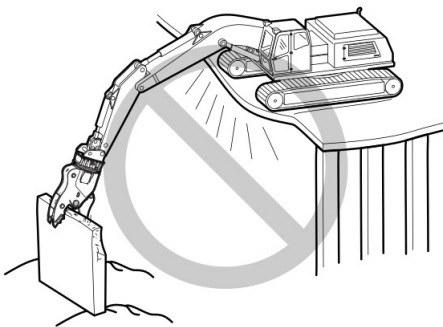


6.6.2 Non-load bearing suspended ceilings

▲ WARNING Danger of collapse

The carrier can collapse and cause injuries and damage.

- Only work with the hydraulic attachment when the carrier is on a load-bearing suspended ceiling.

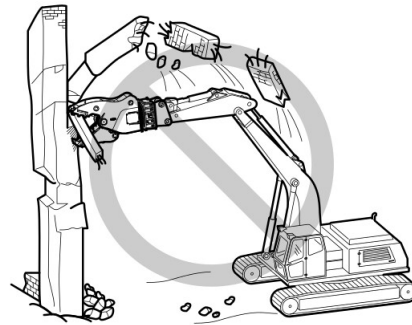


6.6.3 Working position

▲ WARNING Falling debris

Large pieces of debris falling may cause injury and damage.

- Never start demolishing pillars, supports and walls from below or the middle.

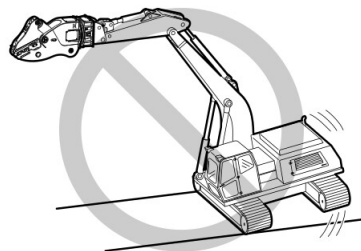


6.6.4 Use over the chain

▲ WARNING Danger of tipping

The carrier can topple over and cause injuries and damage.

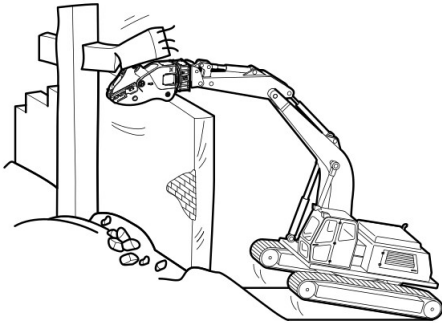
- Never work with full delivery sideways in the direction of movement.



6.6.5 Levering

- Never use the hydraulic attachment for crowbar-type applications.

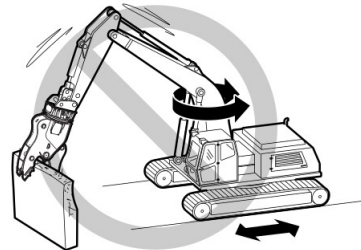
This would seriously damage the hydraulic attachment.



6.6.7 Moving the boom

- Never move the boom or the carrier during breaking/cutting.

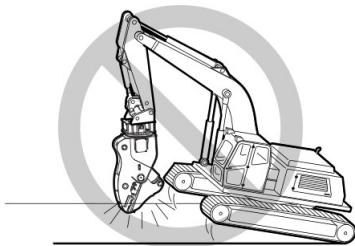
This would seriously damage the hydraulic attachment.



6.6.6 Moving the carrier

- Never relocate the carrier sideways by placing the hydraulic attachment on the ground to lift the carrier.

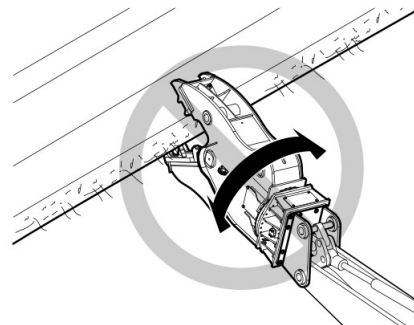
This would seriously damage the hydraulic attachment.



6.6.8 Turning the hydraulic attachment

- Never turn the hydraulic attachment during breaking/cutting.

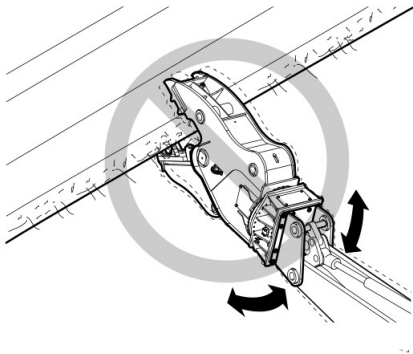
This would seriously damage the hydraulic attachment.



6.6.9 Extending the bucket cylinder

- Never extend the bucket cylinder during breaking/cutting.

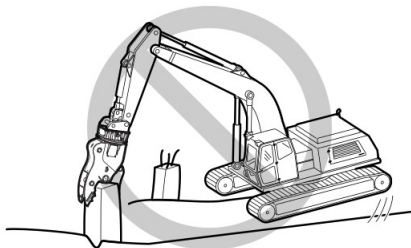
This bending action would destroy the hydraulic attachment.



6.6.10 Pulling

- Never pull at girders, supports or walls with the hydraulic attachment.

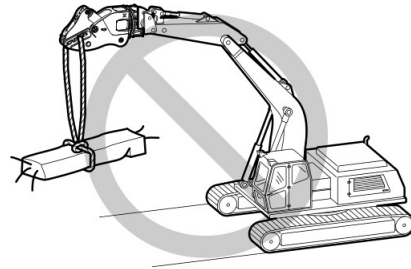
This would damage the hydraulic attachment and the adapter plate. The carrier may lose stability. It can topple over and cause injuries.



6.6.11 Lifting/Transporting

- Never use the hydraulic attachment to lift or transport loads.

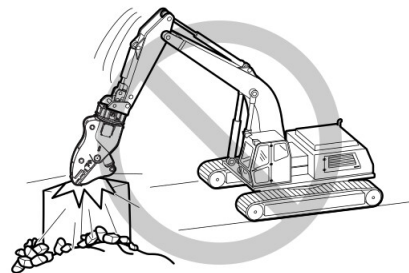
The hydraulic attachment was not constructed to lift or transport loads. This would damage the hydraulic attachment.



6.6.12 Impacting/chopping

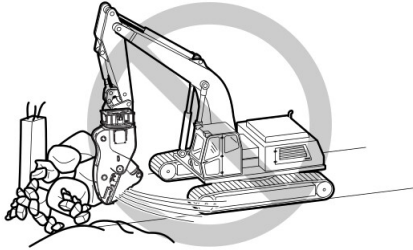
- Do not use the hydraulic attachment to impact or chop to destroy material.

This would seriously damage the hydraulic attachment.



6.6.13 Moving objects

- Never use the hydraulic attachment to move debris. This would damage the hydraulic attachment.



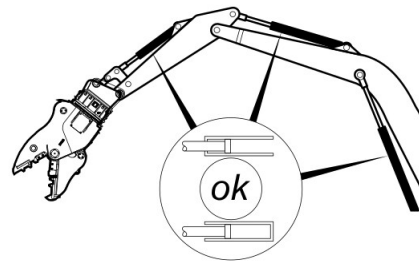
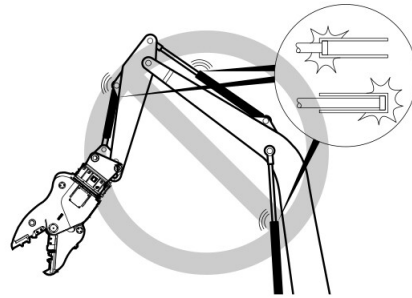
6.6.14 Use under water

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

6.6.15 Cylinder end positions

- Reposition the carrier to avoid working with the cylinder in its end positions.

Avoid operating the hydraulic attachment when the carrier stick and bucket cylinder are in one of their end positions. These end positions have damping facilities; the hydraulic cylinder may be damaged by prolonged use while in its end positions.



7 Maintenance

The maintenance activities are carried out by the carrier driver.

▲ **WARNING Hot hydraulic oil squirting out**

The hydraulic system is under high pressure. If hydraulic connections come loose, hydraulic oil will squirt out under high pressure. Hydraulic oil squirting out can lead to serious injury.

- ▶ Immediately switch off the hydraulic attachment and the carrier if you detect any leaks in the hydraulic circuits.
- ▶ Depressurise the hydraulic system (see chapter **Depressurising the hydraulic system**).
- ▶ Repair any leaks before operating the hydraulic attachment again.

▲ **WARNING Hot hydraulic oil squirting out**

The hydraulic system is under high pressure. Hydraulic oil escaping out can lead to serious injury.

- ▶ Immediately switch off the hydraulic attachment and the carrier if you detect any leaks in the hydraulic circuits.
- ▶ Do not inspect for possible leaks with your fingers or other parts of the body, but use a piece of cardboard instead, holding it up to the suspected leakage site.
- ▶ Examine the cardboard for traces of liquid.
- ▶ Depressurise the hydraulic system (see chapter **Depressurising the hydraulic system**).
- ▶ Repair any leaks before operating the hydraulic attachment again.

▲ **WARNING Hot parts**

The hydraulic cylinder, hoses, pipes and fittings become very hot during operation. Touching them may lead to burns.

- ▶ Never touch hot parts.
- ▶ If you have to carry out activities where you have to touch the parts, wait for them to cool down first.

▲ **WARNING Accidental start**

If the hydraulic attachment is started by accident this may lead to serious injury.

- ▶ Follow the instructions in the Operating Instructions of the carrier to prevent the hydraulic attachment starting by accident.

▲ **WARNING Unexpected movement**

Sudden movements of the carrier may cause serious injury.

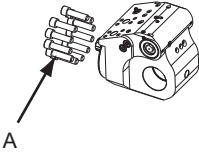
- ▶ Secure the carrier such that it cannot move unexpectedly.
- ▶ Observe the carrier manufacturer's instructions.

NOTICE Environmental damage due to hydraulic oil

Hydraulic oil is environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- ▶ Collect any hydraulic oil which escapes.
- ▶ Dispose of it in accordance with the applicable environmental regulations.

7.1 Maintenance schedule

prior to shift	Check the hydraulic pulverizer and adapter plate for cracks. Check hydraulic lines for leaks and damage. Check the pipe clamp receiver on the carrier. Check cutter blades, tooth plates and tip of tooth for wear; if necessary turn or replace cutter blades, replace tooth plates and tip of tooth. Check the cutting edges of the blades for wear every 8 operating hours, max. 3 mm (0.12 in.) radius. Check hard facing (visual check). If refacing is necessary send the hydraulic pulverizer for repair. Check the bolted connections at the adapter plate and tighten as required. Check fixing bolts at the piston axis, cutter blades, tooth plate and tip of tooth, if necessary tighten or replace. Check the bolted connections at the hydraulic lines and tighten as required. Check cutter blade clearance, adjust if necessary. Lubricate all lubrication nipples of the hydraulic pulverizer.
during shift	Lubricate all lubrication nipples of the hydraulic pulverizer every three hours.
weekly	Check the bolted connections hydraulic pulverizer - upper part. Tighten as required. Check the bolted connections of main bearing pin and tighten as required. Check the bolted connections at the four point bearing and tighten as required. Lubricate four point bearing.
after the first 50 operating hours	Change hydraulic oil filter cartridge.
every 1400 operating hours, or at least every 2 years	Change hexagon head screws (A) and seals at PB cylinder. 
every 500 operating hours	Check oil filter cartridge, replace if necessary.
if necessary	Replace bent and damaged pipes. Replace damaged hoses. Check wear at the adapter plate bolts.

7.2 Depressurising the hydraulic system

Even when you have switched off the carrier, a considerable residual pressure can still be present in the hydraulic system.

A residual pressure can still be present in the hydraulic attachment even after you have disconnected the quick-release couplings or closed the shut-off valves.

The hydraulic attachment can only be depressurised using the hydraulic system of the carrier, by allowing hydraulic oil to drain to the tank via the return connection.

Depending on the type of hydraulic attachment, the internal leaks, the oil temperature, the type of hydraulic oil and the design of the hydraulic installation of the carrier, the time required to relieve the pressure can vary.

Observe the following steps in order to depressurise the hydraulic attachment:

1. Ensure that the hydraulic oil in the hydraulic attachment and in the carrier has a temperature of at least 0 °C (32 °F). If necessary, pre-heat it to at least 0 °C (32 °F).
2. The hydraulic attachment must be connected to the hydraulic system of the carrier device, i.e. the hydraulic hoses must be connected up and the respective shut-off valves in the supply pipe and in the connection to the tank must be opened.
3. Open the pulverizer jaw completely.
4. Place the hydraulic attachment horizontal on the ground.
5. Close the pulverizer jaw briefly, just enough to see a movement of the pulverizer jaw.
6. Depressurise the hydraulic system according to the manufacturer's safety and operating instructions for the carrier.
7. You must wait at least another 30 minutes until the pressure has been relieved through leakages.
8. Measure the pressure with a suitable gage at both measurement connections at the hydraulic attachment.
9. If residual pressure is still present, wait until the pressure has been completely relieved.
10. When you have made sure that no more pressure is present in the hydraulic system, you must disconnect the hydraulic connection to the carrier. Close the

shut-off valves or disconnect the quick-release couplings, so that no hydraulic oil can flow back from the carrier.

7.3 Cleaning

NOTICE Environmental damage due to polluted water

Hydraulic oil and cutter grease are environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- Collect the water used for cleaning if it has been contaminated by hydraulic oil and cutter grease.
- Dispose of the water in accordance with the applicable regulations to avoid environmental hazards.

7.3.1 Preparations

Hydraulic pulverizer attached:

- Let the hydraulic pulverizer hang vertically from the carrier boom and place the body on the ground.
All parts are thus accessible for cleaning.
- Secure the carrier such that it cannot move unexpectedly.

Hydraulic pulverizer not attached:

- Plug up all hydraulic ports.

7.3.2 Procedure

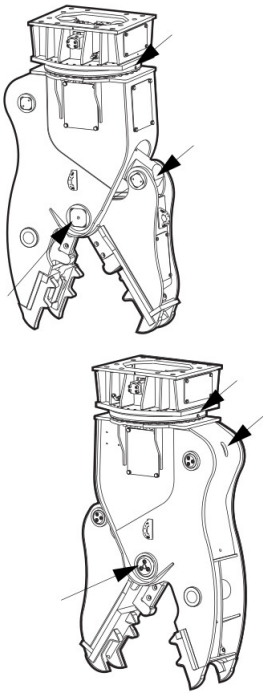
- Use a pressure cleaner to remove dirt from the hydraulic pulverizer.

7.4 Lubrication

7.4.1 Lubricating the hydraulic pulverizer

Lubrication interval: every three hours

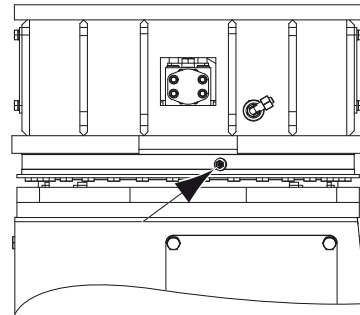
- Let the hydraulic pulverizer hang vertically from the carrier boom. Place the body on the ground.
- Secure the carrier so that it cannot move unexpectedly.
- Only use cutter grease for lubrication.
- Place the grease gun on all lubrication nipples.
- Inject 4 to 6 strokes of cutter grease per lubrication nipple.



7.4.2 Lubricating the four point bearing

Lubrication interval: weekly.

- Let the hydraulic pulverizer hang vertically from the carrier boom and place the body on the ground.
- Secure the carrier such that it cannot move unexpectedly.
- Only use cutter grease for lubrication.
- Place the grease gun on the lubrication nipples of the four point bearing.
 - DP 1820: 4 lubrication nipples
 - DP 2320: 2 lubrication nipples
 - DP 3220: 4 lubrication nipples
 - DP 4220: 4 lubrication nipples
- Inject 4 strokes of cutter grease per lubrication nipple.



▲ WARNING Unexpected movement

Movements of the carrier and the hydraulic attachment may cause serious injury. Persons who are within the danger zone (within the reach of the carrier and the hydraulic attachment) can get injured or killed.

- ▶ Secure the danger zone.
- ▶ Stop the hydraulic attachment immediately if anyone enters the danger zone.
- Clear the danger zone.
- Switch the carrier on.
- Lift the hydraulic attachment and let it hang vertically.
- Turn the hydraulic attachment about 45°.
- Secure the carrier such that it cannot move unexpectedly.
- Place the grease gun on the lubrication nipples of the four point bearing.
- Again inject 4 strokes of cutter grease per lubrication nipple.

7.5 Checking the hydraulic pulverizer and adapter plate for cracks

- Secure the carrier such that it cannot move unexpectedly.
- Check all the hydraulic pulverizer and adapter plate load-bearing parts and welds for cracks prior to every shift.
- Ensure repair or refinishing in good time to prevent greater damage.

7.6 Checking hydraulic pulverizer for wear

▲ **WARNING** Parts of the body or the whole body may be sheared or crushed

The pulverizer jaw may close unexpectedly and shear or crush parts of the body or the whole body.

- ▶ Ensure that there is nobody in the jaw opening.
- Secure the carrier such that it cannot move unexpectedly.
- Prior to starting work, check body, pulverizer jaw, cutter blades and wear plate for wear.
- Replace cutter blades and wear plate in good time to prevent greater damage (see Chapter **Turning or changing cutter blades** and **Changing wear plate**).

NOTICE Damage to blade seats

Working without cutter blades causes serious damage to the blade seats.

- ▶ Replace the missing cutter blades immediately (see Chapter **Turning or changing cutter blades**).

7.7 Checking hydraulic lines

- Secure the carrier such that it cannot move unexpectedly.
- Perform a visual inspection of all lines (pipes and hoses) from the pump to the hydraulic attachment and back to the tank, before starting work.
- Tighten loose bolted connections and hose clamps to the torque required (see Chapter **Bolted connections / tightening torques**).
- Replace damaged pipes and/or hoses.

7.8 Checking bolted connections

- Secure the carrier such that it cannot move unexpectedly.
- Check all bolted connections regularly for tight fit (see Chapter **Bolted connections / Tightening torques**).
- Tighten loose bolted connections and hose clamps to the torque required (see Chapter **Bolted connections / Tightening torques**).

7.9 Checking the adapter plate bolts for wear

- Carry out this visual check whenever the hydraulic attachment has been removed from the carrier.
- Check the adapter plate bolts for excessive wear such as cracks, pitting or severe erosion.
- Rework or replace worn bolts.

7.10 Checking and cleaning the hydraulic oil filter of the carrier

An oil filter must be integrated in the return circuit of the hydraulic system. The maximum mesh width allowed for the oil filter is 50 microns; it must have a magnetic separator.

- Secure the carrier such that it cannot move unexpectedly.
- Change the oil filter cartridge after the first 50 operating hours.
- Check the oil filter **every** 500 operating hours and replace if it is necessary.

7.11 Turning or changing the cutter blades

- Turn the cutter blade if the cutting edge is worn and the contact face is undamaged.
- Change the cutter blade if the contact face is damaged or if the cutter blade shows any other damage.
- Use new, original fixing bolts when you attach new cutter blades.

7.11.1 Removing the cutter blades

- Open the jaw opening completely.
- Place the hydraulic pulverizer horizontal on the ground.

▲ WARNING Parts of the body or the whole body may be sheared or crushed

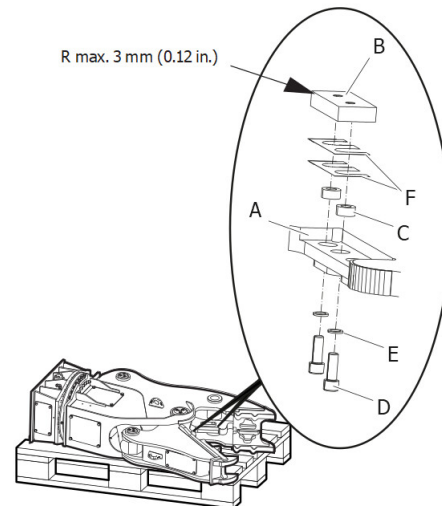
The pulverizer jaw may close unexpectedly and shear or crush parts of the body or the whole body.

- ▶ Ensure that there is nobody in the jaw opening.
- Perform work while outside the jaw opening.
- Disconnect the hydraulic supply to the hydraulic pulverizer by shutting the shut-off valves of the lines »Open« (Port »A«) and »Close« (Port »B«) at the boom.
- Secure the carrier such that it cannot move unexpectedly.
- Loosen the Allen screws (D) with an Allen key.
- Unscrew the Allen screws (D) some turns.

▲ WARNING Metal chips shooting off

The cutter blades are made of hardened steel. When removing the cutter blades with a hammer, chips may shoot off and cause serious eye injuries.

- ▶ Wear safety glasses when hammering out the cutter blades.
- ▶ A copper mandrel must be used for hammering.
- Drive the cutter blade (B) out by hitting a copper mandrel on the heads of the Allen screws (D).
- Screw the Allen screws (D) out completely and remove the pair of lock washers (E).
- Lever the cutter blade (B) out of the blade seat using a screw driver or thin chisel.
- Remove the shims (F).
- Remove the lock rings (C) with pliers.
- Check the blade seat of the cutter jaw and the lock rings (C).



Actual details may differ.

7.11.2 Checking the blade seat

The blade seat (A) should not have any severe damage since this means the support of the cutter blade (B) is not ensured. Damage to the blade seat (A) may lead to fracture of the cutter blade (B).

- Have the damaged blade (A) seat welded by a qualified welder and then returned to its original form using mechanical finishing.

7.11.3 Checking cutter blades

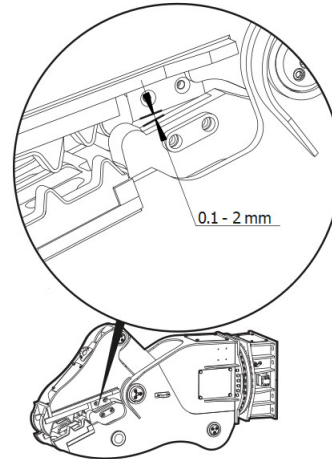
If you turn the cutter blade (B), the surfaces contacting the blade seat should not have any major unevenness. Unevenness causes damage to the blade seat.

- Change the cutter blade (B) if the contact surface (A) is damaged or if the cutter blade (B) has other damage.
- Check the cutting edges of the blades for wear every 8 operating hours.
The cutting edges may be worn to a maximum radius (R max.) of 3 mm (0.12 in.).
- Change the cutter blade if the cutting edges are worn above the maximum radius (R max.) of 3 mm (0.12 in.).
- Turn the cutter blade if the cutting edge is worn and the contact surface is undamaged.
- Replace damaged Allen screws (D), pairs of lock washers (E) and lock rings (C).

7.11.4 Fitting cutter blades

If the inspection of the blade seat (A) does not show any defects or if it has been reworked, fitting of the cutter blade (B) can begin.

- Clean the blade seat.
- Fit the lock rings (C).
- Insert the cutter blade (B).
- Place one pair of lock washers (E) on each Allen screw (D).
- Tighten the Allen screws (D) to the torque required (see chapter **Bolt connections / Tightening torques**).
- Open the shut-off valves of the lines »Open« (Connection »A«) and »Close« (Connection »B«) at the boom.



- Check further pairs of cutter blades also in this way.

7.12 Checking and correcting the blade clearance

- Secure the carrier to prevent any unexpected movements prior to measuring or correcting the blade clearance.

7.12.1 Checking the blade clearance

- Open the jaw opening completely.

▲ **WARNING** Parts of the body or the whole body may be sheared or crushed

The pulverizer jaw may close unexpectedly and shear or crush parts of the body or the whole body.

- ▶ Ensure that there is nobody in the jaw opening.
- Perform work while outside the jaw opening.
- Close the jaw opening until the first pair of cutter blades overlaps.
- Secure the carrier to prevent any unexpected movements.
- Measure the blade clearance with a feeler gauge (leaf gauge).
- The blade clearance must be corrected if it is greater than 2 mm.

7.12.2 Correcting the blade clearance

Shims are required to correct the blade clearance.

These are not included in the hydraulic pulverizers scope of delivery. They must be purchased separately.

The order number can be seen in the list of spare parts.

▲ **WARNING** Metal fragments expelled at high velocity

The cutter blades are made of hardened steel. If the cutter blade pairs come in contact with each other when the cutter jaws close, fragments may be expelled as projectiles and cause serious injuries and damage property.

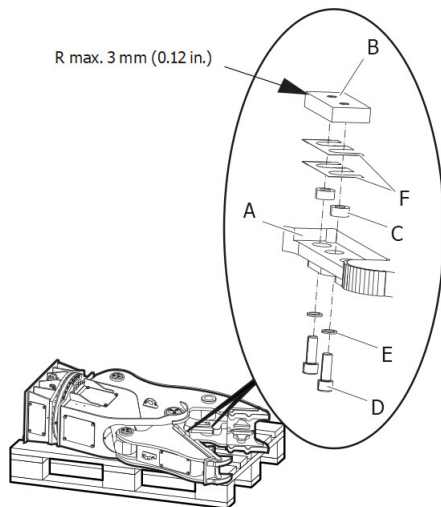
- ▶ Wear safety glasses when making adjustments to the blade clearance.
- ▶ Only shim the blade pairs so there is minimum blade clearance when the jaw opening close.
- Always underlay overlapping pairs of blades with shims evenly. The blade protrusion at both blade seats must be the same.
- Open the jaw opening completely.

▲ **WARNING** Parts of the body or the whole body may be sheared or crushed

The pulverizer jaw may close unexpectedly and shear or crush parts of the body or the whole body.

- ▶ Ensure that there is nobody in the jaw opening.
- Perform work while outside the jaw opening.
- Disconnect the hydraulic supply to the hydraulic pulverizer by shutting the shut-off valves of the lines »Open« (Port »A«) and »Close« (Port »B«) at the boom.

- Secure the carrier such that it cannot move unexpectedly.



- Loosen the Allen screws (D) with an Allen key.
- Unscrew the Allen screws (D) some turns.

▲ WARNING Metal chips shooting off

The cutter blades are made of hardened steel. When removing the cutter blades with a hammer, chips may shoot off and cause serious eye injuries.

- ▶ Wear safety glasses when hammering out the cutter blades.
- ▶ A copper mandrel must be used for hammering.
- Drive the cutter blade (B) out by hitting a copper mandrel on the heads of the Allen screws (D).
- Screw the Allen screws (D) out completely and remove the pairs of lock washers (E).
- Lever the cutter blade (B) out of the blade seat (A) using a screw driver or thin chisel.
- Remove the lock rings (C) using pliers.
- Push shims (F) between cutter blade (B) and blade seat (A).
- Fit the lock rings (C).
- Fit the cutter blade (B).
- Place one pair of lock washers (E) on each Allen screw (D).
- Tighten the Allen screws (D) to the torque required (see chapter **Bold connections / Tightening torques**).
- Re-check the blade clearance (see chapter **Correcting the blade clearance**).

- Repeat this procedure until the blade clearance is less than 2 mm.

7.13 Changing the body jaws tooth plate

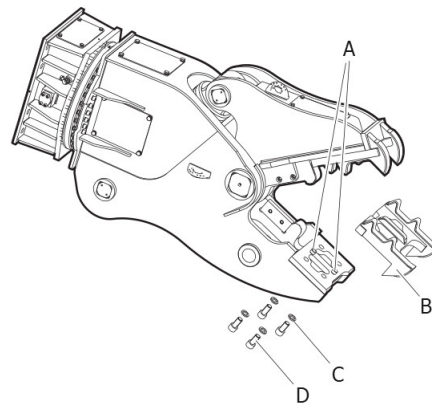
Change the tooth plate if it is worn and the breaking effect decrease.

- Open the jaw opening completely.
- Place the hydraulic pulverizer horizontal on the ground.

▲ WARNING Parts of the body or the whole body may be sheared or crushed

The pulverizer jaw may close unexpectedly and shear or crush parts of the body or the whole body.

- ▶ Ensure that there is nobody in the jaw opening.
- Perform work while outside the jaw opening.
- Disconnect the hydraulic supply to the hydraulic pulverizer by shutting the ball valves of the lines »Open« (Port »A«) and »Close« (Port »B«) at the boom.
- Secure the carrier such that it cannot move unexpectedly.
- Remove the screws (D) and washers (C).



- Remove the worn tooth plate (B) from the body jaw.
- Clean tooth plate seat at the body jaw.
- Make sure the lock pins (A) are in place.
- Place a new tooth plate (B) onto the tooth plate seat.
- Fit a washer (C) to each screw (D).
- Fix the tooth plate (B).

- Tighten with the required tightening torque (see chapter **Bolt connections / Tightening torques**).

7.14 Changing the pulverizer jaws tooth plate

Change the tooth plate if it is worn and the breaking effect decrease.

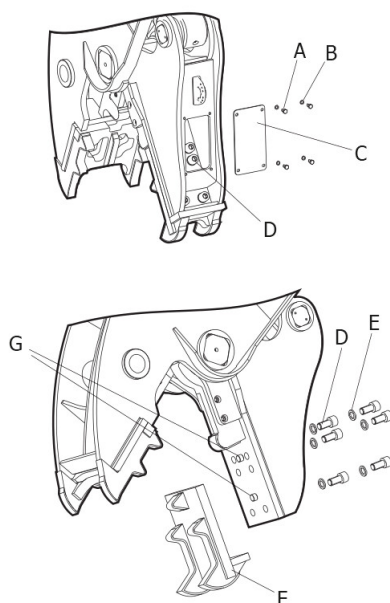
- Open the jaw opening completely.
- Place the hydraulic pulverizer horizontal on the ground.

▲ **WARNING** Parts of the body or the whole body may be sheared or crushed

The pulverizer jaw may close unexpectedly and shear or crush parts of the body or the whole body.

- ▶ Ensure that there is nobody in the jaw opening.
- Perform work while outside the jaw opening.
- Disconnect the hydraulic supply to the hydraulic pulverizer by shutting the ball valves of the lines »Open« (Port »A«) and »Close« (Port »B«) at the boom.
- Secure the carrier such that it cannot move unexpectedly.
- Remove screws (A) and washers (B).
- Remove cover (C).
- Remove the screws (D) and washers (E).

- Remove the worn tooth plate (F) from the pulverizer jaw.
- Clean tooth plate seat at the pulverizer jaw.
- Make sure the lock pins (G) are in place.
- Place a new tooth plate (F) onto the tooth plate seat.
- Fit a washer (E) to each screw (D).
- Fix the tooth plate (F).
- Tighten with the required tightening torque (see chapter **Bolt connections / Tightening torques**).
- Fit the cover (C).
- Fit a washer (B) to each screw (A).
- Fix the cover (C).



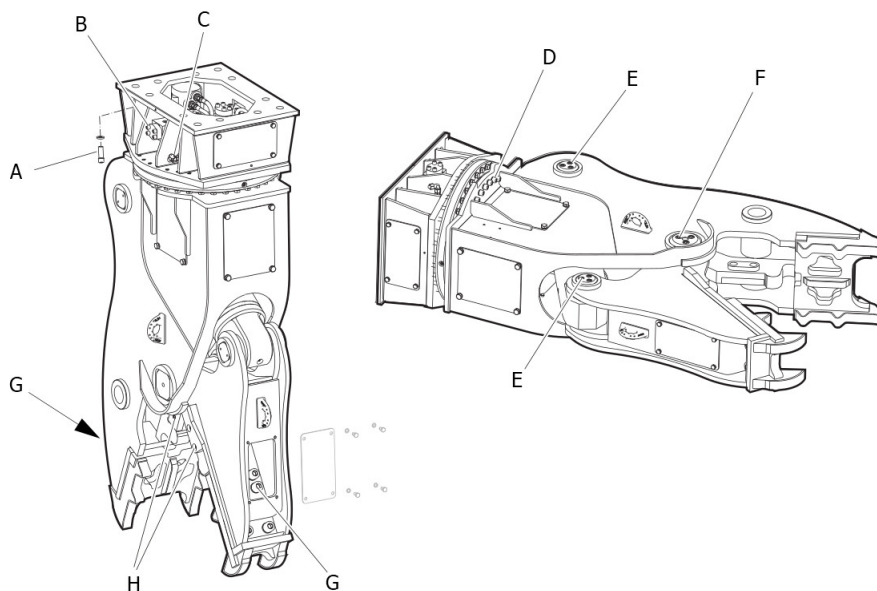
7.15 Bolt connections / Tightening torques DP 1820, DP 2320

The bolt connections of hydraulic pulverizer are subjected to very high loads.

- Tighten any loose connections without exceeding the recommended tightening torques.

Connection point		Interval	Type of spanner	DP 1820	DP 2320
				Size / Torque	
Adapter plate* (fastening screws)	A	daily	Allen key	22 mm (0.87 in.) 1500 Nm (1106 ft lbs)	
Hydraulic port »Open / Close« (Allen screws of flange halves)	B	daily	Allen key	8 mm (0.32 in.) 50 + 10 Nm (37 + 7 ft lbs)	10 mm (0.39 in.) 92 Nm (68 ft lbs)
Hydraulic port »Turn«	C	daily	Open-ended wrench	24 mm (0.95 in.) 70 + 10 Nm (52 + 7 ft lbs)	
Connection Pulverizer - Upper part	D	weekly	Allen key	14 mm (0.55 in.) 255 + 30 Nm (188 + 22 ft lbs)	
Piston axis (fastening screw)	E	weekly	Allen key	10 mm (0.39 in.) 75 + 10 Nm (55 + 7 ft lbs)	
Main bolt pin (fastening screws)	F	weekly	Allen key	14 mm (0.55 in.) 255 + 30 Nm (188 + 22 ft lbs)	
Tooth plate (fastening screws)	G	daily	Allen key	22 mm (0.87 in.) 600 + 30 Nm (443 + 22 ft lbs)	
Cutter blade (fastening screws)	H	daily	Allen key	17 mm (0.67 in.) 530 + 30 Nm (391 + 22 ft lbs)	

* Apply anti-seize compound to the allen screw threads before inserting them. The contact faces of the screw head and the lock washers must not be lubricated.



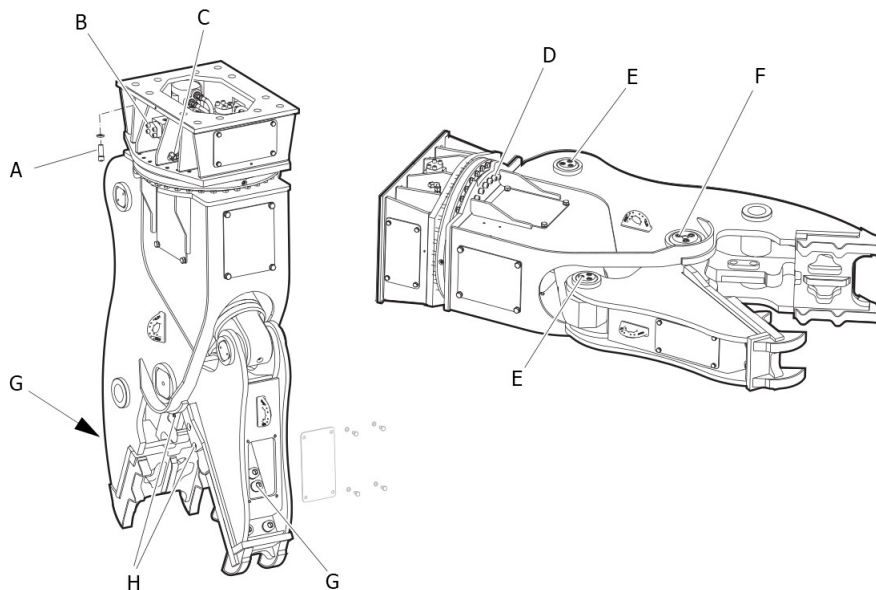
7.16 Bolt connections / Tightening torques DP 3220, DP 4220

The bolt connections of hydraulic pulverizer are subjected to very high loads.

- Tighten any loose connections without exceeding the recommended tightening torques.

Connection point		Interval	Type of spanner	DP 3220	DP 4220
				Size / Torque	
Adapter plate* (fastening screws)	A	daily	Allen key	22 mm (0.87 in.) 1500 Nm (1106 ft lbs)	27 mm (1.06 in.) 2600 Nm (1918 ft lbs)
Hydraulic port »Open / Close« (Allen screws of flange halves)	B	daily	Allen key	12 mm (0.47 in.) 130 Nm (96 ft lbs)	
Hydraulic port »Turn«	C	daily	Open-ended wrench	24 mm (0.95 in.) 63 Nm (47 ft lbs)	
Connection Pulverizer - Upper part	D	weekly	Allen key	17 mm (0.67 in.) 530 + 30 Nm (391 ft lbs)	
Piston axis (fastening screw)	E	weekly	Allen key	10 mm (0.39 in.) 75 + 10 Nm (55 + 7 ft lbs)	
Main bolt pin (fastening screws)	F	weekly	Allen key	14 mm (0.55 in.) 255 + 30 Nm (188 + 22 ft lbs)	
Tooth plate (fastening screws)	G	daily	Allen key	22 mm (0.87 in.) 600 + 30 Nm (443 + 22 ft lbs)	
Cutter blade (fastening screws)	H	daily	Allen key	17 mm (0.67 in.) 530 + 30 Nm (391 + 22 ft lbs)	

* Apply anti-seize compound to the allen screw threads before inserting them. The contact faces of the screw head and the lock washers must not be lubricated.



8 Troubleshooting

8.1 Hydraulic pulverizer does not work

Cause	Remedy	By
Shut-off valve in line A and/or B closed	Check and open shut-off valve	Carrier driver
Defective couplings blocking lines A and B	Check coupling halves and replace defective coupling halves	Workshop
Oil level in tank too low	Top up oil	Carrier driver
Faults in the electrical system of the hydraulic pulverizer installation	Check electrical system of hydraulic pulverizer installation and remedy defects	Workshop
Rocker switch defective	Check the rocker switch and replace	Workshop
Magnet on switch-on valve damaged	Replace the magnet	Workshop

8.2 Insufficient breaking force

Cause	Remedy	By
Lines A and B swapped Only if different pressure settings of lines A and B exist.	Connect up lines A and B correctly (see chapter Hydraulic connection)	Carrier driver
Operating pressure too low	Check pump output and pressure relief valve and correct operating pressure	Epiroc Customer Center / Dealer in your area

8.3 Hydraulic pulverizer does not cut

Cause	Remedy	By
Blades worn or broken	Check blades and turn or replace (see chapter Turning or changing cutter blades)	Workshop
Excessive blade clearance	Check blade clearance and re-adjust (see chapter Checking and correcting the blade clearance)	Workshop

8.4 Hydraulic pulverizer cannot be rotated

Cause	Remedy	By
Rotation motor / gear unit / rotary transmission defective	Check rotation motor / gear unit / rotary transmission and replace defective parts	Epiroc Customer Center / Dealer in your area

8.5 Operating temperature too high

Cause	Remedy	By
Oil level in tank too low	Check oil level and top up oil	Carrier driver or workshop
Carrier pump delivery too high; a constant volume of oil is squirted out of the pressure relief valve	Check and correct motor speed of carrier Drive the pump	Epiroc Customer Center / Dealer in your area
Pressure relief valve defective or valve with poor characteristics	Fit new type-tested pressure relief cartridges or a more precise pressure-limiting valve	Workshop or Epiroc Customer Center / Dealer in your area

8.6 Oil leaks from hydraulic ports

Cause	Remedy	By
Flange halves and/or cap nuts are loose	Check and tighten flange halves and/or cap nuts (see chapter Bolt connections / Tightening torques)	Carrier driver

8.7 Oil leak at parts of the hydraulic pulverizer installation (bolted connections, hoses etc.)

Cause	Remedy	By
Bolted connections are loose; flange connections at valve are loose	Check and tighten bolted connections; replace defective parts if necessary (see chapter Bolt connections / Tightening torques) Check hydraulic pulverizer installation, replace damaged parts. Use only original parts (see chapter Bolt connections / Tightening torques)	Carrier driver or workshop

8.8 Insufficient lubrication

Cause	Remedy	By
Intervals between lubrication too long	Check lubrication and lubricate (see chapter Lubrication)	Carrier driver

8.9 Automatic turning of hydraulic pulverizer

Cause	Remedy	By
Internal leaks in hydraulic system	Check and repair the hydraulic system	Workshop
Pressure relief valve defective	Fit new pressure limiting cartridge	Epiroc Customer Center / Dealer in your area

9 Repair

▲ WARNING Hydraulic system under high pressure

Carrying out repairs on the pressurised hydraulic attachment may lead to serious injury. Connections may come loose unexpectedly, parts may move suddenly and hydraulic oil may squirt out.

- ▶ Depressurise the hydraulic system before carrying out repairs to the hydraulic attachment or the carrier (see chapter **Depressurising the hydraulic system**).
- For technical support contact the Epiroc Customer Center / Dealer in your area.

9.1 Sending in the hydraulic attachment for repairs

NOTICE Mixed hydraulic oil

Never mix mineral and non-mineral hydraulic oils! Even small traces of mineral oil mixed in with non-mineral oil can result in damage to both the hydraulic attachment and the carrier. Non-mineral oil loses its biodegradability.

- ▶ Only use one type of hydraulic oil.
- Always specify which hydraulic oil has been used when sending in the hydraulic attachment to have it repaired.

9.2 Welding

- Only commission qualified welding specialists to perform welding; specialists are people who:
 - have been trained to operate MIG welding equipment according to the national regulations,
 - know all the relevant national/regional safety and accident prevention regulations and
 - who are familiar with and understand these Safety and Operating Instructions.

▲ WARNING Hot hydraulic oil squirting out

The hydraulic system is under high pressure. If hydraulic connections come loose or are disconnected, hydraulic oil will squirt out under high pressure. Hydraulic lines may spring a leak or burst. Hydraulic oil squirting out can lead to serious injury.

- ▶ Depressurise the hydraulic system before carrying out repairs to the hydraulic attachment or the carrier (see chapter **Depressurising the hydraulic system**).
- ▶ Depressurise the hydraulic system according to the manufacturer's safety and operating instructions for the carrier.

▲ WARNING Hot parts

The hydraulic cylinder, hoses, pipes and fittings become very hot during operation. Touching them may lead to burns.

- ▶ Never touch hot parts.
- ▶ If you have to carry out activities where you have to touch the parts, wait for them to cool down first.

NOTICE Environmental damage due to hydraulic oil

Hydraulic oil is environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- ▶ Collect any hydraulic oil which escapes.
- ▶ Dispose of it in accordance with the applicable environmental regulations.

9.2.1 Hard facing the pulverizer jaws

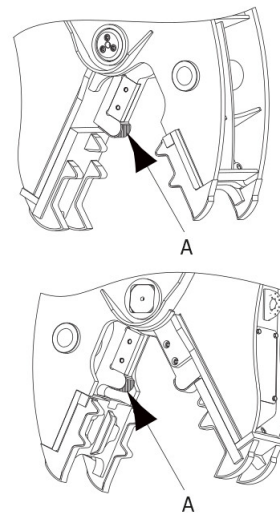
- Depressurise the hydraulic system (see chapter **Depressurising the hydraulic system**).
- Remove the tooth plates (see Chapter **Changing the body jaws tooth plate** and **Changing the pulverizer jaws tooth plate**).
- Remove the cutter blades (see chapter **Turning or changing the cutter blades**).

NOTICE Damage due to hard facing with lack of buffer layer

- ▶ Hard facing directly onto the pulverizer jaw base material may cause the pulverizer jaw to crack.
- ▶ Weld the buffer layer on first before hard facing.
- Observe the following welding regulations to achieve optimum reworking.

Welding regulations

Preheating temperature to buffer layer	Maximum 150-180 °C (302-356 °F)
Welding filler for buffer layer	DCMS-IG EN 12070 G Cr Mo 1 Si, Material 1.7339
Inert gas	DIN EN ISO 14175-M 21
Intermediate layer temperature	Maximum 160 °C (320 °F)
Preheating temperature for hard facing welding	Maximum 100 °C (212 °F)
Intermediate layer temperature	Maximum 200 °C (392 °F)
Welding filler for hard facing	DIN 8555/MSG-1-GZ-60 Dura EA-600-SG
Inert gas	DIN EN ISO 14175-M 21
Cooling	Under cover



A: 3-layer EA 600 SG

10 Storage

10.1 Hydraulic pulverizer

▲ **WARNING** Falling hydraulic pulverizer

The hydraulic pulverizer is heavy. If it topples over where it is stored, it may cause injury.

- ▶ Store the hydraulic pulverizer horizontal on squared timbers or a pallet on a horizontal base.

The following procedure applies to storage:

- Open the pulverizer jaw.
There is less oil in the hydraulic pulverizer if the pulverizer jaw is open. In the event of a leak, less oil is lost and the environmental damage is lower.
- Remove the hydraulic pulverizer from the carrier (see chapter **Removing the hydraulic attachment from the carrier**).
- Store the hydraulic pulverizer in a dry, well-ventilated room.
- If storage is only possible outdoors, then the hydraulic pulverizer is to be protected from the weather with plastic film or tarpaulins.

10.2 Grease cartridges

▲ **WARNING** Fire and harmful vapors

Cutter grease can burn and cause serious fire. Harmful vapors are generated when cutter grease is burnt.

- ▶ Never store grease cartridges near fire-propagating or self-igniting substances.
- ▶ Do not expose the grease cartridges to direct sunlight.
- Store the grease cartridges in a cool, properly ventilated room.

11 Disposal

NOTICE Environmental damage due to consumables

Hydraulic oil and cutter grease are environmentally harmful and must not penetrate the ground or enter the water table or water supplies.

- ▶ Collect any such consumables which may escape.
- ▶ Dispose of them in accordance with the applicable environmental regulations.

11.1 Hydraulic pulverizer

- Remove the hydraulic pulverizer from the carrier (see chapter **Removing the hydraulic attachment from the carrier**).
- Remove the adapter plate (see chapter **Removing the adapter plate**).
- Remove the hydraulic hoses from the hydraulic pulverizer.
- Clean the hydraulic pulverizer (see chapter **Cleaning**).
- Dispose of the hydraulic pulverizer in line with all applicable regulations or consult an authorised and specialised recycling company.

11.2 Hydraulic hoses

- Drain the hydraulic oil from the hydraulic hoses and collect it.
- Dispose of the hydraulic hoses in accordance with the applicable regulations to avoid environmental hazards.

11.3 Hydraulic oil

- Collect any hydraulic oil that escapes.
- Dispose of it in accordance with the applicable environmental regulations.

11.4 Cutter grease and grease cartridges

- Dispose of cutter grease and not completely emptied grease cartridges in accordance with the applicable regulations.
- Completely emptied grease cartridges can be recycled.

12 Technical specifications

12.1 Technical specifications DP 1820, DP 1820 PB

Type	DP 1820	DP 1820 PB
Carrier weight class ¹	15 - 22 t (33000 - 48500 lb)	15 - 22 t (33000 - 48500 lb)
Service weight ²	1820 kg (4010 lb)	1820 kg (4010 lb)
Weight without adapter	1650 kg (3640 lb)	1650 kg (3640 lb)
Dimensions		
Length	2187 mm (86 in.)	2187 mm (86 in.)
Width	1158 mm (46 in.)	1158 mm (46 in.)
Depth	630 mm (25 in.)	630 mm (25 in.)
Width pulverizer jaw	260 mm (10 in.)	260 mm (10 in.)
Width body jaw	400 mm (16 in.)	400 mm (16 in.)
Jaw opening / max	746 mm (29 in.)	746 mm (29 in.)
Jaw depth	720 mm (28 in.)	720 mm (28 in.)
Blade length	190 mm (7.50 in.)	190 mm (7.50 in.)
Force of cylinder		
Cutting force - upper blades	227 t (250 tn. sh.)	274 t (302 tn. sh.)
Crushing force - jaw tip	71 t (78 tn. sh.)	86 t (95 tn. sh.)
Operating pressure	350 bar (5100 psi) max. 170 bar (2500 psi)	
Open / Close		
Turn		
Oil flow	140 - 200 l/min (37.0 - 52.8 gal/min) 35 - 50 l/min (9.2 - 13.2 gal/min)	
Open / Close		
Turn		
Cycle ³		
Closing	1.6 s	2 s
Opening	1.8 s	1.1 s
Hydraulic connections		
Open / Close	SAE ¾ in. 6000 PSI	SAE ¾ in. 6000 PSI
Turn	M 20 x 1.5	M 20 x 1.5
Hose lines (inside diameter)		
Open / Close	min. 20 mm (min. 0.78 in.)	min. 20 mm (min. 0.78 in.)
Turn	8 mm (0.3 in.)	8 mm (0.3 in.)
Pipework (diameter and wall thickness)		
Open / Close	min. 25 x 4 mm	min. 25 x 4 mm
Turn	12 x 1.5 mm	12 x 1.5 mm
Hole pattern (group)	9	

¹ Weight apply to standard carriers only. Any variations must be agreed with Epiroc and / or the carrier manufacturer.

² Hydraulic pulverizer including adapter plate of medium size. Please note that the working weight can be considerably higher, depending on the adapter plate.

³ with maximal oil flow

12.2 Technical specifications DP 2320, DP 2320 PB

Type	DP 2320	DP 2320 PB
Carrier weight class ¹	18 - 29 t (39700 - 63900 lb)	18 - 29 t (39700 - 63900 lb)
Service weight ²	2350 kg (5180 lb)	2350 kg (5180 lb)
Weight without adapter	2150 kg (4740 lb)	2150 kg (4740 lb)
Dimensions		
Length	2270 mm (89 in.)	2270 mm (89 in.)
Width	1263 mm (50 in.)	1263 mm (50 in.)
Depth	680 mm (27 in.)	680 mm (27 in.)
Width pulverizer jaw	288 mm (11 in.)	288 mm (11 in.)
Width body jaw	440 mm (17 in.)	440 mm (17 in.)
Jaw opening / max	835 mm (33 in.)	835 mm (33 in.)
Jaw depth	826 mm (33 in.)	826 mm (33 in.)
Blade length	190 mm (7.50 in.)	190 mm (7.50 in.)
Force of cylinder		
Cutting force - upper blades	280 t (309 tn. sh.)	339 t (374 tn. sh.)
Crushing force - jaw tip	81 t (89 tn. sh.)	97 t (107 tn. sh.)
Operating pressure	350 bar (5100 psi) max. 170 bar (2500 psi)	
Open / Close		
Turn		
Oil flow	150 - 250 l/min (39.6 - 66.0 gal/min) 35 - 50 l/min (9.2 - 13.2 gal/min)	
Open / Close		
Turn		
Cycle ³		
Closing	1.8 s	2.1 s
Opening	1.8 s	1.1 s
Hydraulic connections		
Open / Close	SAE 1 in. 6000 PSI	SAE 1 in. 6000 PSI
Turn	M 20 x 1.5	M 20 x 1.5
Hose lines (inside diameter)		
Open / Close	min. 25 mm (min. 1 in.)	min. 25 mm (min. 1 in.)
Turn	8 mm (0.3 in.)	8 mm (0.3 in.)
Pipework (diameter and wall thickness)		
Open / Close	min. 30 x 4 mm	min. 30 x 4 mm
Turn	12 x 1.5 mm	12 x 1.5 mm
Hole pattern (group)	9	

¹ Weight apply to standard carriers only. Any variations must be agreed with Epiroc and / or the carrier manufacturer.

² Hydraulic pulverizer including adapter plate of medium size. Please note that the working weight can be considerably higher, depending on the adapter plate.

³ with maximal oil flow

12.3 Technical specifications DP 3220, DP 3220 PB

Type	DP 3220	DP 3220 PB
Carrier weight class ¹	26 - 45 t (27320 - 99210 lb)	
Service weight ²	3250 kg (7170 lb)	3250 kg (7170 lb)
Weight without adapter	2990 kg (6590 lb)	2990 kg (6590 lb)
Dimensions		
Length	2588 mm (102 in.)	2588 mm (102 in.)
Width	1431 mm (56 in.)	1431 mm (56 in.)
Depth	870 mm (34 in.)	870 mm (34 in.)
Width pulverizer jaw	303 mm (12 in.)	303 mm (12 in.)
Width body jaw	450 mm (18 in.)	450 mm (18 in.)
Jaw opening / max	1003 mm (39 in.)	1003 mm (39 in.)
Jaw depth	993 mm (39 in.)	993 mm (39 in.)
Blade length	240 mm (9.50 in.)	240 mm (9.50 in.)
Force of cylinder		
Cutting force - upper blades	389 t (429 tn. sh.)	473 t (521 tn. sh.)
Crushing force - jaw tip	102 t (112 tn. sh.)	124 t (137 tn. sh.)
Operating pressure		
Open / Close	350 bar (5100 psi)	
Turn	max. 170 bar (2500 psi)	
Oil flow		
Open / Close	200 - 300 l/min (52.8 - 79.3 gal/min)	
Turn	35 - 50 l/min (9.2 - 13.2 gal/min)	
Cycle ³		
Closing	1.9 s	2.4 s
Opening	2.1 s	1.2 s
Hydraulic connections		
Open / Close	SAE 1 in. 6000 PSI	SAE 1 in. 6000 PSI
Turn	M 20 x 1.5	M 20 x 1.5
Hose lines (inside diameter)		
Open / Close	min. 25 mm (min. 1 in.)	min. 25 mm (min. 1 in.)
Turn	8 mm (0.3 in.)	8 mm (0.3 in.)
Pipework (diameter and wall thickness)		
Open / Close	min. 30 x 4 mm	min. 30 x 4 mm
Turn	12 x 1.5 mm	12 x 1.5 mm
Hole pattern (group)	10	

¹ Weight apply to standard carriers only. Any variations must be agreed with Epiroc and / or the carrier manufacturer.

² Hydraulic pulverizer including adapter plate of medium size. Please note that the working weight can be considerably higher, depending on the adapter plate.

³ with maximal oil flow

12.4 Technical specifications DP 4220, DP 4220 PB

Type	DP 4220	DP 4220 PB
Carrier weight class ¹	38 - 57 t (83800 - 125700 lb)	
Service weight ²	4220 kg (9300 lb)	4220 kg (9300 lb)
Weight without adapter	3920 kg (8640 lb)	3920 kg (8640 lb)
Dimensions		
Length	2865 mm (113 in.)	2865 mm (113 in.)
Width	1613 mm (64 in.)	1613 mm (64 in.)
Depth	870 mm (34 in.)	870 mm (34 in.)
Width pulverizer jaw	315 mm (12 in.)	315 mm (12 in.)
Width body jaw	470 mm (19 in.)	470 mm (19 in.)
Jaw opening / max	1113 mm (44 in.)	1113 mm (44 in.)
Jaw depth	1076 mm (42 in.)	1076 mm (42 in.)
Blade length	240 mm (9.50 in.)	240 mm (9.50 in.)
Force of cylinder		
Cutting force - upper blades	500 t (551 tn. sh.)	616 t (679 tn. sh.)
Crushing force - jaw tip	125 t (138 tn. sh.)	154 t (170 tn. sh.)
Operating pressure		
Open / Close	350 bar (5100 psi)	
Turn	max. 170 bar (2500 psi)	
Oil flow		
Open / Close	300 - 400 l/min (79.3 - 105.7 gal/min)	
Turn	35 - 50 l/min (9.2 - 13.2 gal/min)	
Cycle ³		
Closing	1.6 s	2.6 s
Opening	2.7 s	1.3 s
Hydraulic connections		
Open / Close	SAE 1 in. 6000 PSI	SAE 1 in. 6000 PSI
Turn	M 20 x 1.5	M 20 x 1.5
Hose lines (inside diameter)		
Open / Close	min. 32 mm (min. 1.3 in.)	min. 32 mm (min. 1.3 in.)
Turn	8 mm (0.3 in.)	8 mm (0.3 in.)
Pipework (diameter and wall thickness)		
Open / Close	min. 38 x 5 mm	min. 38 x 5 mm
Turn	12 x 1.5 mm	12 x 1.5 mm
Hole pattern (group)	11	

¹ Weight apply to standard carriers only. Any variations must be agreed with Epiroc and / or the carrier manufacturer.

² Hydraulic pulverizer including adapter plate of medium size. Please note that the working weight can be considerably higher, depending on the adapter plate.

³ with maximal oil flow

13 EC Declaration of Conformity (EC Directive 2006/42/EC)

We, Construction Tools GmbH, hereby declare that the machines listed below conform to the provisions of EC Directive 2006/42/EC (Machinery Directive) and the harmonised standards mentioned below.

Demolition pulverizer

DP 1820

DP 1820 PB

DP 2320

DP 2320 PB

DP 3220

DP 3220 PB

DP 4220

DP 4220 PB

Following harmonised standards were applied:

- EN ISO 12100

Technical Documentation authorised representative:

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Authorised Representative:

see respective separate original EC declaration of conformity

Manufacturer:

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