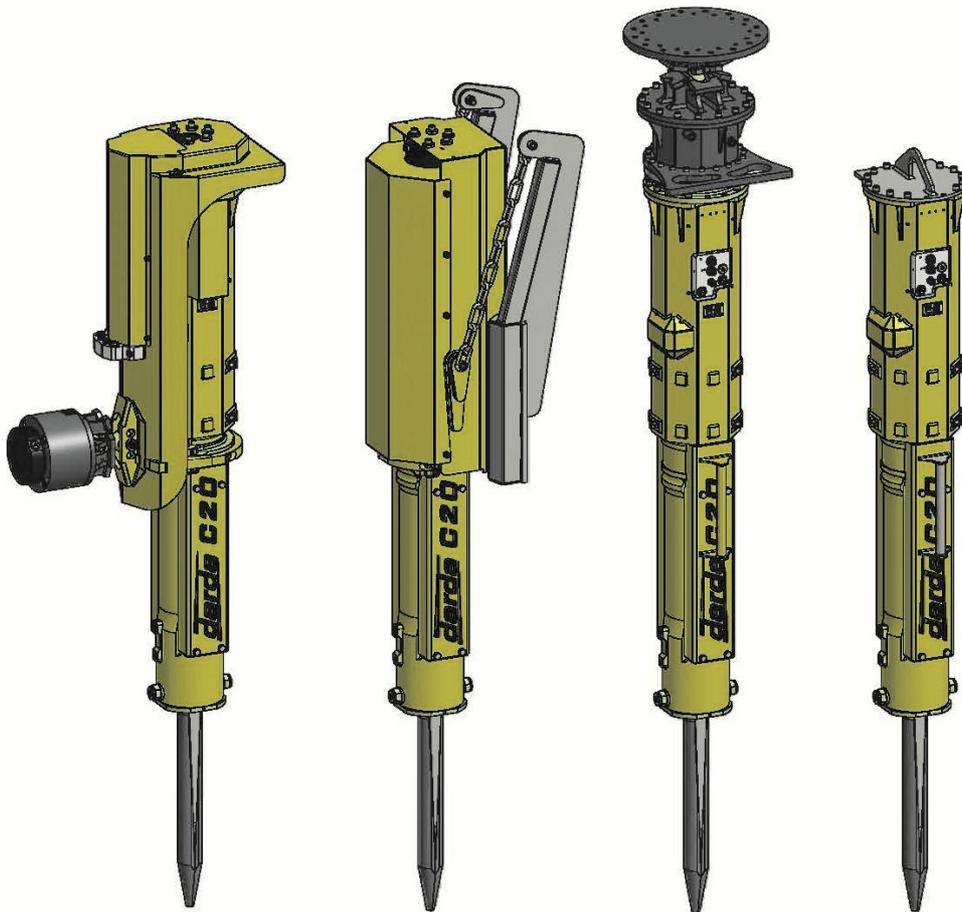




Product Manual

Mechanized Stone Splitting Cylinder



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Product Manual: Concrete Crusher / Steel Cutter

Version: 1.0 English

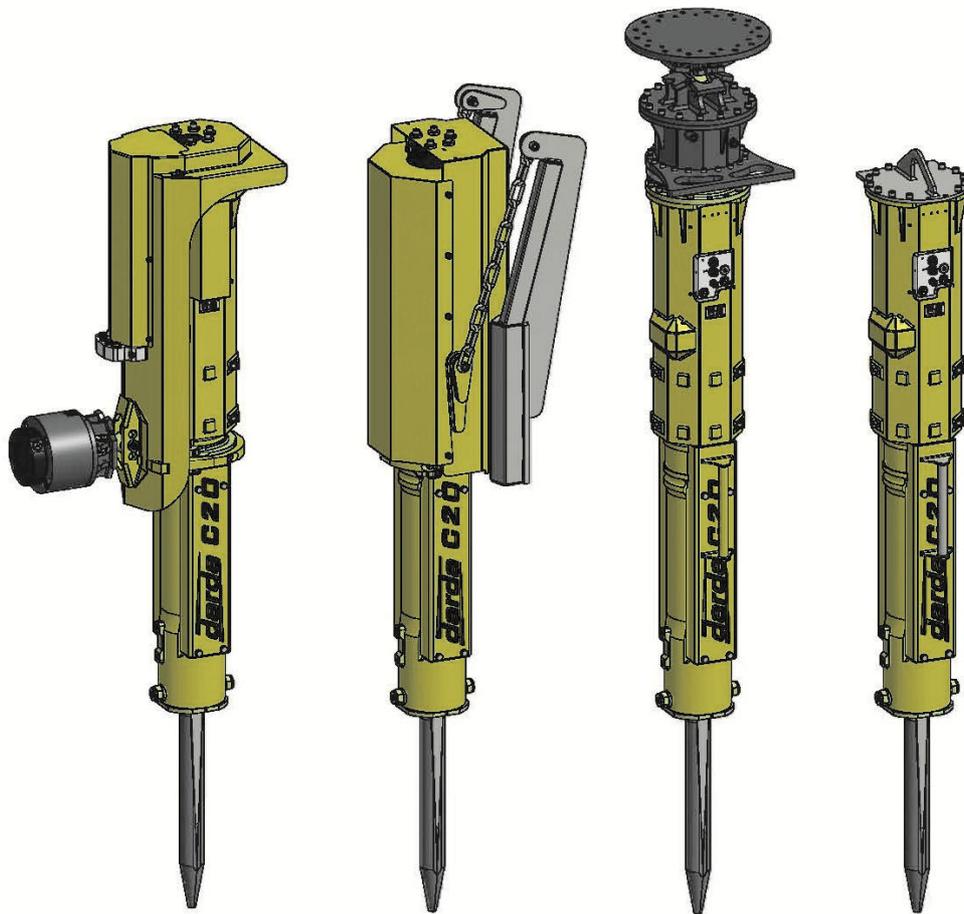
Release date: 06/2016

We reserve the right to change the design and device for the improvement of the product.



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Outline of the Product Manual

The entire documentation of the mechanized stone splitting cylinder includes:

Product Manual

- **Information Manual (IM)**
 - for the operator of the device
- **Operating Manual (OM)**
 - for the operator and
 - for the technical supervisor of the device

Outlined Overview of the Entire Documentation

Outlined Overview of the Information Manual (for the operator)

Information Manual (IM)

Chapter	Content
1	Introduction
2	Device Data Sheet
3	Technical Data
4	Instructions for Servicing, Maintenance and Repair
5	Information for Disposal
A	Appendix A – Signature List

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Operating Manual (OM)

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6	Working with the stone splitting cylinder
7	Maintenance / Cleaning
8	Disposal
9	Technical Data

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1 Introduction

1.1 Preface

Dear customer,

Dear operating company,

by acquiring a mechanized stone splitting cylinder from Darda GmbH, you are the owner of one of the latest generation of mechanized stone splitting cylinders. The mechanized stone splitting cylinder is setting new standards for performance, quality and use in the proven Darda tradition.

To ensure the technical possibilities of this device over the long term, it is necessary to familiarise the operating and maintenance personnel with the handling, conversion, maintenance, etc.

Staff is familiarised by

- a training session at the manufacturer and
- this product manual.

To exclude malfunctioning and damage to the device as much as possible, give the concerned personnel the option to participate in a training session and to familiarise themselves with the functions of the device by using this product manual.

Best wishes,
Darda GmbH

1.2 Product Identification / Product Information

Validity

The descriptions in this product manual refer solely to the mechanized stone splitting cylinder as it is described in the device data sheet (⇒ **chapter 2**) and was developed and built by the manufacturer.



Please enter the name plate data of your stone splitting cylinder in the device data sheet, if the manufacturer has not already done this.

When making complaints or queries, please cite the data entered in the device data sheet.

1.3 Storage

This **information manual** is a component of the entire documentation for the device and must always be stored in the vicinity of the device so it is immediately available if need be.

1.4 Definition of Terms

In this product manual, the mechanized stone splitting cylinder is described as a device in the following sections.

1.5 Responsibility of the Operator

The operator is required to allow work with the device only by experts who

- were sufficiently trained in accordance with the activities to be carried out.
- know the fundamental requirements for work safety and the prevention of accidents and have been familiarised with the handling of the device by qualified staff.
- have read and understood the safety and warning information in this documentation.

Please heed the following instructions in the interest of all staff:

- Supplement this documentation with the generally valid, legal and otherwise binding regulations for work safety, accident prevention and environmental protection, and inform the personnel working with the device about this!
- Supplement this documentation with instructions taking into account specific operating features e.g. regarding the organisation of work, processes, personnel deployed (including duty of supervision and notification)!
- Clearly determine the responsibilities of the staff for operating, cleaning, maintenance, etc.!
- Check at regular intervals whether the personnel bears the danger and safety information in mind during work!
- Take measures to ensure the device is only operating when in safe and perfect operating condition!
- Have the device cleaned and serviced at regular intervals!
- Do not let any structural changes be made (with the exception of those described in the documentation) without written approval from the manufacturer!
- Ensure that persons who were not familiarised with the residual risks of the device via the safety information do not enter the danger zone of the device!
- The operator in charge or the construction management team is solely responsible for securing the construction site / demolition site and its surroundings. Before beginning work, the persons responsible for the construction site / demolition site must ensure that there are no dangers, particularly when cable networks for supplying energy or dangerous materials are present. Measures are to be taken or a suction system is to be installed in cases where dust builds up. For short work, you can also use respiratory equipment suited for dust.

⇒ **OM, 2 Safety Instructions**

1.5.1 Definition of Specialists / Authorised Personnel

Physical or material damage can result from unqualified intervention in the device. Only qualified personnel may operate, clean and maintain the device for this reason.

Qualified personnel in this case are persons who

- are familiar with the safety concepts of concrete demolition.
- are trained as operating personnel in handling the device and know the content of the product manual related to operation and use.
- have received appropriate training from qualified personnel.
- were authorised – due to their schooling, experience and training as well as their knowledge of the relevant norms, conditions, accident prevention requirements, structural calculations and operating circumstances by the person in charge of the safety of the device – to carry out the required activities and can recognise and avoid possible dangers.

1.6 Intended Use

The device from **Darda GmbH** is solely intended for the commercial splitting of concrete, rock and stone within fixed buildings and in freestanding structures.

The following restrictions are to be regarded:

- The used carrier must be suited for the demolition work.
(The instructions of the manufacturer are to be followed at all times.)
- All work must be carried out in accordance with the descriptions in this product manual and all relevant safety and environmental protection regulations must be heeded.

Please heed the technical data and the figures that explain the correct usage of the devices.



All options for using the device that are not expressly described under intended use and the conditions thereof are not permitted.

1.7 Limited Service Life

The service life of the devices is limited.

Regardless of the number of operating hours, have the hydraulic hoses replaced by the manufacturer or a person authorised by the manufacturer every 6 years.



Before using the device, check its overall condition, safety and ability to operate each time.

1.8 Complaints

Damage claims arising from transport damage will only be honoured if the manufacturer and the delivery company are notified immediately.

- Fill out a damage report immediately for the returned shipment (due to transport damage / repairs) and send the parts back to the manufacturing plant in their original packaging, if possible.
- Record possible transport damage on the shipping documents upon receipt of the goods!
- Enclose the following details in the returned shipment:
 - Name and address of the sender and recipient
 - Type and serial number of the device (⇒ **Chapter 2, Device Data Sheet**)
 - Description of the defect
 - In case of transport damage: name of the delivery company and, if possible, exact time of delivery, driver name and registration number of the delivery vehicle

1.9 Guarantee and Liability

In principle, our **General Sales and Delivery Conditions** apply to the use of the devices.

Agreements which deviate from these have to be agreed in writing and confirmed by us!

The General Sales and Delivery Conditions are given to the operator together with the offer.

Guarantee and liability claims in respect of personal injury or damage to property will not be honoured if they arise from one or more of the following causes:

- use of the devices for purposes other than those for which it is intended.
- operation of the devices with defective safety equipment or incorrectly installed or non-functional protection and / or safety equipment.
- disregard of the instructions in this product manual in respect of safety, transportation, storage, assembly, commissioning, operation, maintenance and repair of the devices.
- improper assembly, commissioning, operation, maintenance and repair of the devices.
- deficient monitoring and maintenance of parts which are subject to wear (e.g. pressure pieces, wedges).
- unauthorised structural changes to the devices.
- natural disasters, foreign matter impacts and acts of God.

To ensure the functional safety, only original replacement parts from the manufacturer may be used.

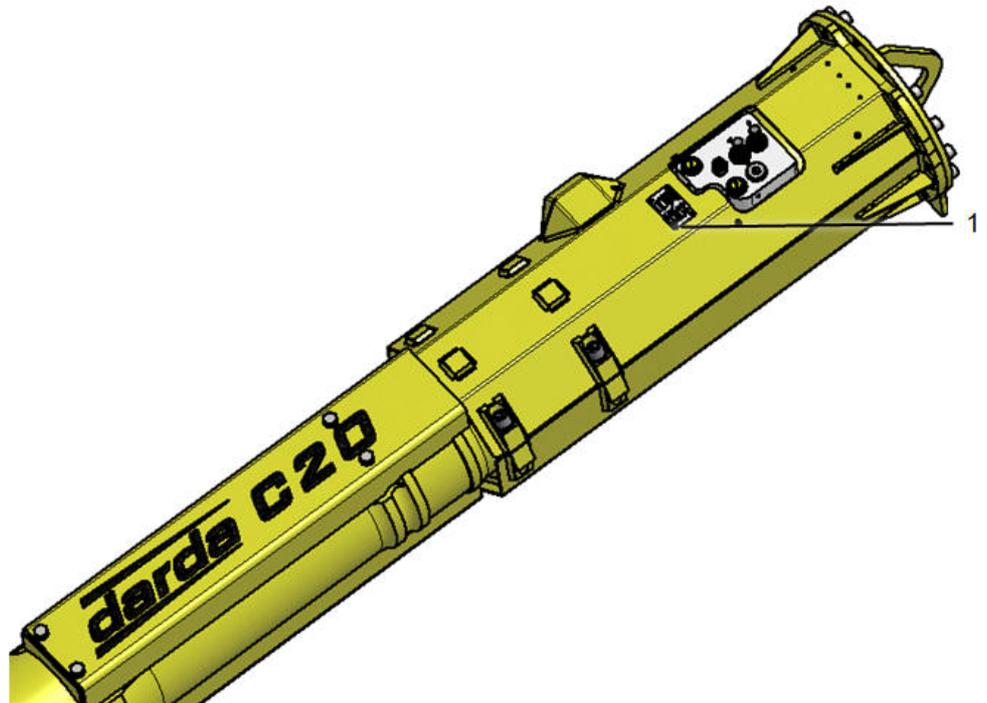
1.10 Declaration of Conformity

You will find the Declaration of Conformity at our homepage under <http://www.darda.de>

2 Device Data Sheet

This product manual refers to the following device:

Mechanized Stone Splitting Cylinder from **Darda GmbH**



1 Position of the name plate

		 
DARDA GmbH D-78176 Blumberg Tel. +49 7702 4391-0 www.darda.de		Type <input type="text"/>
S/N <input type="text"/>	Made in Germany	P _{in} min. <input type="text"/> MPa
<input type="text"/>		P _{in} max. <input type="text"/> MPa
		P _{work.} <input type="text"/> MPa

Please enter the name plate data of your device into the above illustration, if the manufacturer has not already done this.

3 Technical Data

3.1 Mechanized Stone Splitting Cylinder

Dimensions	C20C	C20V	C20H	C20J
Total length ^{1,2)}	1628 mm	1833 mm	1790 mm	2110 mm
Total width ^{1,2)}	304 mm	500 mm	382 mm	400 mm
Total height ²⁾	462 mm	558 mm	765 mm	410 mm
Weight				
Total weight ^{1,2)}	285 kg	390 kg	395 kg	375 kg
Total weight ³⁾	350 kg	455 kg	460 kg	440 kg
Recommended carrier weight	5 - 7 t			
Hydraulic connection				
Connection pressure, min.	17.5 MPa (175 bar)			
Connection pressure, max.	27 MPa (270 bar)			
Operating pressure	50 MPa (500 bar)			
Oil flow, max.	100 l/min			
Operating material				
Specifications of the hydraulic oil to be used	ISO VG 32 - VG 46			
Specifications of the lubricating grease to be used	Lithium saponified high-pressure grease, free of solids			
Specifications of the lubricating grease to be used for the pressure piece wedge surface	Special Darda lubrication paste			

Splitting head		
Type	N	L
Splitting head length	500 mm	700 mm
Required borehole diameter	Ø76 mm	Ø76 mm
Minimum borehole depth	750 mm	950 mm
Splitting distance	22 mm	16 mm
Theoretic splitting force	14760 kN 1500 t	17660 kN 1800 t



Contact the manufacturer before using biological hydraulic oil!

Never use tool grease to lubricate the bearings!

- 1) Value with retracted wedge, without support plate
- 2) Value without fitting kit
- 3) Incl. fitting kit and splitting head N



Any further usage exceeding the specified ones will be considered as improper! The manufacturer cannot be held liable for any personal or material damage resulting thereof!

4 Instructions for Servicing, Maintenance and Repair



We call your attention expressly to the fact that servicing, maintenance and repair work may only be carried out by authorised and trained personnel!

This implies they have read and must have understood this product manual and in particular Chapter 2 Safety Instructions, and in addition, have completed occupational training which has provided them with the necessary technical background for their work!

The operator is responsible for the qualifications of his personnel.

For damage that results from insufficient knowledge and training of the personnel, the manufacturer does not assume liability.

5 Information for Disposal

5.1 General Information

The operator is responsible for the proper disposal of the device. The sector-specific and local conditions for the disposal of the various materials must be followed.



Disassembly and disposal of the device may only be handled by qualified personnel.

5.2 Disposal of Old Oil

Old oil is to be disposed in an environmentally friendly way and under consideration of the regional and national requirements.

- Make sure that the old oil does not pollute the environment.
- Dispose of old oil in suitable containers that meet the requirements.

Appendix A – Signature List

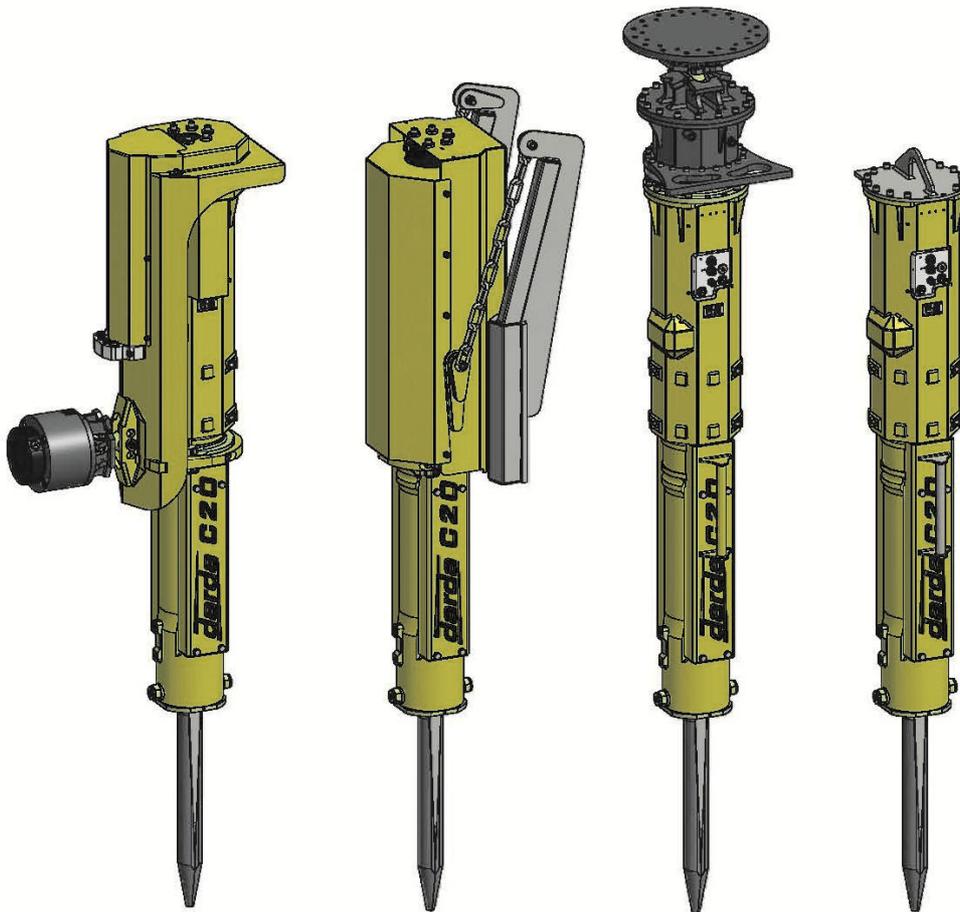
Procedure / How to fill in the list of signatures

- Copy the following signature list below.
- Enter the address of your company / authority and confirm this by using the company stamp.
- Make any member of the staff enter their name and signature (who have been instructed on the devices either on your own or the manufacturer's premises).
- File this list with the other documents.



Operating Manual

Mechanized Stone Splitting Cylinder



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Operating Manual: Concrete Crusher / Steel Cutter

Version: 1.0 English

Release date: 06/2016

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The entire documentation of the mechanized stone splitting cylinder includes:

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 - for the operator and
 - for the technical supervisor of the device

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8	Disposal
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1 Introduction

1.1 Preface

Dear Operator,
Dear Technical Supervisor,

You are about to operate, convert, maintain or repair a **mechanized stone splitting cylinder**.

This operating manual is intended to support you with information for carrying out this important work.

Please read this operating manual carefully and pay special attention to the safety instructions!

If you have questions about the mechanized stone splitting cylinder, our staff will be happy to assist you.

Best wishes,
Darda GmbH

1.2 Validity

The descriptions in this **operation manual** refer solely to the
mechanized stone splitting cylinder

as defined on the Device Data Sheet as a whole or they refer to modules, components and individual parts that were developed and built by Darda GmbH.

⇒ **IM, 2 Device Data Sheet**



1.3 Storage

This **operating manual** is a component of the entire documentation for the devices and must always be stored in the vicinity of the devices so it is immediately available, if need be.

1.4 Definition of Terms

In this product manual, the mechanized stone splitting cylinder is described as a device in the following sections.

1.5 Symbols in this Manual

1.5.1 Danger Warning Levels

DANGER!



Text that is marked with **DANGER!** provides a warning about exceptionally great, immediate dangers. If you do not take accident prevention measures, these hazards will lead with certainty to serious (irreversible) injuries or even death!

Please heed this text and take accident prevention measures!

WARNING!



Text that is marked with **WARNING!** provides a warning about exceptionally great, possible danger. If you do not take accident prevention measures, these hazards will lead with certainty to serious (irreversible) injuries or even death!

Please heed this text and take accident prevention measures!

CAUTION!



Text that is marked with **CAUTION!** provides a warning about possible dangerous situations. If you do not take accident prevention measures, these hazards will lead with certainty to slight or medium (irreversible) injuries!

Please heed this text and take the accident prevention measures!

NOTICE!

Text that is marked with **NOTICE!** contains very important instructions for situations that, if the accident prevention measures are not taken, may result in damage to the product and / or its functions or an object in its vicinity.

Please heed this text and take the accident prevention measures!



Text that is marked with this symbol contains very important instructions! Please heed this text!



This symbol indicates text that contains important instructions / comments or tips.

1.5.2 Danger Symbols**1.5.2.1 General Danger Symbols**

Warning about dangers that lead to serious (irreversible) injuries or even death!

1.5.2.2 Specific Danger Symbols

Warning about dangerous voltage and/or dangerous electricity!



Warning about dangerous hot surfaces!



Warning about mechanical movements or hand injuries!



Warning about crashing loads!



Warning about explosions!



Do not tear with the arm system!



NOTICE: Device turns by itself!



Do not operate in end position!



Provide lubrication every 2 hours!

1.5.3 Instruction Symbols



- Heed the provided documentation and/or instructions!



- Switch off the device (disconnect)!



- Remove the plug from the electrical power supply!



- Wear an industrial hard hat in accordance with EN 397!



- Use ear protectors!



- Use a face screen in protection class 2 with a mechanical strength A!



- Use safety gloves with pulse protection and
 - level 4 abrasion resistance
 - level 4 cut resistance
 - an average of level 4 resistance



- Use safety shoes in protective class S1!



- Use the appropriate dust respirator!



- Safety distance
 - for third persons: at least 25 m.
 - for the operator: at least 10 m.



An expansion of the danger zone is to be determined by the operator.

1.5.4 General Symbols

● This dot marks the descriptions of activities which you should carry out.

– This dash marks specifications.

⇒ This arrow marks a cross reference.

If a cross reference to another chapter is necessary in the text, this is shortened for clarity.

Example: ★ **OM, 2 Safety Instructions**

This means: Please refer to the Operating Manual,
Chapter 2 Safety Instructions.

If the cross reference refers to a page, figure or position number, this information is added to the end of the cross reference.

Example: ★ **Fig. 4 - 4, Pos. 1**

This means: Please refer (in chapter 4 of this operating manual) to
figure 4 and position number 1.

(3) Numbers in brackets refer to the positions in figures.

1.6 Responsibilities of the Personnel



Before beginning work, all persons entrusted with jobs using the devices are required

- to heed the fundamental regulations on industrial safety and accident prevention.
- to read the safety and the warning information contained in this product manual and to confirm with their signature that they have understood them.

(★ IM, Annex A – Signature List)

Please heed the following instructions in the interest of all staff:

- Refrain from any method of working which might present a safety risk!
 - Follow all danger and warning instructions in this product manual!
 - Please also heed in addition to this documentation the general, statutory and otherwise binding regulations on work safety, accident prevention and environmental protection!
 - Heed the fire-alarm and fire-fighting possibilities and inform yourself about the location and operation of fire extinguishers!
 - Wear the protective clothing that is appropriate for the work to be performed!
 - Do not wear open long hair, loose clothing or jewellery (including rings)!
 - Perform only work for which you have been sufficiently trained and instructed!
 - Do not perform any repair work without prior consultation with the manufacturer and the operator!
 - Do not make any structural changes without approval in writing from the manufacturer (except what is described in this product manual)!
 - Ensure that other persons who do not work with the devices (and consequently do not know the residual risks of the devices) cannot enter into the danger zones.
 - Shut down the devices when any safety hazards occur! Protect the devices against accidental start-up and notify the operator / construction management team immediately!
-

1.7 Limited Service Life

The service life of the devices is limited.

Regardless of the number of operating hours, have the hydraulic hoses replaced by the manufacturer or a person authorised by the manufacturer every 6 years.



Before using the device, check its overall condition, safety and ability to operate each time.

1.8 Protection against Unauthorised Operation, Maintenance and Repair

The operation, maintenance and repair work on the devices may solely be performed by qualified personnel (⇒ IM 1.5.1 Definition of Specialists / Authorised Personnel).

The operator is to ensure that only he/she can operate the device and that it won't be used by others.

1.9 Liability for the Carrier

We, Darda GmbH, are expressly not liable for direct or indirect danger that could result from the carrier (mini excavator/demolition robot).

Information about the dangers that could result from the carrier are the responsibility of the manufacturer and the operator.

1.10 Carrier and Control Box Equipment

The carrier and particularly the control box must be equipped with the standard protective equipment for demolition work.

For carriers without a control box, personal safety equipment must be used and the operator must maintain a minimum distance of 10 metres from the demolition site.

The work area is an off-limits area and may not be entered by the operator or others.

The construction management team is responsible for making the work area off limits.



1.11 Personal Safety Gear



The personal safety gear in this product manual is solely recommended in connection with the device.



The requirements for personal safety gear due to the conditions at the site of use or other products or use of the device in combination with other products are not described in this product manual and must be stipulated by the operator and construction management team in accordance with the actual risks.

You will find specifications for the protective safety equipment in **chapter 1.5.3 Instruction Symbols**.



2 Safety instructions

The device is a quality product manufactured according to state-of-the-art technology rules and was released from the manufacturing plant in perfect condition in respect of safety technology!

In spite of this, there are residual risks

- during assembly / disassembly,
- during commissioning / shut down procedure,
- during operation and
- during maintenance / cleaning.

When there is

- lack of knowledge of these residual risks,
- failure to heed the warning information in this product manual,
- work which is incorrectly implemented or
- use of the device for purposes for which it is not intended,

it could result in death or serious bodily injuries or damage to property!

As a result of these existing potential residual risks, it is the manufacturer's duty to inform the operator and user about these risks!

As the manufacturer we fulfil our duty to inform with the descriptions in this product manual in general and, in particular, in this chapter.

2.1 Intended Use

The device from **Darda GmbH** is an interchangeable piece of equipment and is intended for the splitting of concrete, rock and stone within fixed buildings and in freestanding structures. All other materials such as metal cannot be handled with this method.

The following restrictions are to be regarded:

- You may not apply any external mechanical force, e.g. by using crowbars, on the splitter, and in particular on the pressure pieces and the wedge (possibility of deformation).
- The used carrier must be suited for the demolition work.
(The instructions of the manufacturer are to be followed at all times.)
- All work must be carried out in accordance with the descriptions in this product manual and all relevant safety and environmental protection regulations must be heeded.

Please heed the technical data and the figures that explain the correct usage of the devices.



All options for using the device that are not expressly described under intended use and the conditions thereof are not permitted.

2.2 Safety Instructions for Certain Types of Use

2.2.1 Hazards Caused by Hot Surfaces



Even after a short operation time or after longer idle times, the hydraulic hose assemblies or other device parts can already or still be hot!

In case of skin contact, serious burns may be incurred!

- **Note that during normal operation the hydraulic oil may reach a temperature of up to 80 °C!**
- **Never open the screw connections of the hydraulic device parts that are hot (or highly pressurised)!**
- **Before starting work on hydraulic device parts, check whether you can work safely at the given temperature! Before starting work on hydraulic device parts, let them cool down sufficiently if need be!**
- **Wear protective gear that is appropriate for all the work with or on the devices!**

2.2.2 Hazards from Suspended Loads

DANGER!

Fatal injuries from crushing can result if a suspended load falls!

Make sure you and other persons never linger below the suspended device.

- Be sure to regard the warning instructions of the carrier manufacturer!
 - The leveraging when grasping long elevated pieces can cause the danger that the device turns. Make sure you and other persons are never in this area!
-

2.2.3 Hazards from Noise

NOTICE!

When working with the device, an immediate danger from emitted airborne noise results from the demolition work.

- Wear ear protectors when working with the device!
-

2.2.4 Hazards from the Surroundings

DANGER!

There are dangers from the surroundings.

Surrounding dangers are dangers that can emerge at the site where the devices are being used, but are not caused by the devices.

- Observe the surroundings when working with the devices and stop your work immediately if you notice dangers and inform the operator / construction management team in charge.
 - Evacuate the danger zone.
-

2.2.5 Hazards from Swivelling into Traffic Routes



DANGER!

Pay attention to pedestrians and traffic when swivelling with the carrier in the vicinity of traffic and pedestrian routes.

- Prevent accidents by blocking off danger zones.

2.2.6 Hazards from Insufficient Lighting



WARNING!

In the event of insufficient light when working with the device, there is a danger of bodily injury and / or material damage.

The person in charge of the demolition site is to ensure that minimum lighting power of 200 Lux is present in the work area of the device.

2.2.7 Hazards Caused by Device Parts under Hydraulic Pressure



DANGER!

Hydraulic oil escaping at high pressure can permeate the skin and may cause poisoning, infections and other serious injuries to the eyes or other organs!

- For all work on hydraulic hose assemblies or device parts, wear appropriate personal protective gear (e.g. hard hat, face screen, protective gloves, protective clothing)!

2.2.8 Hazards from Meteorological Impacts**DANGER!**

Meteorological impacts can affect the device as well as the demolition material.

- Stop working with the device immediately in the event of a thunderstorm since there is a danger of being hit directly by lightning!
 - Do not work with the device during thunderstorms.
-

2.2.9 Hazards from Operator with Limited Sensory Perception**DANGER!**

Operating the device with limited sensory perception can result in dangers for the operator, third persons and the surroundings.

- Operating the device with limited sensory perception is strictly forbidden.
-

2.3 Safety instructions for the Different Tasks**2.3.1 Failure or Malfunctioning****DANGER!**

If the device fails or malfunctions, it is to be taken out of operation immediately.

- Block off the work area of the device.
 - Secure the device against accidental start-up.
 - Inform the operator immediately.
-

2.3.2 Permissible mounting weight



DANGER!

The authorised mounting weight of the carrier may not be exceeded.

- Before assembling the device, check whether the carrier is suited for this activity to avoid its tipping over.

2.3.3 Danger from the Tipping of the Carrier



DANGER!

When the device lifts demolished material, there is a danger that the carrier will tip over.

- When working with the device, the operator must ensure that the carrier cannot tip over.

2.3.4 Hazards from Tearing with the Arm System



DANGER!

Do not tear at the demolition material with the arm system.

This can result in damage to the carrier, particularly the arm system.

2.3.5 Danger from Use as Hoist



DANGER!

Do not use the devices as hoists since the dislocation of the centre of gravity can result in the danger that the carrier tips over.

The work area of the device can be significantly enlarged by the dimensions of the hoisted pieces.

2.4 Safety instructions for Maintenance



DANGER!

We call your attention expressly to the fact that maintenance of the devices may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

- Before you carry out maintenance work on the devices, switch off all hydraulic and electric aggregates connected to the device.
- Before carrying out work on the device, separate all the hydraulic and electric aggregates!
- Relieve the hydraulic accumulators / hose assemblies / devices, etc. from pressure!
- Take measures to avoid the unintentional start-up of the device!
- Carry out the maintenance work in accordance with the descriptions in this operating manual!

2.4.1 Safety Risk from Defective Maintenance / Repair



DANGER!

Heed the information about the maintenance intervals.

Defective maintenance of the devices can lead to damage due to the high mechanical demands.

Defective maintenance / repair can represent dangers for persons.

2.4.2 Safety Risk from Contaminated Hydraulic Oil



NOTICE!

- Before starting up the devices, check the hydraulic oil for contamination. Contaminated hydraulic oil can lead to malfunctioning.

2.4.3 Unexpected Start-up / Delayed Shut-off



DANGER!

- Before carrying out work on the device, disconnect all the hydraulic aggregates!

2.4.4 Hazards from a Loss of Power



DANGER!

With a loss of power, dangers for people and the environment can result from the device.

- Protect the carrier against accidental start-up and block off the danger zone.

2.4.5 Hazards from (Absent) Separator



DANGER!

If the hydraulic hoses of the carrier are not equipped with a separator (e.g. coupling), there is a danger of unexpected start-up / delayed shut-off with work on the device.

- Before you separate the device from the carrier,
 - lower the arm of the carrier with the device to a firm surface.
 - switch off the carrier and protect it against accidental start up.

2.4.6 Hazards from Concealed Dangers / Residual Risks

DANGER!

When masonry is pulled down and steel profiles are cut, there are fundamentally unforeseeable residual risks that can only be prevented by systematic work planning, working methods taking into account possible risks, experience, etc.!

The following list is intended to draw your attention to some possible risks:

- When demolishing supporting walls, steel beams or supporting pillars, building areas can collapse!
 - When prying down ceilings, the material falling down can result in the maximum floor load being exceeded and the carrier may sink through!
 - When supply lines / pipe systems that are not deactivated are damaged, the device or the carrier may be live, water or other media may escape or the supply to other sections of the building areas that are not affected by the demolition may be cut off!
 - Before starting work, discuss the procedure with the person in charge of the demolition site!
 - Wear appropriate personal safety gear for all work!
 - Do not linger in the danger zone of the device during demolition work and use appropriate measures to prevent other persons from entering this zone!
 - Carry out the work with utmost care!
-



2.5 Danger from Operating Material / Demolition Material

2.5.1 Hazards from Moving Parts with High Kinetic Energy



DANGER!

When persons linger in the danger zone of the device, there is the danger of injuries from falling and flying parts during operation.

- Do not linger in the danger zone of the device (minimum distance from carrier: 10m) or take appropriate measures to prevent persons from entering or lingering in this zone!
- Personal protective gear must be worn at all times during work with the device.

(★ 2.9 Protective equipment)

2.5.2 Hazard from Dust



CAUTION!

To protect yourself from dust that accumulates when splitting concrete, rock and stone, the operator is to take measures to minimize this (e.g. by using a suction system).

For short work you can also use respiratory equipment suited for dust.

2.5.3 Hazards from Operating Material**2.5.3.1 Hazards from Hydraulic Oil**

DANGER!

When working in the area of hydraulic supply lines, danger can result from

- suddenly escaping hydraulic oil,
 - contact with hydraulic oil that damages your health.
 - Only perform work on the hydraulics when
 - the carrier has been separated from the power supply in advance,
 - when the hydraulic hoses are not pressurised.
 - Make sure even in the case of deactivated hydraulic supply that there is no danger from hydraulic oil possibly still remaining and pressurised in the hydraulic hoses.
 - Regularly check that the hydraulic hoses and their connections are in proper condition.
 - Use personal protective equipment suited for all activities!
 - If you have swallowed or breathed in hydraulic oil,
 - seek out medical treatment immediately. Inform the doctor of emergency measures recommended by the hydraulic oil manufacturer!
 - If you have gotten hydraulic oil in your eyes, on your skin or clothing,
 - take the recommended emergency measures,
 - contact a doctor immediately.
-

2.6 Safety Instructions for Conversion



DANGER!

We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

- Carry out the conversion in accordance with the professional association's safety instructions and the regulations for the prevention of accidents!
 - Only use correct and functional parts / tools for converting the device.
 - Only carry out the conversion of the device while heeding the descriptions in this product manual!
 - Before converting the device, be sure to take it out of operation as described in chapter 5.2 and secure it against accidental start-up.
-

2.7 Safety Instructions for Transport



DANGER!

When transporting the device, the applicable work safety measures are to be considered!

- Secure the device in accordance with the requirements for transport (e.g. with lashing straps) to prevent slippage.
-

2.8 Safety Instructions for Commissioning

DANGER!

We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

- Make sure there are no potential hazards for persons or the environment when commissioning the device!
 - Make sure that no persons linger or enter the danger zone of the device or the carrier (minimum distance of 25 m from carrier) during commissioning!
 - Take measures that provide warnings before the commissioning of the device!
 - Before any commissioning, check
 - the proper functioning of the device and the carrier!
 - whether the device and all components are free from contamination, wear, deformation, damage and corrosion!
 - whether all parts and fixtures fit tightly!
 - hydraulic hoses and connections for leakage!
 - whether the device has been lubricated sufficiently!
 - the correct assembly of the splitting heads
 - the condition of all wear parts
 - Before beginning work, plan your procedure and execute the work methodically!
 - If necessary, consult experts and ask them for information or advice!
 - Never direct the device against persons if it is fully operational!
 - Do not put into operation a device whose functional / operational safety is not ensured / present!
-



2.9 Protective Gear

When working on / with the device, wear the personal protective gear that the relevant safety instructions require.

Work with the device is not allowed without personal protective gear!



2.9.1 Class S1 Safety Shoes

When performing tasks such as

- transport
- commissioning
- operation
- maintenance, cleaning, repairing

wear safety shoes in class S1 according to IEC 61310.



2.9.2 Personal face screen in protection class 2 with a mechanical strength A!

When performing tasks such as

- commissioning
- operation
- maintenance, cleaning, repairing

wear a face screen in protection class 2 according to EN 166.



2.9.3 Protective gloves with pulse protection and

- level 4 abrasion resistance
- level 4 cut resistance
- an average of level 4 resistance

When performing tasks such as

- transport
- commissioning
- maintenance, cleaning, repairing

wear protective gloves with a pulse protection according to IEC 61310.



2.9.4 Industrial Hard Hat

When performing tasks such as

- transport
- commissioning
- operation
- maintenance, cleaning, repairing

wear a hard hat according to EN 397.

2.10 Information about Off-limits Area

The operator or the construction management team is solely responsible for securing the direct and indirect danger zones.

Before beginning work, the persons responsible for the construction site must ensure that there are no dangers, particularly when cable lines for supplying energy or dangerous materials are present.

Persons that do not operate the device must maintain a safety distance of at least 25 m from the danger zone.

The operator is responsible for the expansion of this danger zone.



If work is being performed with a carrier that does not have a control box, the operator must maintain a safety distance of at least 10 m from the danger zone.

The operator is responsible for the expansion of this danger zone.



3 Description of Device and Operations

Pressure transmission / limitation of the stone splitting cylinder

The pressure supplied by the hydraulic unit of the carrier is considerably less than the required operating pressure of the hydraulic cylinder.

The working pressure is made available by integration of a pressure intensifier.

This allows it to attain a high operating pressure with minimum supply pressure.

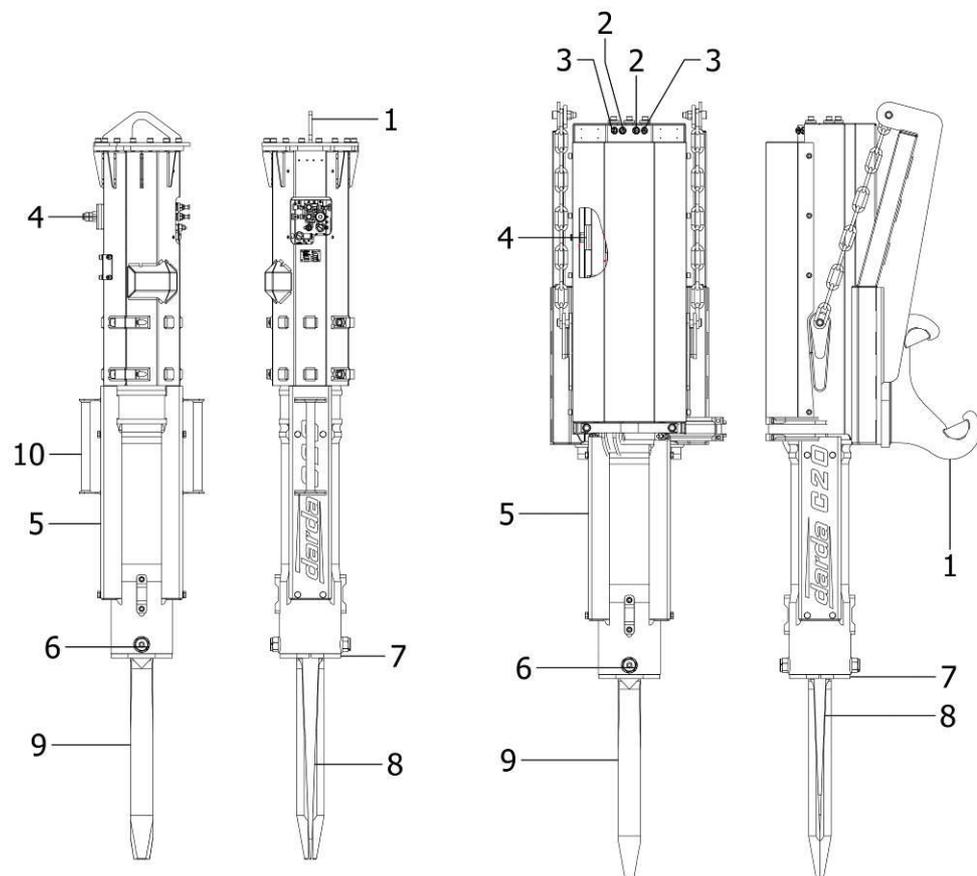
Thus the operating pressure is independent of supply pressure fluctuations.

3.1 Mechanized Stone Splitting Cylinder

3.1.1 Description of Parts

C20 C

C20 V



- 1 Device support (customer-specific)
- 2 Hydraulic connecting pipes for splitting direction
- 3 Hydraulic connecting pipes for splitting cylinder
- 4 Connection for filling Darda special lubrication paste
- 5 Cover
- 6 Clamping screw for pressure pieces
- 7 Guide for pressure piece
- 8 Wedge
- 9 Pressure piece
- 10 Grips

Fig. 3-1 Stone splitting cylinder C20 C, C20 V

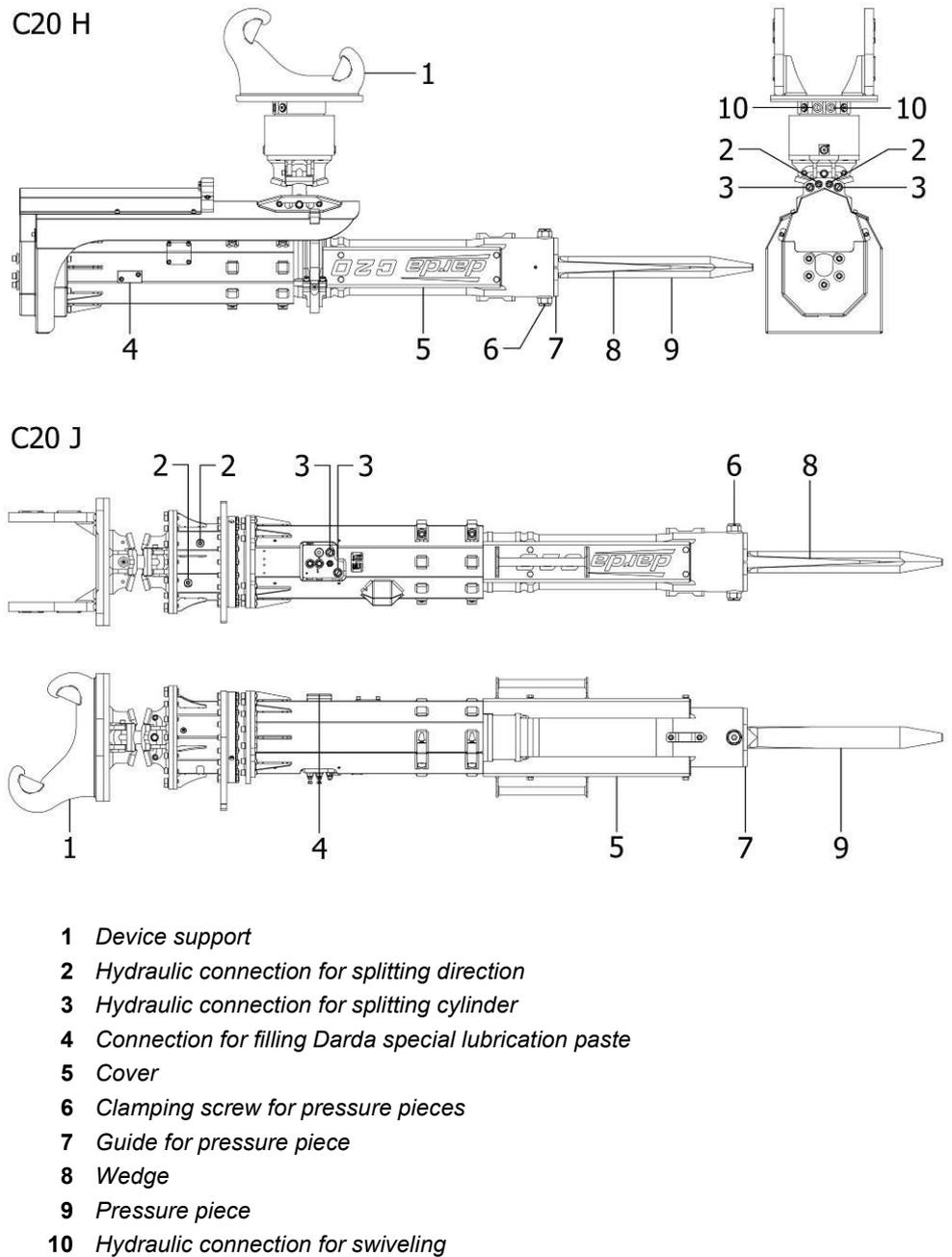


Fig. 3-2 Stone splitting cylinder C20 H, C20 J

3.1.2 Functional Description

3.1.2.1 General Information about the Device

The device is mounted to the arm of a carrier by means of a support plate specified by the customer.

Wedge retraction and extension, the splitting direction setting, and device swiveling must be undertaken by a hydraulic valve in the carrier.

4 Assembly / Disassembly



We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

4.1 Fitting the Device



Before attaching the device, read the safety instructions in chapter 2!

- Position the carrier arm so that it can be connected to the carrier support.
- Connect the carrier arm with the device in accordance with the support system being used. Make sure that the safety elements are correctly fitted.
- Check to make sure the hydraulic connections are clean. Remove any large dirt particles with utmost care.



The device has been subjected to a function test on the manufacturer's premises. To this end, hydraulic oil specified in the technical data sheet was used. Make sure that you are using oil with the same specifications!

In any case, contact the manufacturer if you are using biological oil for the carrier!

- Connect the hydraulic hoses of the device with the hydraulic ends of the carrier arm. We recommend using leakage-free hydraulic quick release couplings.
- Check the oil level in the hydraulic tank of the carrier and fill up hydraulic oil, if necessary.

4.2 Removing the Device



Before you start removing the device from the carrier, read the safety instructions in chapter 2!

The device is removed in the reverse order from assembly.

DANGER!



If not properly removed, the device may fall and cause serious injuries (e.g. fractures / contusions on legs / feet)!

- For this reason put the device down on a level, horizontal and solid base (e.g. Europallet) before removing it from the carrier!
- Switch off the carrier drive and actuate the hydraulic valve for opening / closing the device until the pressure in the device or the hydraulic hoses has been released!



Depending on the coupling system being used, hydraulic oil will leak from the device and the carrier upon removal! The oil from the device will amount to a maximum of 5 litres; the amount from the carrier depends on the design and cannot be defined here!

- Place an appropriate receptacle (e.g. collecting tray) under the point of separation in order to collect the oil.
- Disconnect the device from the carrier arm, seal the hydraulic hoses, if necessary, and store the device in a suitable place.



- Make sure that foreign bodies such as sand or water cannot enter the hydraulic hoses!

5 Commissioning / Shut-down Procedure

5.1 Commissioning / Operation



We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

(★ 2.8 Safety Instructions for Commissioning)

5.2 Shut-down Procedure



WARNING!

A device that is in a lifted position may lower automatically after the carrier is shut-down as the pressure in the hydraulic hoses is reduced! Therefore proceed as follows when shutting-down in order to prevent damage to persons or material!

- Before shutting-down the device or the carrier, put the device down on a level, horizontal and solid base (e.g. Europallet).
- Switch off the carrier drive and actuate the hydraulic valve for opening / closing the device until the pressure in the device or the hydraulic hoses has been released!
- Make sure the device and the carrier cannot be put into operation by accident or by unauthorised personnel.

6 Working with the Stone Splitting Cylinder



Before working with the devices, follow the safety instructions in chapter 2!

6.1.1 Work Preparation

6.1.2 Drilling Boreholes

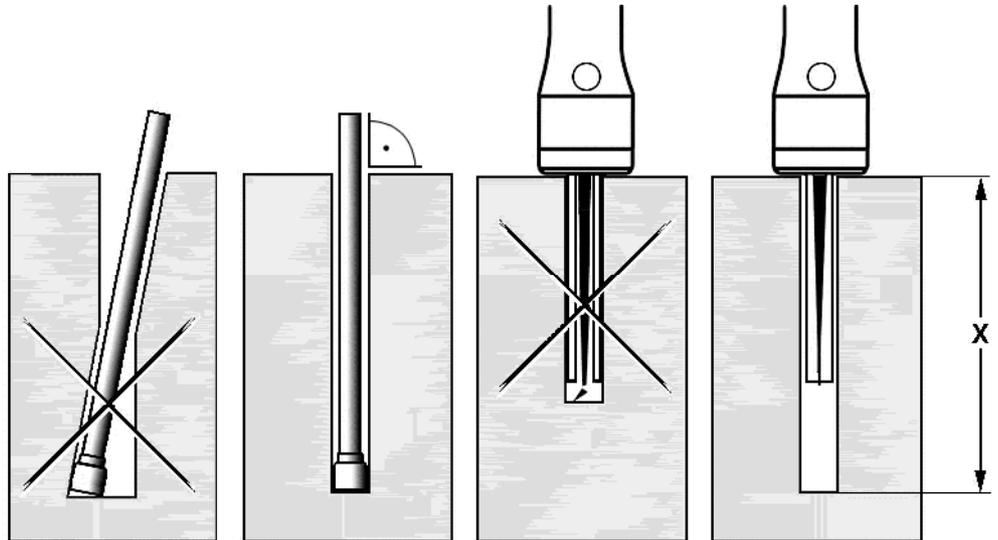


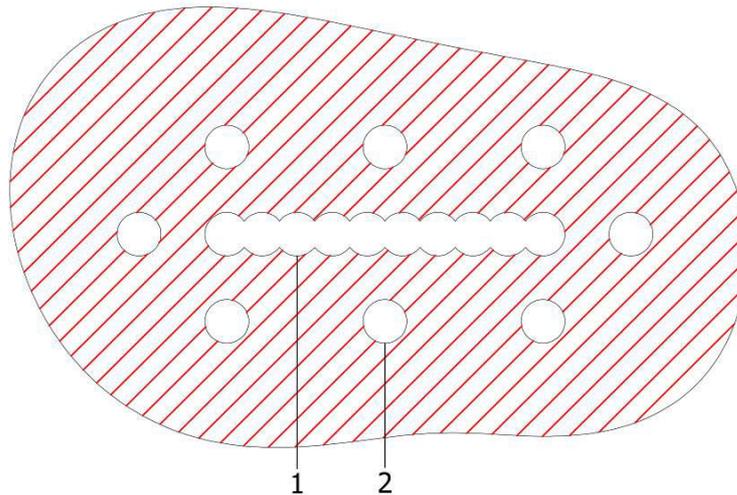
Fig. 6-1 - 1 Drilling boreholes



To avoid damage to the splitting cylinder, the boreholes must be the correct size and cautiously drilled!

Please heed the following instructions:

- To protect the splitting head, the borehole should be drilled as straight as possible.
- The diameter of the borehole should not exceed / fall below the values stated in the chapter Technical Data. Too much play between the perforated wall and the splitting head reduces the effective splitting distance.
- The borehole must be at least 5 cm deeper than the length of the splitting head in the case of a completely extended wedge.
 ⇨ **8 Technical Data**
- As a rule, the borehole is to be drilled vertically to the surface.
- The boreholes must be arranged such that the material to be removed can move into a free space, thereby producing a split.



- 1 Free space
- 2 Borehole for splitting head

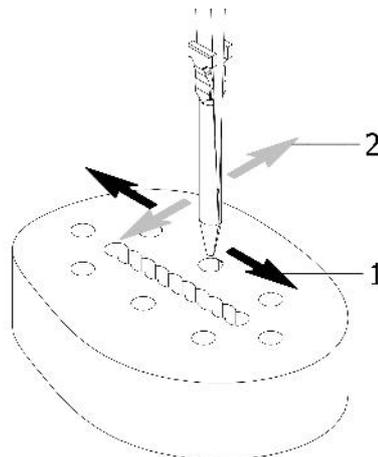
Fig. 6-1 - 2 Drilling free spaces

- A free space must be produced, e.g. by drilling, on level surfaces where there are no free spaces where the splitting can be started.

6.2 Stone Splitting Cylinder

6.2.1 Splitting Direction

Before the splitting head is introduced into the borehole, the splitting direction must be set. The direction selected must run towards the free space and must allow the force to act in the direction of the free space.



- 1 Splitting direction / crack direction
- 2 Application of force of splitting head

Fig. 6-2 - 1 Splitting direction

6.2.2 Maximum Splitting Force

The maximum splitting force is generated with a hydraulic pressure intensifier. The pressure intensifier needs at least 5 seconds to reach maximum pressure. When in use, the hydraulic connection pipes vibrate.

6.2.3 Automatic Lubrication of Slide Surfaces

During every splitting process, the slide surfaces are supplied with special Darda lubrication paste. If the lubricant container is empty, the wedge cannot be extended any more. Retraction is possible.

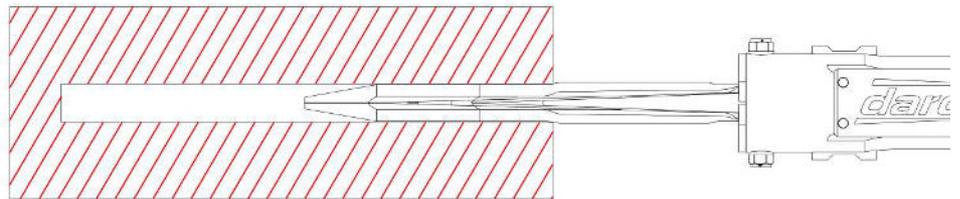
**6.2.4 Limit Positions of Wedge**

When retracting, the limit position is reached when the hydraulic connection pipes start to vibrate.

When extending, the limit position is reached when no crack has appeared yet in the stone 10 seconds after the hydraulic connection pipes have started to vibrate.

6.2.5 Splitting Head

- Guide splitting head fully into borehole.
- Guide graduated splitting head in until step is reached.



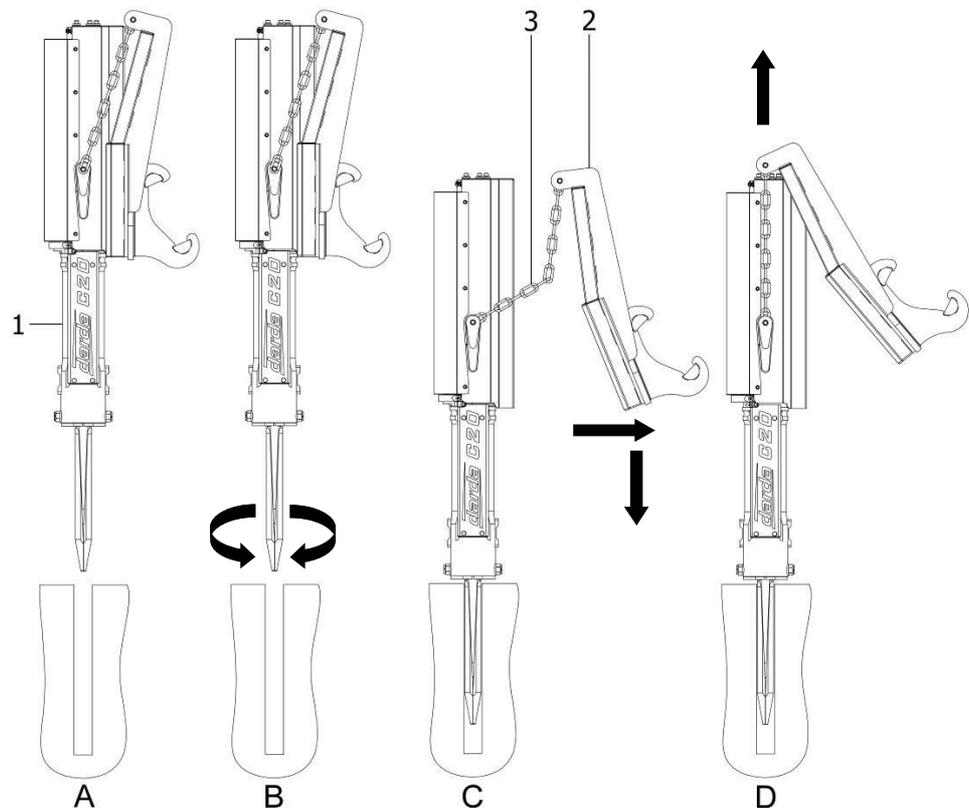
- Extend wedge and retract again fully.
- Move in graduated splitting head.
- Extend wedge and retract fully.
- Only pull splitting cylinder out of borehole when the wedge is retracted.
- Pull out splitting cylinder in axial direction of borehole.

6.2.6 C20 C

- Use carrier to move splitting cylinder towards borehole.
- Operator enters hazard zone, firmly holds the splitting cylinder by the grips and sets the splitting direction.
- Slowly lower splitting head and leave the hazard zone.

C20 V

- Use carrier to move splitting cylinder towards borehole (A).
- Set splitting direction (B).
- Place splitting head on borehole and slowly lower arm of carrier. The splitting cylinder's own weight causes it to fall into the borehole (C).
- Pull support (2) away from splitting cylinder so that the connection chains (3) sag and the splitting cylinder (1) is free (C).
- Align support so that connection chain (3) is flush with axle of splitting cylinder (1) and pull splitting cylinder (1) out of borehole (D).
- Move splitting cylinder (1) into starting position (A).



- 1 Splitting cylinder
- 2 Support
- 3 Connection chain

Fig. 6-2- 4 C20 V

6.2.7 C20 H und J

- Use carrier to move splitting cylinder towards borehole.
- Set splitting direction.
- Place splitting head on borehole.
- Carefully move arm to guide splitting head into borehole. If the arm is jerked or moved too far, the splitting head will be damaged.



7 Maintenance / Cleaning

We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

7.1 Procedure

7.1.1 Maintenance Every 2 Operating Hours

- Position the device so that all lubricating nipples can easily be reached with your grease gun.
- **Secure the device against unauthorised operation!**
- Check all hydraulic connections and lines for leakage and any externally visible damage.

Never use tool grease to lubricate the bearings!

- Use a grease gun and the grease specified in the technical data section to lubricate the lubricating nipples until the grease leaks from in-between the bearings.

7.1.2 Maintenance Every 40 Operating Hours or Once a Week

- Check all the components for wear, deformations, breaks or cracks and check for signs of wear. Replace the wear parts or the wear surfaces in accordance with the descriptions in this product manual.

(⇒ 7.1.3 Maintenance When Required)

7.1.3 Huolto tarvittaessa



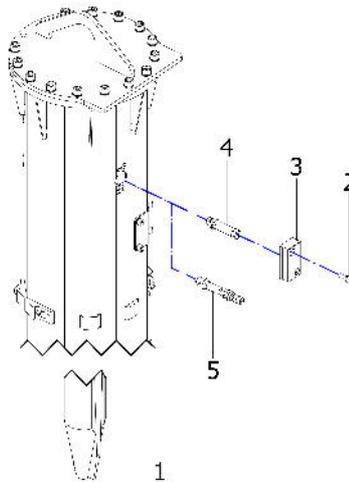
Suorita seuraavassa kuvatut huoltotyöt vain laitteen käytöstä poistamisen jälkeen!

(⇒ 5.2 Käytöstä poistaminen)

7.1.4 Filling the Lubricant Container



Ensure that the grease filler's pipe is filled with lubricant before you fill the lubricant container.



- 1 Wedge
- 2 Screws
- 3 Cover
- 4 Lock screw
- 5 Adapter

Fig. 6-2 - 2 Filling the lubricant container

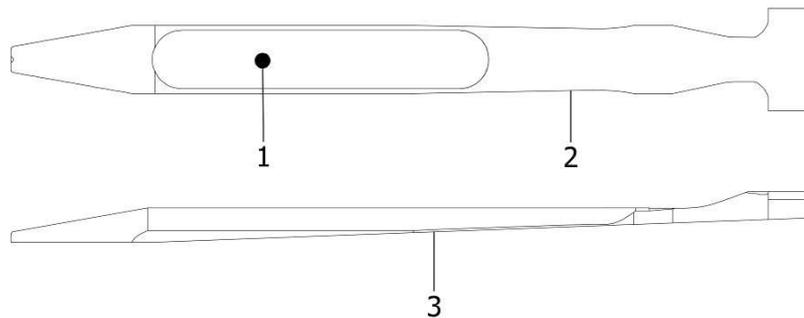


- Retract wedge (1) (not in limit position). If still possible the wedge should be flush with the pressure pieces.
- **Depressurize hydraulics and lock so they cannot be started up by mistake!**
- **Note that the screw connections (4) may be hot.**
- **Wear protective gear that is appropriate for all the work with or on the devices!**
- Unscrew screws (2) and remove cover (3).
- Remove lock screw (4) and fit adapter (5).
- Connect hose of lubricant pump with adapter and fill container. When filling ensure that wedge only moves slightly.
- Once no more lubricant can be pumped into the container, remove hose of lubricant pump from adapter (5).
- Remove adapter (5), fit lock screw (4) and cover (3).
- Retract wedge (1) to limit position.

7.1.5 Checking Splitting Head for Wear



- Retract wedge (1)
- **Depressurize hydraulics and lock so they cannot be started up by mistake!**
- Use a screwdriver or similar tool to spread the splitting head.
- Clean slide surfaces of special Darda lubrication paste.
- Pressure pieces
 - If more than 20% of the surface of the hard coating (1) has come loose, the pressure piece must be replaced.
 - **Cracks in the hard coating are not wear!**
 - If recesses have formed on the side faces (3) of the pressure piece, it must be replaced. Recesses may result in the pressure piece tearing off and thereby cause further damage.



- 1 Surface of hard coating
- 2 Pressure piece
- 3 Side face

- Wedge
 - If more than 20 % of the wedge's slide surface is damaged by grooves and material bulges, the wedge must be replaced.

7.1.6 Maintenance Every 6 Years

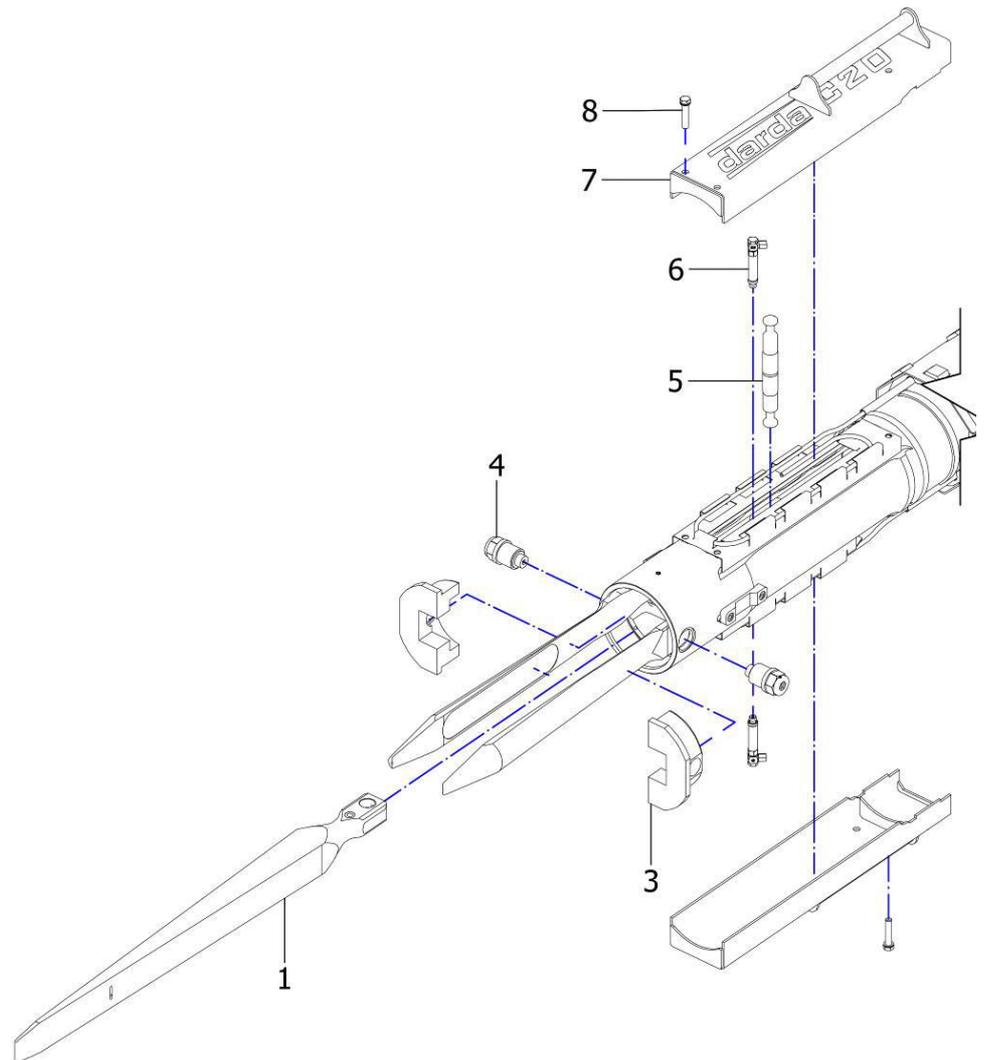
- Regardless of the number of operating hours, have the hydraulic hoses replaced by the manufacturer or a person authorised by the manufacturer every 6 years.

7.1.7 Replacing Wear Parts



We would like to expressly point out that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

7.1.7.1 Replacing the Wedge

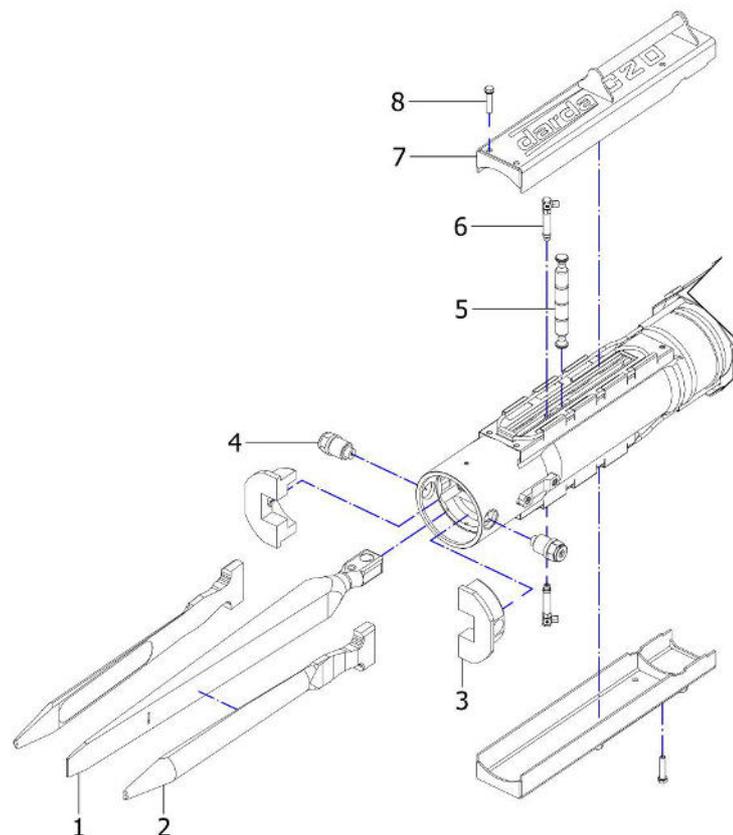


- | | |
|-------------------------|---------------------------|
| 1 Wedge | 6 Screw connection |
| 3 Guide | 7 Cover |
| 4 Clamping screw | 8 Screw |
| 5 Bolt | |

Fig. 6-4 - 1 Replacing the wedge

- Retract wedge (1).
- **Depressurize hydraulics and lock so they cannot be started up by mistake!**
- Remove screws (7) from both sides and cover (6).
- Remove clamping screw (3) from both sides.
- Remove both guides (2).
- Pull out bolt (4).
- Pull out wedge (1).
- Fill lubrication holes of new wedge with lubrication paste.
- Fit splitting wedge in reverse order.
- Use a screwdriver or similar tool to spread the splitting head. Use a spatula to coat the slide surfaces with special Darda lubrication paste.

7.1.7.2 Replacing the Pressure Pieces



- | | |
|------------------|--------------------|
| 1 Wedge | 5 Bolt |
| 2 Pressure piece | 6 Screw connection |
| 3 Guide | 7 Cover |
| 4 Clamping screw | 8 Screw |

Fig. 6-5 - 1 Replacing the pressure pieces

- **Depressurize hydraulics and lock so they cannot be started up by mistake!**
- Remove the wedge as described in the previous chapter.
- Turn first pressure piece 90° and pull out.
- Turn second pressure piece 90° and pull out.
- Fit pressure pieces in reverse order.
- Fit the wedge as described in the previous chapter.

7.2 Cleaning



Only clean the device after shutting it down beforehand!

**Before starting to clean, read the chapter about the shut-down procedure.
(★ 5.2 Shut-down Procedure)**



- Remove
 - coarse demolition material which has settled on the device during work manually at regular intervals.
**Wear personal protective gear for this work
(e.g. respiratory equipment, face screen)!**
 - To remove moisture from the bearings, the device must be lubricated after cleaning.

7.3 Repair



We call your attention expressly to the fact that repair work on the devices that are described in the documentation is principally not allowed for reasons of safety!



Guarantee claims will not be honoured if the security lacquer or the lead seal is damaged!

8 Disposal

After shutting down the devices correctly (★ **5.2 Shut-down Procedure**), removing the hydraulic oil and removing possible lubricating grease residues, the devices can be disassembled and recycled according to materials.



If contaminated with radioactive, poisonous or other substances hazardous to persons or the environment, the devices must be disposed of in accordance with the applicable regulations!

8.1 Disposal of Old Oil

Old oil is to be disposed in an environmentally friendly way and under consideration of the regional and national requirements.

- Make sure that the old oil does not pollute the environment.
- Dispose of old oil in suitable containers that meet the requirements.

9 Technical Data

9.1 Technical Data for the Concrete Crusher

Dimensions	C20C	C20V	C20H	C20J
Total length ^{1,2)}	1628 mm	1833 mm	1790 mm	2110 mm
Total width ^{1,2)}	304 mm	500 mm	382 mm	400 mm
Total height ²⁾	462 mm	558 mm	765 mm	410 mm
Weight				
Total weight ^{1,2)}	285 kg	390 kg	395 kg	375 kg
Total weight ³⁾	350 kg	455 kg	460 kg	440 kg
Recommended carrier weight	5 - 7 t			
Hydraulic connection				
Connection pressure, min.	17.5 MPa (175 bar)			
Connection pressure, max.	27 MPa (270 bar)			
Operating pressure	50 MPa (500 bar)			
Oil flow, max.	100 l/min			
Operating material				
Specifications of the hydraulic oil to be used	ISO VG 32 - VG 46			
Specifications of the lubricating grease to be used	Lithium saponified high-pressure grease, free of solids			
Specifications of the lubricating grease to be used for the pressure piece wedge surface	Special Darda lubrication paste			

Splitting head		
Type	N	L
Splitting head length	500 mm	700 mm
Required borehole diameter	Ø76 mm	Ø76 mm
Minimum borehole depth	750 mm	950 mm
Splitting distance	22 mm	16 mm
Theoretic splitting force	14760 kN 1500 t	17660 kN 1800 t



Contact the manufacturer before using biological hydraulic oil!

Never use tool grease to lubricate the bearings!

Never use tool grease to lubricate the bearings!

- 1) Value with retracted wedge, without support plate
- 2) Value without fitting kit
- 3) Incl. fitting kit and splitting head N