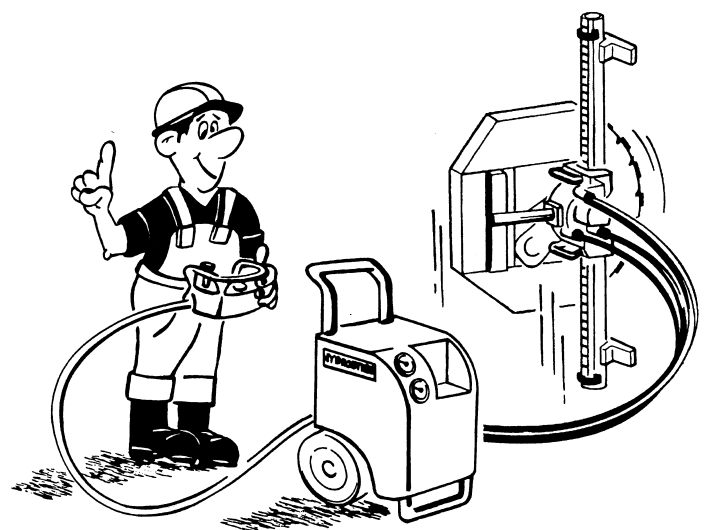


Safety Manual ***System Description***

Wall saws

Issue: 14.8.03



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0 Introduction

0.1 Scope of the Safety Manual

The Safety Manual contains a description of how to safely operate all Wall saw systems. It contains all the safety instructions that must be followed when working with and on the system. Safety instructions specific to each machine will be found in the corresponding Operating Instructions and must likewise be strictly adhered to.

0.2 Document structure

The Wall saw systems documentation is structured as follows:

- General system:** **Safety Manual** with the following contents:
(Technical Data, Safety Instructions, System Description, Design and Function, Assembly / Disassembly, Operation, Maintenance)
- Machines:** **Operating Instructions** with the following contents:
(Product Description, Safety Instructions, Design and Function, Assembly / Disassembly, Operation, Maintenance)
- Components:** **Instruction leaflet** with the following contents:
(Exploded view with part numbers, important instructions on use)

0.3 Terms

0.3.1 General Terms

Operating Instructions

The Operating Instructions are an essential document accompanying the product. They contain all the information that is necessary to operate the product safely and to be able to maintain it.

The Safety Manuals for Wall saw systems and the Operating Instructions for machines produced by **TYROLIT Hydrostress AG** and the descriptions of machines sourced from outside suppliers are supplied with the system parts.

Official EU language

The official languages of the European Union are currently: Danish, German, English, Finnish, French, Greek, Dutch, Italian, Portuguese, Swedish and Spanish.

National language

The official language of the respective country is referred to as the national language.

Original language

The language in which the document was written is referred to as the original language. The original language of these Operating Instructions is German.

0.3.2 Terms related to Wall saw systems

Term	Definition
Rail support	The rail supports are used to support (mount) the guide rail.
Guide rail	The guide rail runs along the intended cut. It supports the saw head.
Saw head	The saw head contains the feed motor (electric, hydraulic or hand crank), the swivelling motor (electric, hydraulic or with hand crank) and the drive motor (electric or hydraulic) for the tool.
Cutting tool	The saw blade (wall saw) or the chain (corner saw) is referred to as the cutting tool
Drive (electric and hydraulic)	The drive provides the power for the electric motors and the control unit as well as the appropriate power for the hydraulic motors.
Motors	A distinction can be made between the drive motor (tool), the swivelling motor (swivelling-in and -out of the tool) and the feed motor (forward and backward motion of the saw head on the guide rail). The motors can be electrically powered for low outputs or hydraulically powered for higher outputs. In certain cases the feed or swivelling motor can also be replaced by a hand crank.
Blade guard	The blade guard is a safety device that prevents accidental contact with the tool, intercepts flying parts and at the same time acts as a spray guard.

1 Technical data

1.1 Recommended ambient temperature

Storage: between -15 °C and 50 °C

Usage: from -15 °C to 45 °C

Warning: At sub-zero temperatures to as low as -15 °C antifreeze must be used. If the system is shut down or at a standstill for long periods the cooling water must be blown out of the system. At ambient temperatures of around $+45\text{ °C}$ the water must be cooled.

1.2 Water connection

Pressure: min. 1 bar to max. 6 bar at max. 25 °C

Quantity: min. 6 l/min.

1.3 Cutting speed

This must be selected according to the nature of the material.

The recommended values in m/sec. are
 granite, old concrete with or without reinforcement 25–40 m/s
 new concrete, asphalt, sandstone, etc. 35–45 m/s

Maximum permitted cutting speed
 for TYROLIT tool 63 m/s

1.4 Specification for oils and grease

1.4.1 Oils

Hydraulic oil: HLP / ISO VG 46

Gear oil: ISO VG 100

1.4.2 Grease

Gear grease: Penetration: 420-460

NLGI: 00

Lubricating grease: Penetration: 265-295

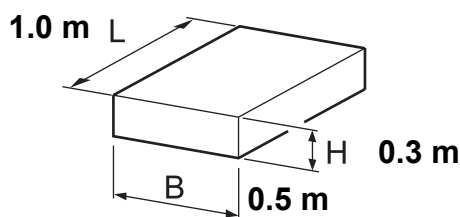
NLGI: 2

1.5 Weights

- Relative weights:
 - Asphalt: 1.5 t/m³
 - Reinforced concrete: 2.7 t/m³
 - Granite: 2.8 t/m³
 - Sandstone: 2.5 t/m³

1.5.1 Weight calculation (example):

- Calculation formula: $l \times w \times h \times \text{material} = \text{weight}$
 Example (reinforced concrete): $1 \times 0.5 \times 0.3 \times 2,700 = 405 \text{ kg}$



Material in kg/m³
 Weight in kg

1.6 Power consumption

The power consumption of the various drives differs considerably.

Details of the power consumption of a particular drive can be found on the corresponding rating plate.

1.7 Name plates

All data specific to the type of machine and components can be found on the name plates fitted.

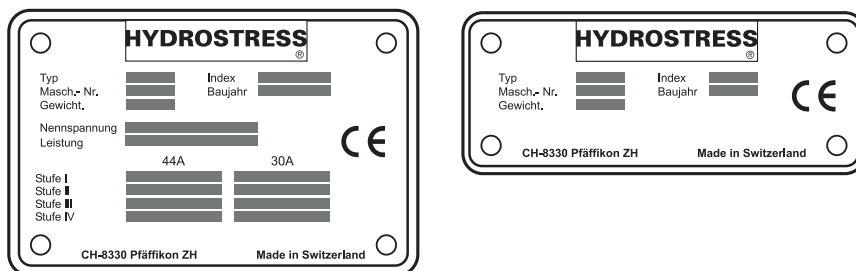


Fig. 1-1 Name plates

2 Safety instructions

2.1 General

2.1.1 Target audience

This chapter describes the safety instructions that it is essential to follow when using the Wall saw systems.

All persons who work on and with the Wall saw systems have a duty to read and understand the chapters of the Safety Manual relevant to their particular activities.

This applies in particular to the “Safety instructions” chapter which is mandatory for all persons and activities.

2.1.2 Observance of the safety instructions

No work must be performed on or with the Wall saw systems before the safety instructions contained in the Safety Manual and in the Operating Instructions (Chapter 2) have been read and understood. The Safety Manual and the Operating Instructions are the mandatory references for all work – instruction leaflets are of an informative nature and contain certain instructions only concerning correct use.

The Wall saw systems have been inspected before being shipped and are delivered in perfect condition. **TYROLIT Hydrostress AG** does not accept any liability for damage caused by the failure to observe the instructions and information provided in the Safety Manual and in the Operating Instructions. This applies in particular to:

- Damage caused by improper use and operator error.
- Damage caused by improperly installed third-party software.
- Damage caused by failure to observe safety-related information in the Safety Manual or shown on the warning signs fitted to the machine.
- Damage caused by defective or absence of maintenance work.
- Damage caused by cutting unauthorised material.

Independently performed conversions and alterations may affect safety and are not permitted.

2.2 Information and symbols

2.2.1 Hazard symbols

In this Safety Manual and in the Operating Instructions information panels are used to draw attention to residual dangers and to point out important technical requirements.

Hazard symbols

2.2.1.1 Hazard symbols in the Safety Manual



Danger

Warning of danger, where failure to comply could lead to death or serious injury.



Warning

Warning of danger, where failure to comply could lead to injury and/or damage to property.

Information symbols

2.2.1.2 Information symbols in the Safety Manual



Information

Text displayed in this way is practical information and is aimed at achieving optimum use of the installation or apparatus. Failure to take note of this information may mean that the performances shown in the technical data can no longer be guaranteed.

2.2.2 Instructions on the product



Danger

Voltage warning

Before working in an area identified in this way, the installation or device must be fully disconnected from the power (voltage) and secured against being accidentally powered up again.

Failure to heed this warning may lead to death or serious injury.

2.2.3 Generally applicable warnings of residual dangers

In the following warnings of residual dangers are shown that are generally applicable to all work with and on the Wall saw systems and during all phases of the life of the systems.



Danger	
<p>Electric shock due to defective electrotechnical equipment.</p> <p>The electrotechnical equipment must be checked prior to each use and from time to time during prolonged usage. Defective parts such as cables and plugs must be exchanged by electrotechnically trained personnel in the powered down state.</p> <p>Failure to comply with this regulation may lead to serious physical injury or death. Secondary damage such as fires may also occur.</p>	



Warning	
<p>Danger from sharp cutting tool edges</p> <p>Touching a cutting tool whilst it is still in motion is prohibited.</p> <p>When touching cutting tools it is recommended that protective gloves are worn.</p> <p>Failure to adhere to this regulation may result in cut wounds to the hands.</p>	



Warning	
<p>Danger of allergic reactions if skin comes into contact with hydraulic oil.</p> <p>Persons who have an allergic reaction to hydraulic oil must wear protective gloves and goggles when carrying out work where they come into contact with hydraulic oil. Any areas of the skin affected must be rinsed immediately with copious amounts of water.</p> <p>Failure to adhere to this regulation may result in allergic reactions or injuries to the eyes.</p>	

2.3 Safety principles

2.3.1 Delimitation of the safety concept

The Wall saw systems have no effect on the safety concept of other systems, apparatus and installations.

2.3.2 Safety elements

Protection of users is based primarily on a safety concept and design safety.

2.3.2.1 Passive safety elements

Protection from live parts

All functional units that contain parts which carry hazardous voltages, are shock-protected by suitable covers.

2.3.3 Removing protective devices

Protective devices should only be removed when the device is turned off, disconnected from the mains and at a standstill. Covers in particular should only be removed and refitted by authorised personnel (see Chapter 2.5.1 "Authorised personnel", 2-9).

The only exception should be the changing of tools, including blade guard and saw head, but then only when the Emergency Stop button has been pressed.

Before using the Wall saw systems again, the safety elements must be checked for correct operation.

2.3.4 Safety measures (organisational)

2.3.4.1 Product monitoring obligation

Operating personnel must notify changes in operational behaviour or of safety-related parts to a responsible person or the manufacturer immediately.

2.3.4.2 Location of the Safety Manual

A copy of the Safety Manual must be available at all times to staff at the place of use of the apparatus.

2.3.5 Safety measures (personnel)

2.3.5.1 Individual protective equipment

Anyone working with and on the Wall saw systems is required to wear individual protective equipment.

The individual protective equipment comprises the following:

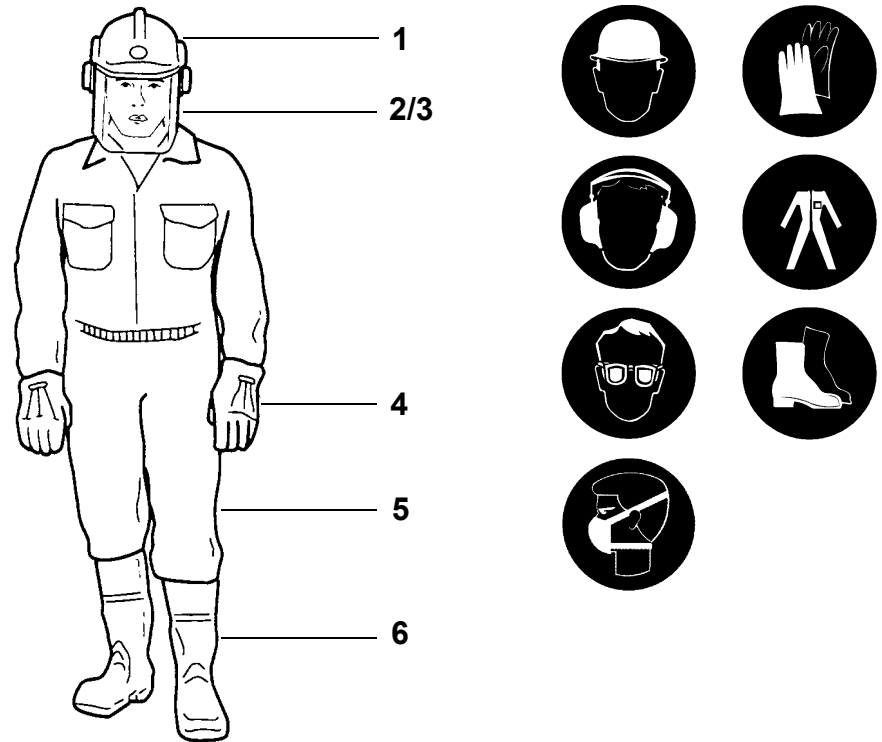


Fig. 2-1 Individual protective equipment

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Helmet with ear protectors 2. Visor or goggles 3. Breathing mask 4. Safety gloves | <ul style="list-style-type: none"> 5. Close-fitting, sturdy, comfortable clothing 6. Work boots with steel toecaps and non-slip soles |
|---|---|

The specific safety instructions given in the individual chapters may sometimes contain only some of the pictograms shown above. These relate to safety measures to be taken solely in relation to the associated specific hazard and therefore do not excuse the operator from heeding this instruction to wear all the items of individual protective equipment listed above.

2.4 General safety rules

2.4.1 Statutory provisions

The generally applicable national and local safety and accident prevention provisions and the supplementary operator regulations must be followed and complied with.

2.4.2 Warranty

TYROLIT Hydrostress AG warrants that the Wall saw systems will operate correctly and safely on condition that all the directions, working instructions and maintenance instructions contained in this Safety Manual and in the Operating Instructions are strictly followed and observed.

TYROLIT Hydrostress AG will not entertain claims for damages or warranty claims for damage that has arisen as a result of improper or inappropriate handling.

2.4.3 Inspection and maintenance obligation

The operator is under an obligation to only use the Wall saw systems when they are in a perfect and undamaged condition. The maintenance intervals shown in the Safety Manual must be strictly observed. Malfunctions and mechanical damage must be rectified without delay.

2.4.4 Spare parts

Only original spare parts should be used. Otherwise damage may be caused to the Wall saw systems or damage to other property and personal injury may result.

2.4.5 Power connections

Wall saw systems, that are operated by electrical components must be connected to an earthed power supply.

Before putting into operation a check must be made that the local mains voltage corresponds to the operating voltage of the electrical components. If this is not the case, the operating voltage setting must be adjusted accordingly. Detailed information on this will be found in the corresponding Operating Instructions.

The operating voltage of electrical components supplied by **TYROLIT Hydrostress AG** is basically set at 230 V AC or 3 x 400 V AC.

The power supply must be disconnected before removing any housings.

2.4.6 Modifications

No technical alterations should be made independently to the equipment and installation components in the form of additions or conversions without the written consent of **TYROLIT Hydrostress AG**. This concerns all additions and conversions that are not provided for by the system design.

2.4.7 Safety instructions in the individual chapters

The chapters of this Safety Manual and of the Operating Instructions contain additional safety instructions. These make reference to specific potential dangers (residual dangers). The instructions must be followed closely and require that the actions or sequences of actions described are taken.

2.4.8 Correct application

The Wall saw systems are designed and built for the following application:

- Cutting of concrete (including reinforced) and natural stone.
- Cutting of parting cuts, flush cuts, cross-cuts and joints in ceilings, floors or ceilings
- Wall saw systems should only be used and operated with the authorised anchoring systems.
- Only tools with the original hole pattern must be used.

If Wall saw systems are operated in a closed or underfloor area, the exhaust gases from combustion motors must be discharged into the open air.

The applicable mandatory limitations on use and parameters are contained in Chapter 1 "Technical data", 1-1.

2.4.9 Abuse or misuse

Any use other than for the intended purpose (see Chapter 2.4.8, 2-7), constitutes improper use or misuse.

Since improper use or misuse can sometimes result in considerable danger, details are given here of what we believe constitutes improper use or misuse.

The following applications are prohibited:

- Cutting wood, glass and plastics
- Cutting of loose parts (including in concrete)
- Operation in water and in explosion-protected areas
- Cutting without system and tool cooling

- Wall saw systems should only be used with the approved guide rails.
- Cutting without the safety devices provided
- Incorrect or absence of waste water disposal (saw sludge)

2.4.10 Making the workplace safe

Before starting work enough space should be created to ensure working without danger.

The workplace must be adequately lit.

Danger areas must be visibly cordoned off so that no-one can enter the danger areas during sawing.

The front, underneath and rear of the sawing area must be protected so that persons or equipment cannot be harmed by falling parts or sawing sludge. Lumps of concrete that have been loosened must be secured against falling.

Breathing in the water fog that is created is a health hazard. Ensure adequate ventilation in sealed-off areas.

The sludge resulting from cutting is very greasy. Suitable steps must be taken (removal or cordoning off) so that persons do not slip and injure themselves.

2.5 Responsibility

2.5.1 Authorised personnel

Work on or with Wall saw systems should only be performed by authorised persons. Personnel are considered to be authorised if they meet the necessary training and know-how requirements and they have been assigned a precise functional role.

The personnel qualifications for the corresponding work are defined in the introduction under "General" of the respective chapters.

2.5.2 Delimitation of authority (functional roles)

2.5.2.1 Manufacturer

TYROLIT Hydrostress AG or its local agents in the EU are deemed to be the manufacturer of equipment components supplied by **TYROLIT Hydrostress AG**. Within the context of an integrated quality and safety control system the manufacturer is entitled to request from the operator information on its Wall saw systems.

2.5.2.2 Operator

As the primary legal entity, the operator is responsible for the correct use of the product and for the training and use of the authorised personnel. He sets out the mandatory skills and level of training of the authorised personnel for his company.

2.5.3 User (operative)

- Sets up the Wall saw systems for the material to be cut or the material thickness.
- Performs sawing tasks independently and monitors these.
- Locates malfunctions and initiates or performs troubleshooting.
- Carries out servicing and simple maintenance.
- Monitors the correct functioning of the safety devices.
- Makes the site safe.

2.5.4 Service engineers

The service engineer is an employee of **TYROLIT Hydrostress AG** or a person authorised by **TYROLIT Hydrostress AG**.

- Makes adjustments to the system.
- Performs repairs, complex service work and maintenance work.

2.5.5 Qualification and training Operator

- Trained building expert in a specialist role
- Has extensive experience in personnel training and danger assessment.
- Has read and understood the “Safety instructions” chapter.

2.5.5.1 User

- Has attended user training at **TYROLIT Hydrostress AG** or corresponding technical courses at regional professional associations and federations.
- Has received an introduction (basic training) to the operation of the Wall saw systems from the manufacturer.

2.5.5.2 Service engineers

- Specialist professional training (mechanical / electrotechnical).
- Has attended specialist courses at **TYROLIT Hydrostress AG**.

2.6 State-of-the-art

2.6.1 Standards applied (safety)

The following analyses have been performed and documented:

- Check for conformity to:
 - European Machine Directive 2006/42/EC
 - EMC (Electromagnetic Compatibility) Directive 2014/30/EU

All safety-related findings from the analyses have been taken into account in the design, construction and description of the Wall saw systems and translated into appropriate action.

2.6.2 Analyses performed

As part of the development process, the known risks were systematically analysed. Hazard symbols on the system and in the Safety Manual make reference to residual dangers.

2.6.2.1 Residual dangers analysis

In order to be able to warn the user of residual risks in the Safety Manual, the Operating Instructions and on the product itself, a residual risks analysis has been performed.

3 Design and function

3.1 General

Wall saw systems comprise the following machines:

- Guide rail (various types)
- Saw head, including drive, feed and swivelling motors. (hydraulic or electric)
- Corner saw including saw and feed motors. (hydraulic or electric)
- Cutting tool (saw blade or chain)
- Blade guard (various sizes and types)
- Drive (hydraulic or electric in - various power classes)
- Control unit (various designs)

Depending on the type of use (application) the customer assembles the Wall saw system according to the specific requirements of the job.

3.2 Design of the different system variants

There are almost endless combinations for assembling a Wall saw system to meet the particular requirements of a job. The most common variants are listed in the following.

3.2.1 Hydraulic version

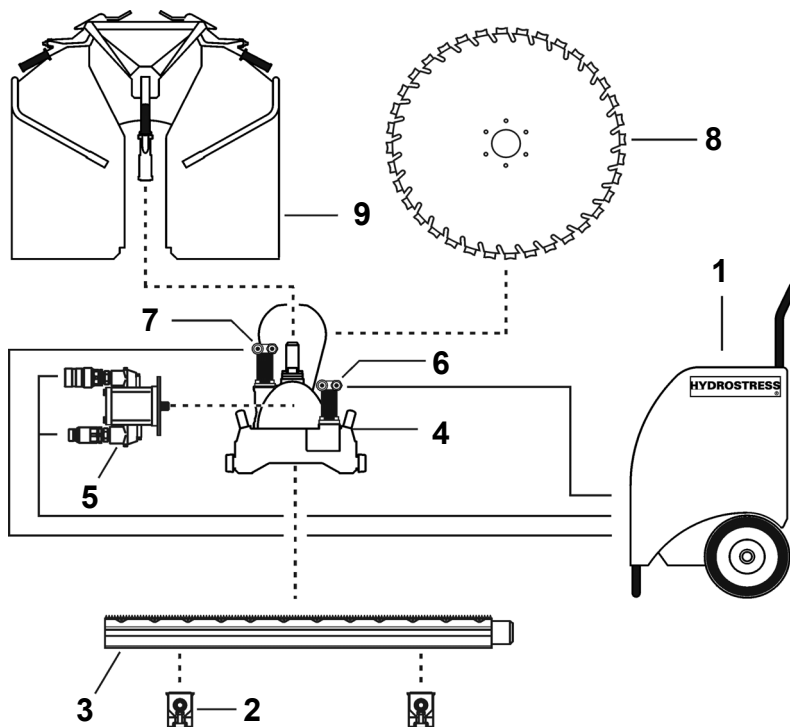


Fig. 3-1 Hydraulic system design

- | | |
|----------------------------|------------------------------|
| 1 Hydraulic drive assembly | 6 Hydraulic feed motor |
| 2 Rail support | 7 Hydraulic swivelling motor |
| 3 Guide rail | 8 Saw blade |
| 4 Saw head | 9 Blade guard |
| 5 Hydraulic drive motor | |

3.2.1.1 Operational scope

The electric versions of the system are preferably used for work where large cutting tool diameters and accordingly high power levels are required.

3.2.2 Electric version

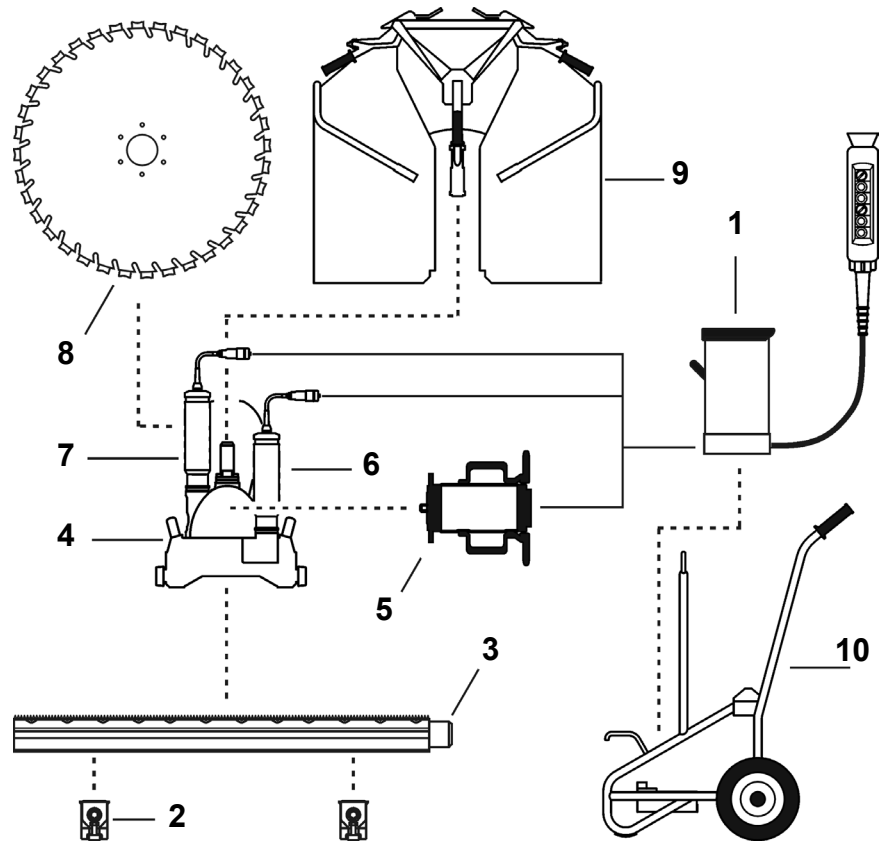


Fig. 3-2 Electric system design

- | | |
|-------------------------|-----------------------------|
| 1 Electric control unit | 6 Electric feed motor |
| 2 Rail support | 7 Electric swivelling motor |
| 3 Guide rail | 8 Saw blade |
| 4 Saw head | 9 Blade guard |
| 5 Electric drive motor | 10 Transporter |

3.2.2.1 Operational scope

The hydraulic versions of the system are preferably used for work where smaller cutting tool diameters and accordingly lower power levels are required.

3.2.3 Composite version

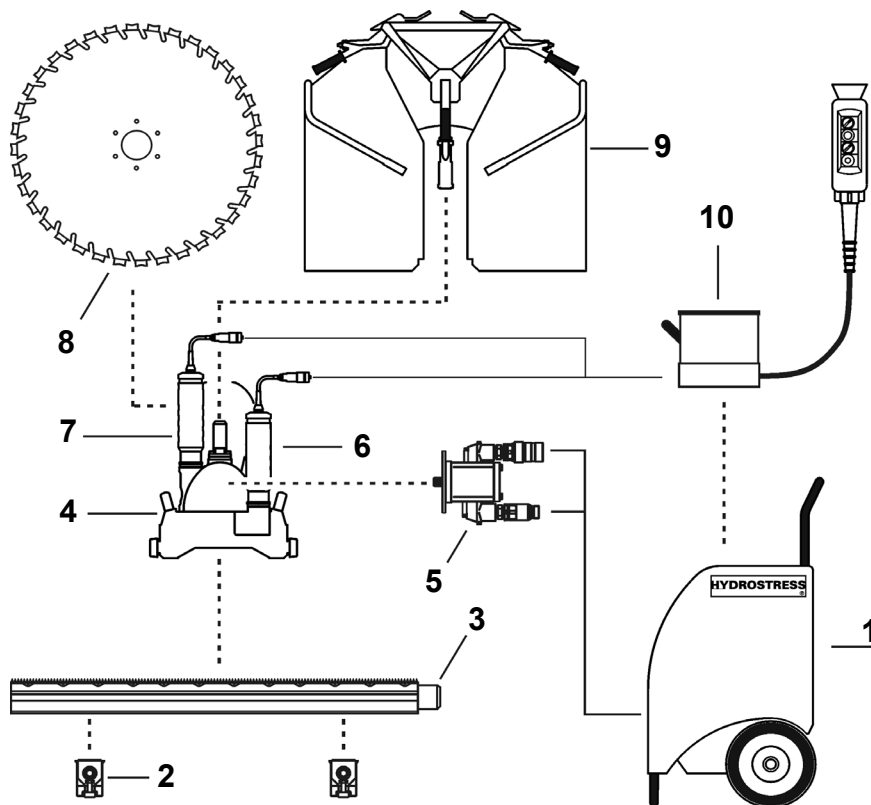


Fig. 3-3 Composite system variant

- | | |
|----------------------------|-----------------------------|
| 1 Hydraulic drive assembly | 6 Electric feed motor |
| 2 Rail support | 7 Electric swivelling motor |
| 3 Guide rail | 8 Saw blade |
| 4 Saw head | 9 Blade guard |
| 5 Hydraulic drive motor | 10 Electrical control unit |

3.2.3.1 Operational scope

The composite system versions are preferably used for work where the specific requirements of the job call for a composite system variant in order to achieve a better cutting performance.

3.2.4 Corner saw

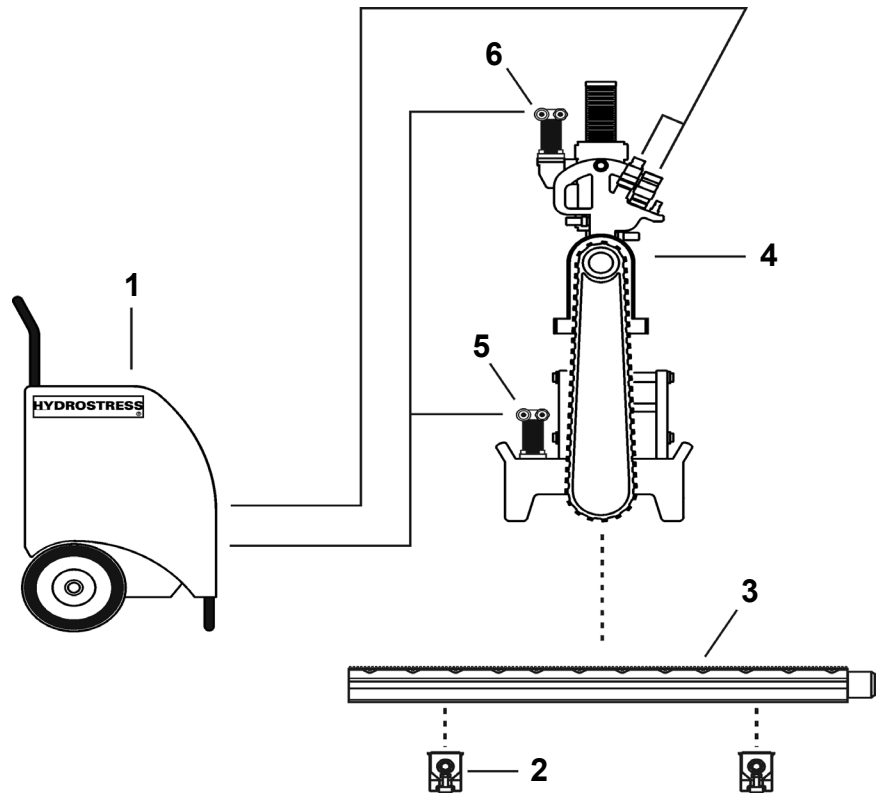


Fig. 3-4 Corner saw

- | | |
|----------------------------|------------------------|
| 1 Hydraulic drive assembly | 4 Corner saw |
| 2 Rail support | 5 Hydraulic feed motor |
| 3 Guide rail | 6 Hydraulic feed motor |

3.2.4.1 Operational scope

The corner saw is used where in the corners of the cutouts no overcuts from the round saw blade and no corner drill holes are wanted.

3.3 Functional description

3.3.1 System description

The overall function of all Wall saw systems always remains the same. A motor drives the saw blade. This is swung in order to penetrate the material to be cut. It then travels along the guide rail in order to perform the desired cut.

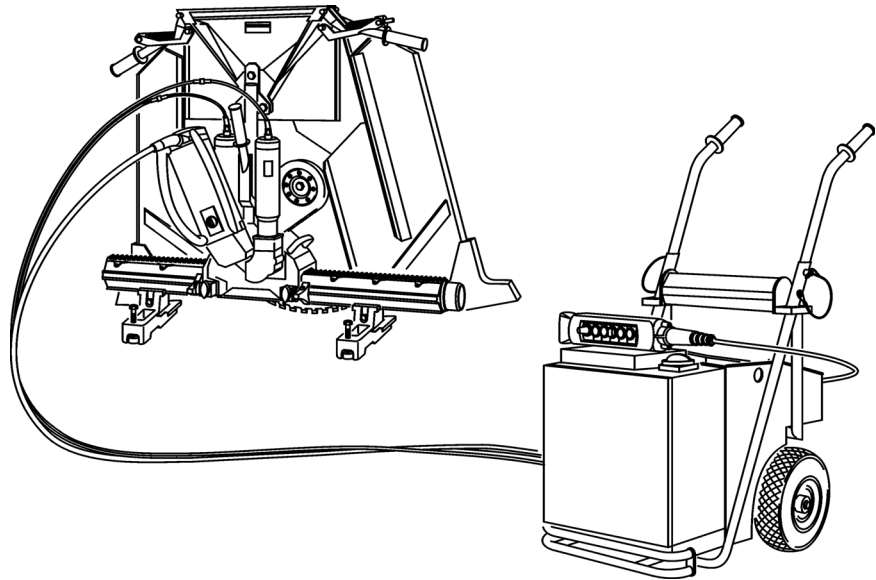


Fig. 3-5 System view (example of an electric system variant)

The corner saw is a minor exception. This is needed when no overcut or corner drill holes are wanted in the corners.

Specially adapted system configurations are available in the various power classes. Various control units are also available.

Various drives with different power classes can be used to feed the motors according to the requirements.

The choice of saw blade (tool) diameter can of course be varied. The types and ranges of sizes of the blade guard are correspondingly wide.

3.3.2 Component description

3.3.2.1 Guide rail including rail supports

Once the cutout has been marked, the rail supports are fitted along with the pre-assembled rail guide. The guide rails are toothed racks that are designed to ensure a smooth connection to the feed motor.

3.3.2.2 Saw head

The saw head is the central component of the Wall saw systems. All the motors, along with the cutting tool and the blade guard, are mounted on the saw head. Hydrostress saw heads are fitted with geared or belt-driven swivel arms.

3.3.2.3 Drive motor

The drive motor drives the cutting tool. Both the power and either an electric or hydraulic version can be selected as required.

3.3.2.4 Feed motor

Using the feed motor the saw head can be moved backwards and forwards on the guide rail. The feed motor is adapted to the various power requirements of the respective system.

3.3.2.5 Swivelling motor

The swivelling motor drives the swivelling part of the saw head. This allows the cutting tool to be inserted in the material to be cut. The swivelling motor is adapted to the various power requirements of the respective system.

3.3.2.6 Hydraulic drive assembly / Power supply

The hydraulic drive assembly supplies the hydraulic motors. The hydraulic motors are connected via flexible hoses to the hydraulic drive assembly.

When electric motors are used an electrical supply with control unit is employed in place of the hydraulic drive assembly. The electrical supply is connected via flexible electric cables to the motors.

3.3.2.7 Cutting tool (saw blade, chain)

The cut is performed with the help of the cutting tool. Depending on the system used, there is an almost limitless numbers of possible adaptations of both the type and the diameter.

Unlike the actual wall saw, which as a cutting tool is fitted with a saw blade, the corner saw works with a diamond chain.

3.3.2.8 Corner saw

The corner saw is needed to achieve clean corners without overcuts. Once the wall cut has been performed, the corner saw is mounted using the same guide rail. The corner saw basically only penetrates the corners and does not have any longitudinal travel.

3.3.2.9 Blade guard

The blade guard is a safety device and is positioned over the cutting tool. It prevents contact with the cutting tool when it is motion, intercepts flying parts and thus reduces the risk of injury. The blade guard acts as a spray guard at the same time.

The blade guard is available in various types and sizes.

4 Assembly , disassembly

4.1 General

4.1.1 Safety instructions

Before proceeding read Chapter 2 “Safety instructions”, 2-1 in this system manual. Be sure also to take note of all the danger information given here and follow the instructions on how to avoid physical injury and damage to property.

4.1.2 Personnel qualifications

Assembly and disassembly of Wall saw systems should only be carried out by authorised personnel. Personnel are only authorised where they meet the following requirements:

- have successfully completed user training at **TYROLIT Hydrostress AG** or corresponding technical courses at regional professional associations and federations.
- the Safety instructions in Chapter 2 must have been read and understood.

4.2 Assembly / disassembly



Information

Assembly and disassembly of the Wall saw systems are described in Chapter 6 “Operation”, 6-1, since these activities are part of the normal sequence of operations of the Wall saw systems.

4.2.1 Transport to and from the place of installation

The system components must be transported in such a way that they are not damaged in transit. Where suitable means of transport are available, these must be used.

5 Start-up

5.1 Putting into operation

Each time that the Wall saw system is put into operation it must be checked to ensure that it is free of defects.

Putting into operation of the individual system parts (machines and components) is described in the corresponding Operating Instructions or instruction leaflets.

6 Operation

6.1 General

Before proceeding read Chapter 2 “Safety instructions”, 2-1 in this Safety Manual. Be sure also to take note of all the danger information given here and follow the instructions on how to avoid physical injury and damage to property.

6.1.1 Safety instructions

It is essential to observe the following safety instructions, in particular in relation to the operation of the Wall saw systems.



Danger

Danger of falling heavy parts.

When performing the types of work described in this chapter, it is essential to wear the following individual protective equipment: helmet, goggles, protective gloves and safety shoes.

It is essential that the work instructions and procedures described in this safety manual are followed.

Failure to observe this regulation may lead to serious physical injury, or death, and to property damage.

Danger



Electric shock due to defective electrotechnical equipment.

The electrotechnical equipment must be checked prior to each use and from time to time during prolonged usage. Defective parts such as cables and plugs must be exchanged by electrotechnically trained personnel in the powered down state.

Failure to comply with this regulation may lead to serious physical injury or death. Secondary damage such as fires may also occur.

Danger



Danger from machine suddenly starting up.

Before switching on the system the operator must ensure that no other person is present in the danger areas.

Failure to adhere to this regulation may result in crushing or cut wounds to body parts and damage to property.

Danger



Hazard from falling building structures to which the Wall saw system has been secured.

The building structure must be properly secured (see Operating Instructions in this Safety Manual).

Failure to observe this regulation may lead to serious physical injury, possibly even death, and to property damage.

Danger



Noise danger.

When using the Wall saw system hearing protection must be worn.

If this instruction is not followed irreparable hearing damage may result.

Warning



Danger from segments or concrete chips flying off from the cutting tool.

Sawing without the blade guard is prohibited.

The danger areas must be properly secured (see Operating Instructions in this Safety Manual).

Failure to observe this regulation may lead to serious physical injury or death.



Warning

Danger from sharp cutting tool edges.

Touching a cutting tool whilst it is still in motion is prohibited.

When touching cutting tools at a standstill it is recommended that protective gloves are worn.

Failure to adhere to this regulation may result in cut wounds to the hands.



Warning

Danger from projectile sharpening block.

In order to sharpen the tool the sharpening block must be clamped or fastened in at a suitable point. Resharpener by holding the sharpening block in the hand is expressly prohibited.

Failure to observe this regulation may result in slight or serious physical injury and damage to property.



Warning

Hazard from toxic exhaust gases (carbon monoxide).

When a drive is operated with a combustion motor in a sealed or underfloor area, it is essential that the exhaust gases are discharged into the open air.

Failure to adhere to this regulation may lead to symptoms of poisoning, or possibly death from suffocation.



Warning

Danger of allergic reactions if skin comes into contact with hydraulic oil.

Persons who have an allergic reaction to hydraulic oil must wear protective gloves and goggles when carrying out work where they come into contact with hydraulic oil. Any areas of the skin affected must be rinsed immediately with copious amounts of water.

Failure to adhere to this regulation may result in allergic reactions or injuries to the eyes.

6.1.2 Personnel qualifications

The Wall saw systems should not be operated by unauthorised persons. Personnel are only authorised where they meet the following requirements:

- have successfully completed user training at **TYROLIT Hydrostress AG** or corresponding technical courses at regional professional associations and federations.
- the Safety instructions in Chapter 2 must have been read and understood.
- are familiar with all the general rules of architecture

6.2 Safety-related operator's controls

6.2.1 Blade guard

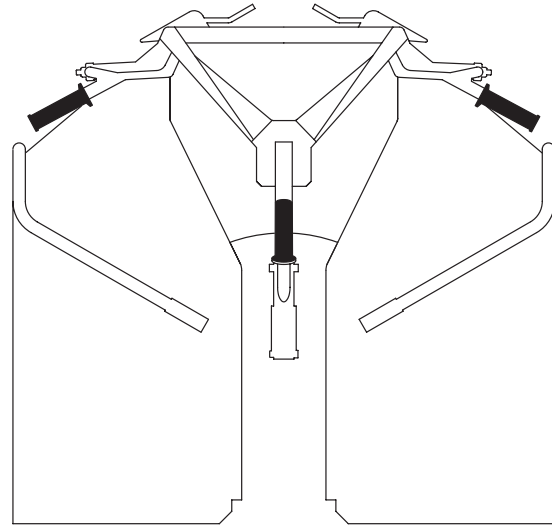


Fig. 6-1 Blade guard

The blade guard is a safety device. It provides protection from accidental contact with the cutting tool and from flying parts and at the same time acts as a spray guard. Working without the blade guard is prohibited.

6.2.2 Emergency Stop pushbutton

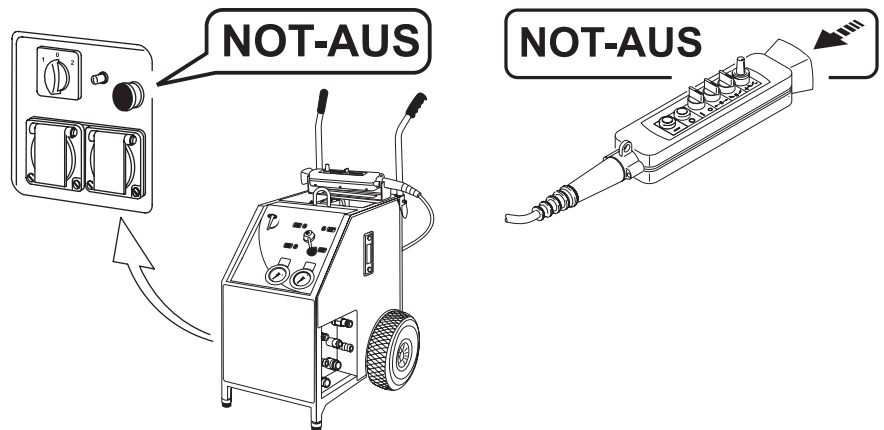


Fig. 6-2 Emergency Stop pushbuttons on the drive assembly and remote controller

In danger situations the Emergency Stop pushbutton must be pressed immediately. Pressing the Emergency Stop pushbutton immediately halts the system and prevents the system being accidentally switched on again.

6.3 Controls and displays

Current Wall saw systems are controlled via the drives by means of a remote controller.

6.3.1 Controls and displays on the machines

The controls and displays of the individual machines and components are described in the corresponding Operating Instructions or instruction leaflets for each particular type of individual machine and component.

Example: Hydraulic Wall saw system

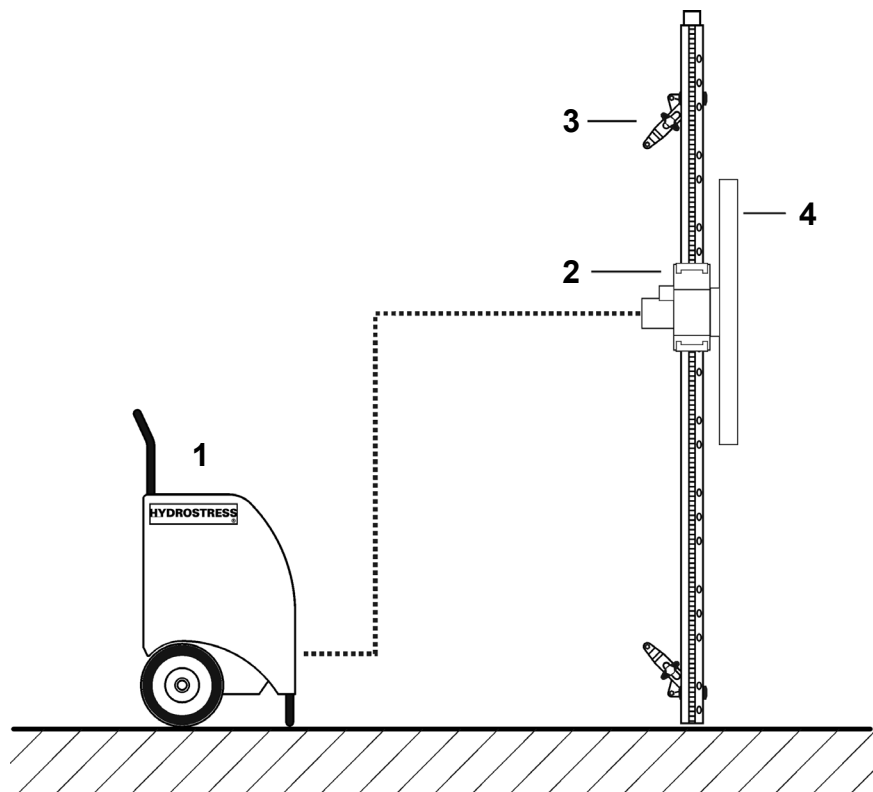


Fig. 6-3 Documents for a hydraulic Wall saw system (example)

- 1 Operating Instructions for drive assembly type ...
- 2 Operating Instructions for saw head type ...
- 3 Instruction leaflet for rail support type ...
- 4 Instruction leaflet for blade guard type ...

6.4 Operation

In order to guarantee that all work is carried out in complete safety, it is essential to perform the activities described in this Safety Manual.



Information

This checklist is intended solely to provide a better overview of the sequence in which the stages of the work should be carried out.

6.4.1 Process checklist

1. Approval from the supervision of works

Before any work commences the approval of the supervision of works must be obtained. The following points must be clarified:

- Are their static concerns about the building structure?
- Are electrical lines laid in the wall or ceiling (floor)?
- Are sanitation lines laid in the wall or ceiling (floor)?
- Have loose parts been left in the wall or ceiling (floor)?
- How deeply are any longitudinally running reinforcements?

2. Mark out cut

The cut to be made must be marked out. In doing so the size and/or the weight of the structural blocks must be taken into account.

Then the anchoring holes for mounting the rail supports must be marked out.

3. Determine cutting sequence

In principle, for a wall cutout for example, first the bottom, then the side and only at the end the top, cuts must be performed.

4. Secure danger area

Before starting work the danger areas must be secured (example: see Chapter 6.4.2.4 "Secure danger area", 6-12).

5. Mount guide rail

First the holes must be drilled for the anchoring dowels. Then the rail supports are mounted, along with the preassembled guide rail. Before tightening the anchoring screws the guide rail must be precisely aligned. Finally the rail end pieces must be fitted.

6. Assemble the Wall saw system

First the saw head with the feed motor and the swivelling motor are positioned and secured on the guide rail. Because of their weight, it is preferable to mount main motors later on. Then the cutting tool and the blade guard are mounted.

7. Make connections

Following mounting of the saw head the power connections must be made. If hydraulic motors are being used, ensure that the correct connections for the correct motor and for forward and reverse are created.

8. Secure structural blocks

Before sawing work commences the structural blocks must be correctly secured from the structural engineering point of view. It must be ensured that the structural blocks neither overturn nor fall out or down and that they cannot displace.

-
- 9. Carry out a test run** Before commencing with the sawing work, carry out a test run over the entire cutting length. This should ensure that the power connections to the drive are of sufficient length and that during sawing work they will not be torn out or be cut through.
- 10. Carry out a precut / guide cut** Before the cut itself a precut / guide cut should be made. This will ensure that the cutting tool (saw blade) does not drift.
- 11. Sawing, etc.** Now the cuts must be performed in the order envisaged. For each new cut steps 8 to 11 must be repeated. If necessary, steel wedges are used to secure the cut concrete.
- 12. Dismantling the Wall saw system** Once the sawing work has been completed the Wall saw system can be disassembled. First the supply lines and then the individual components should be disassembled.
- 13. Removal of the structural blocks** Removal of the structural blocks is dangerous and therefore particular care is called for. It must in particular be ensured that no persons remain in the danger areas and the securing and suspension or crane apparatus are adequately designed for the load to be held or lifted.
- 14. Disposal of sawing sludge** If necessary the sawing sludge must be disposed of according to the normal local environmental regulations. The sawing sludge contains all the materials that have been sawn through.

6.4.2 The procedure in detail

6.4.2.1 Obtaining the approval of the supervision of works

Before any work commences the approval of the supervision of works must be obtained. The following points must be clarified:

- are their static concerns about the building structure?

Action:

If structurally important bearing or support structures are cut through, this may have fatal consequences (static weakening or subsidence)

- are electrical lines laid in the wall or ceiling (floor)?

Action:



Danger

Danger from electric shock

If one or more electricity lines are located in the wall, the ceiling or the floor, it must be ensured that these have been de-energized and secured against re-energizing.

Failure to comply with this regulation may lead to serious physical injury or death. Secondary damage such as fires may also occur.

- are sanitation line laid in the wall or ceiling (floor)?

Action:

If sanitary lines (supply or waste pipes for water or waste water) exist, these must first be drained.

- have loose parts been left in the wall or ceiling (floor)?

Action:

Loose or soft materials cannot be cut. They must therefore be removed first. Otherwise the result would be that the tool would jam or that individual segment would come away and be propelled.

- how deeply are any longitudinally running reinforcements?

Action:

If along the cuts to be performed there are reinforcements in the concrete, it is important to know how deep below the surface these may be located. If instead of the reinforcements being sawn through, the reinforcements are sawn along, the resultant heat could make the segments come loose with the result that the cutting tool is destroyed. For details of this, see Chapter 6.4.2.10 "Carry out a guide cut / precut", 6-19.

6.4.2.2 Mark out cuts and anchoring holes

The parts to be sawn out are normally already marked out by the customer. It is now a matter of determining the maximum concrete block weight and adapting to the conditions. In doing so the following points must be taken into account:

- it must be possible to adapt the handling to the task
- the crane or the lifting device must be designed for the loads to be lifted
- the weight of the structural block cut out should not exceed the maximum permitted floor loading

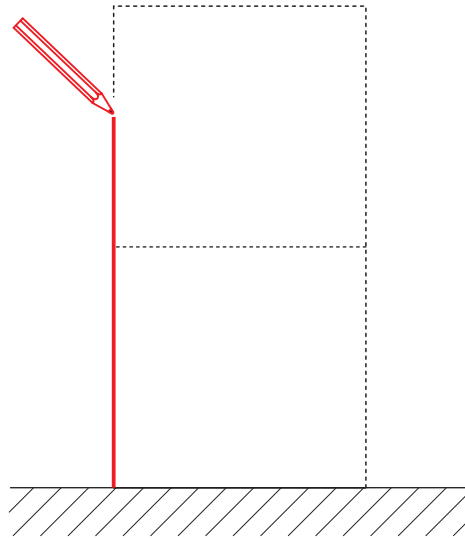


Fig. 6-4 Marking of cuts

Then the drill holes for the dowels for mounting the rail supports and for anchoring the load hooks to secure the structural blocks and for their removal must be marked.

6.4.2.3 Define the sequence of cuts

The sequence of cuts is important in order that the cutting tool does not jam later and that the structural blocks can be removed without problems. When defining the sequence of cuts express account must also be taken of personal safety issues.

In principle, for a wall cutout for example, first the bottom, then the side and only at the end the top cuts must be performed.

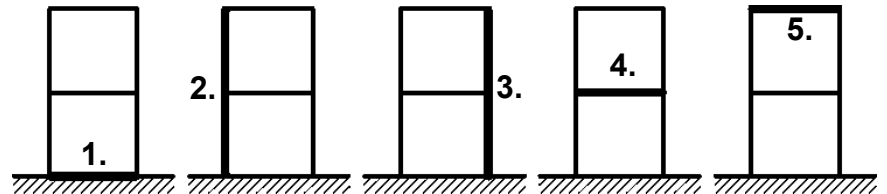


Fig. 6-5 Define the sequence of cuts

For floor cutouts the cutout blocks must be supported with suitable building material or suspended and secured on a crane or other suitable lifting apparatus with sufficient load-bearing capacity.

6.4.2.4 Secure danger area

Warning



Danger from segments or concrete chips flying off from the cutting tool.

Sawing without the blade guard is prohibited.

The danger areas must be properly secured (see Operating Instructions in this Safety Manual).

Failure to observe this regulation may lead to serious physical injury or death.

Danger areas with wall cuts

The danger areas must be marked out and secured. During sawing operations no persons should remain in these danger areas.

It is just as important to secure the rear of the danger area. Individual concrete splinters or cutting tool segments may come loose and be projected.

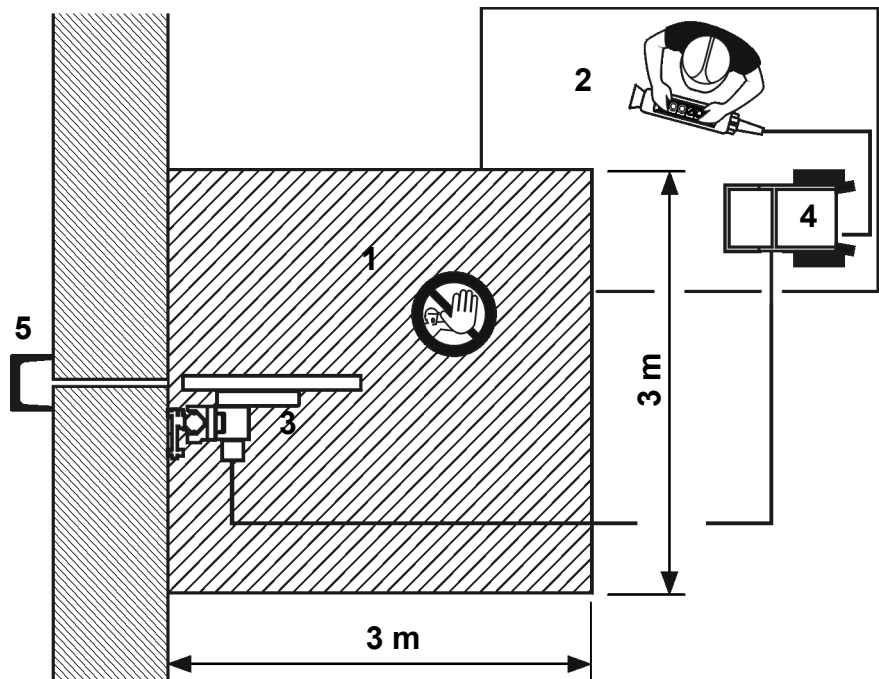


Fig. 6-6 Danger areas with wall cuts

- 1 Danger area
- 2 Recommended working area
- 3 Wall saw with blade guard
- 4 Drive assembly
- 5 Securing of rear sawing area

Danger areas with floor cuts

The danger areas must be marked out and secured. During sawing operations no persons should remain in these danger areas.

It is just as important to secure below the danger area. Individual concrete splinters or cutting tool segments may come loose and be projected.

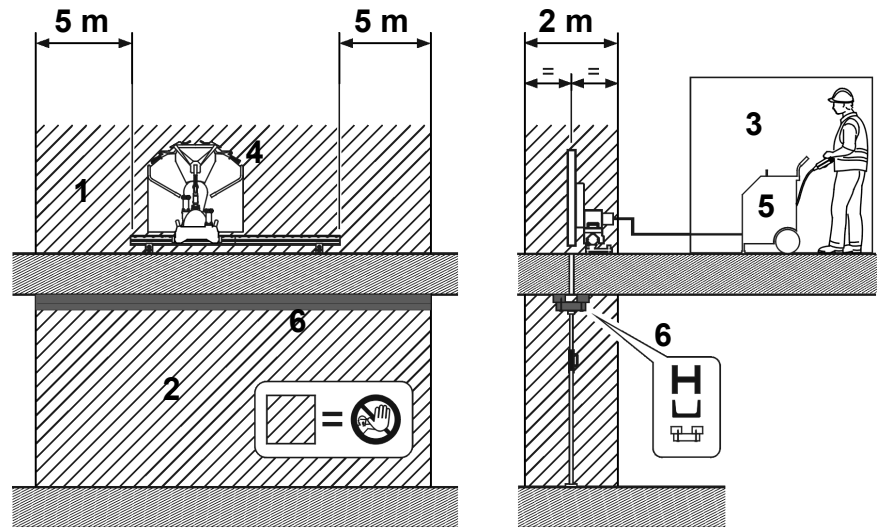


Fig. 6-7 Danger areas with floor cuts

- | | |
|----------------------------|-------------------------------------|
| 1 Danger area | 4 Wall saw with blade guard |
| 2 Danger area below | 5 Drive assembly |
| 3 Recommended working area | 6 Securing of below the sawing area |

Securing at the rear or below can consist of an H or U iron, but also wood, boards and so on.

6.4.2.5 Mount guide rail

1. The dowels and anchoring elements must first be positioned.



Information
To secure the rail supports, anchoring elements appropriate for the sub-surface must be used. When positioning the dowels the installation instructions of the dowel manufacturer must be followed.

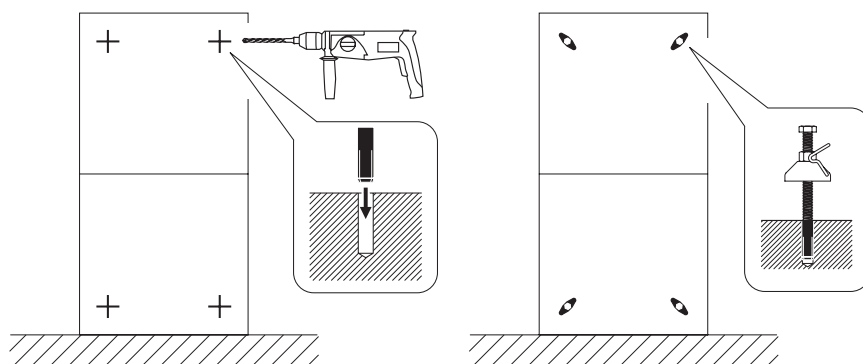


Fig. 6-8 Fit dowels and anchoring block

2. The guide rail must then be clamped in the rail supports (preassembly).
3. Now the rail supports together with the guide rail are mounted on the anchoring elements.

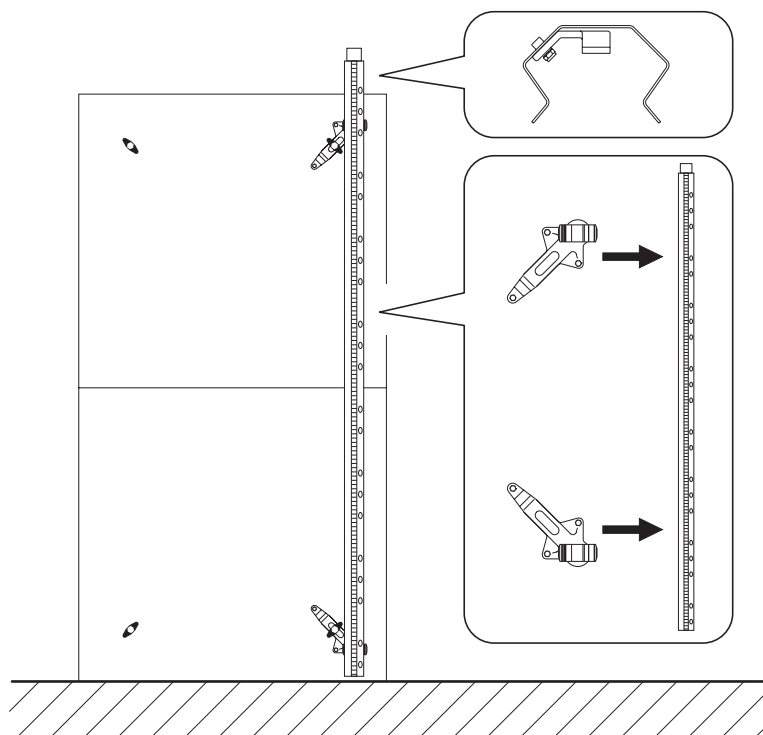


Fig. 6-9 Mount guide rail

4. Next the guide rail must be precisely aligned for the cut to be performed and tightened.
5. Finally the end pieces must be inserted in both ends of the guide rail. This prevents the sawing head being able to travel further than the rail ends.

6.4.2.6 Assemble the Wall saw system

Once assembly of the guide rail is complete the wall saw can be mounted.

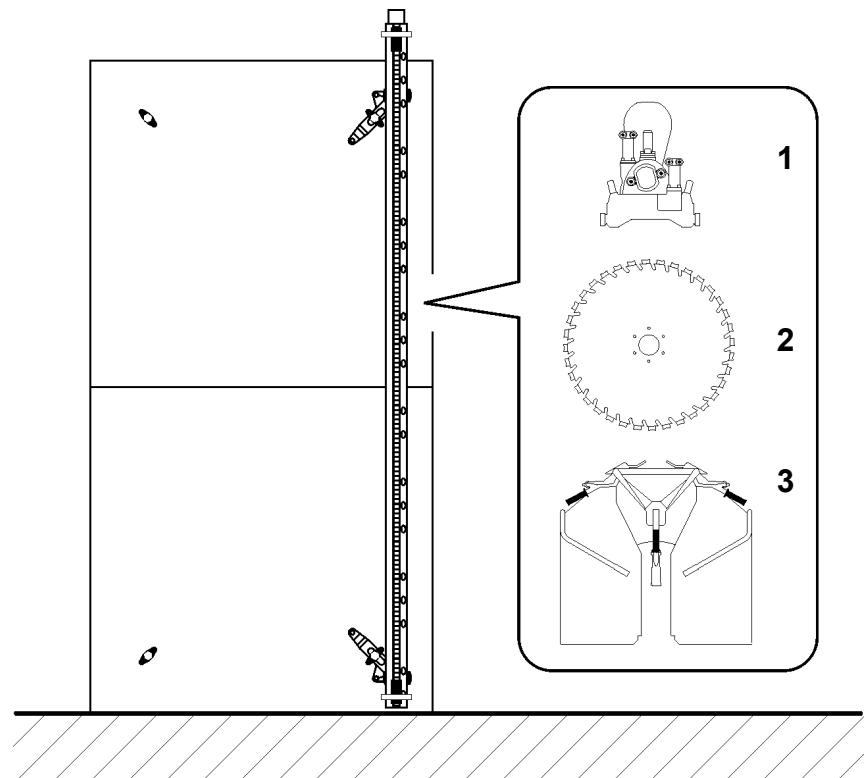


Fig. 6-10 Mounting the wall saw

- 1 Saw head
- 2 Cutting tool (saw blade)

- 3 Blade guard

1. First the saw head (including feed motors) (1) is positioned on the guide rail and secured. Because of their weight it is preferable to mount the drive motors afterwards.
2. Then the cutting tool (saw blade) (2) is mounted.
Mounting of the cutting tools on the various types of saw heads and anchorings is described in the Operating Instructions for the saw heads of the Wall saw systems.
3. Finally the blade guard (3) must be mounted and secured.

6.4.2.7 Make connections

Once the Wall saw system has been mounted, the power connections must be made.

To do this proceed as follows:

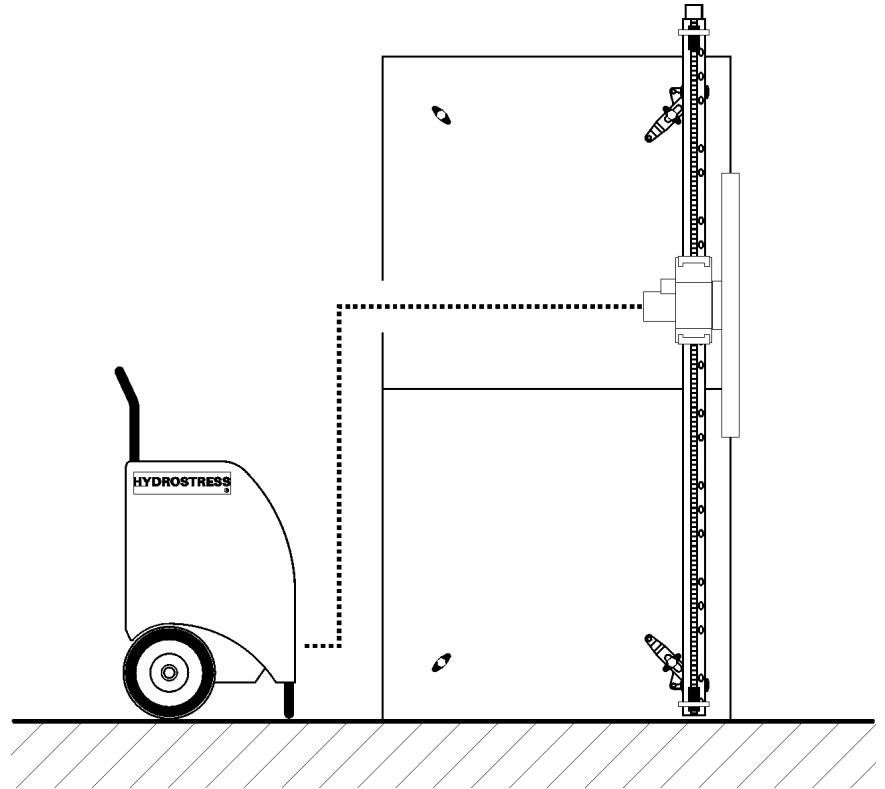


Fig. 6-11 Connecting the drive assembly to the wall saw

1. The power connections between the drive assembly and the saw head must be made first.
In doing so it is necessary to ensure that there is no confusion between on the one hand the motors and on the other the feed and return lines.
2. Finally the drive assemblies must be connected to the power connection.

6.4.2.8 Securing cutouts

Before commencing the sawing activities the structural blocks to be cut out must be secured against falling out in the case of a wall cutout, or against falling down in the case of a floor or ceiling cutout. Two examples of securing are given in Chapter 6.5 “Removing the structural blocks”, § 6-27.



Danger

Hazard from falling building structures to which the Wall saw system has been secured.

The building structure must be properly secured (see Operating Instructions in this Safety Manual).

Failure to observe this regulation may lead to serious physical injury, possibly even death, and to property damage.

Example: Securing by supporting from below

Another way of securing the structural blocks to be removed during floor cutouts is to support them from below with the help of timber and structural supports.

Removal of the structural blocks can take place later as follows:

- lifting down with the help of a fork-lift truck
- lowering down with the help of a block and tackle

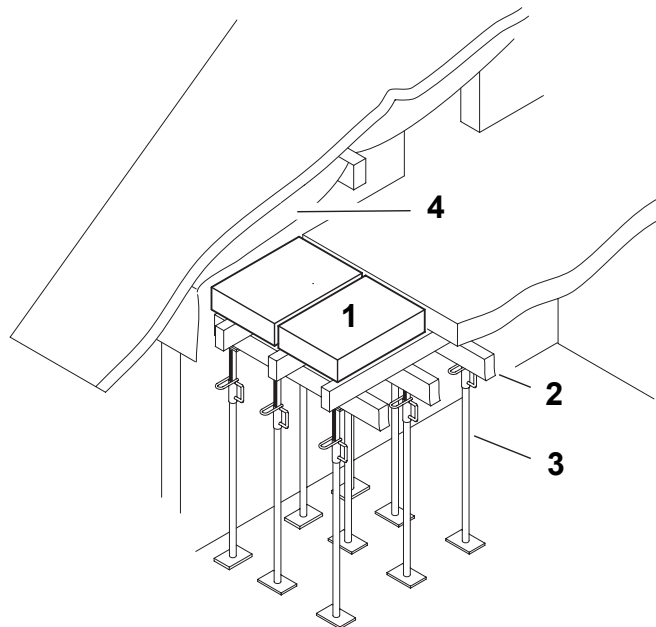


Fig. 6-12 Securing of structural blocks by means of structural supports

- | | |
|-------------------------|-----------------------|
| 1 Cut structural blocks | 3 Structural supports |
| 2 Timber | 4 Spray guard |

6.4.2.9 Carry out a test run

Before commencing the sawing work a test run must be carried out along the entire length of the cut to be performed.

Before the test run a check is necessary to see that no anchoring screws of the rail supports are protruding which would block the path of the saw head. During the test run it must be ensured that no hoses or cables are in the vicinity of the cutting tool (saw blade) or come to rest there. At the same time a check is necessary that the power connections are long enough and do not catch anywhere during travel.



Information	
	A test run prevents damage to the power connections from being torn out or cut through.

6.4.2.10 Carry out a guide cut / precut

Definition

Guide cut: Cut for blade guide
(Cut depth max. 10 % of the blade diameter)
no reinforcement

Precut: The precut is performed with a small blade diameter and a large segment width.

Guide cut

Guide cuts are used to guide the blade so that it does not drift and should always be performed for safety reasons. Guide cuts should only be performed with blades with a maximum blade diameter of 1,025 mm (see table).

Precut

Large depths cannot be cut in a single pass. Therefore, for blade diameters of 1,225 mm and above precuts must be made. The precuts must be performed with a blade of small diameter and with wide segments.

Cutting

Once the cutting tool has been put into operation the cooling water must be turned on. The prescribed quantity of cooling water is 2–6 l/min at an optimum water temperature of ≤ 18 °C, with the absolute minimum being 2 l/min. The pressure of the water supply should be between 1 and a maximum of 6 bar.

Depending on the task and the conditions suitable drainage must be provided, e.g. water barrier, water suction device, plastic coverings, etc.

For the precut it is important that this is performed at low feed speed.

The table shows how big the tool must be in relation to the cutting depth.

Saw blade dia.	Depth of cut	Precut required?
825	30	Guide cut with same blade required
925	35	
1025	40	
1225	50	Precut with smaller blade and wider segments required
1500	67	
1600	72	

Example:

An opening must be cut in a 35 cm thick concrete wall.

- The tool must have a diameter of 900 mm
- No precut is required
- At maximum penetration depth the tool will overcut by approximately 30 cm at both ends of the cut.

Overcut

If overcuts and corner drills holes are not wanted, the corner saw must basically be used.

The following table shows by how much the cutting tool overcuts at both ends of the cut according to the penetration depth and the size of the cutting tool.

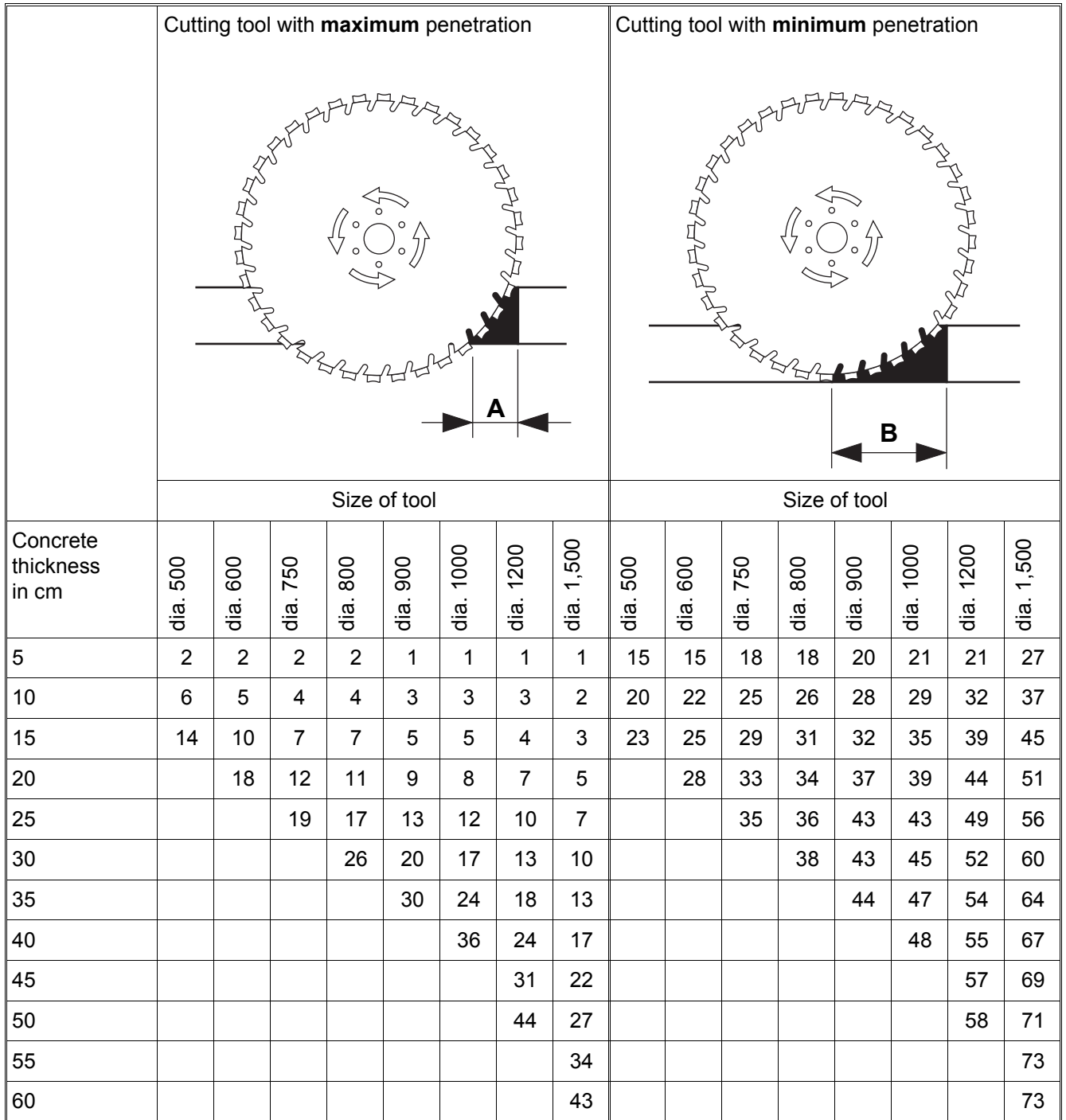


Fig. 6-13 Table of overcut dimensions

Before sawing

It is essential to observe the following instructions:

- The direction of cut and the direction of the swivelling motion of the swivelling head must be checked.
- The teeth of the guide rail must be clean.
- The cut guides on rail supports must be folded in
- Sharp-edged objects must be covered
- All dowel screws on the rail supports must be tightened (check), as otherwise the saw head will be impeded.
- All rail supports must securely fixed to the guide rail (check).
- The rail end pieces must be fitted (check).
- The cooling water must emerge from the point of rotation of the cutting tool (check).
- A test run must have been performed (see Chapter 6.4.2.9 “Carry out a test run”, 6-19)

Procedure

The following points must be observed:

- If possible do not cut in reinforcements running in the direction of cut (if this is unavoidable, see Chapter “Reinforcements in the longitudinal direction”, 6-24)
- The swivel arm has been pulled
- The cutting depth should be between 5 and 8 cm and should not exceed 10 % of the blade diameter.

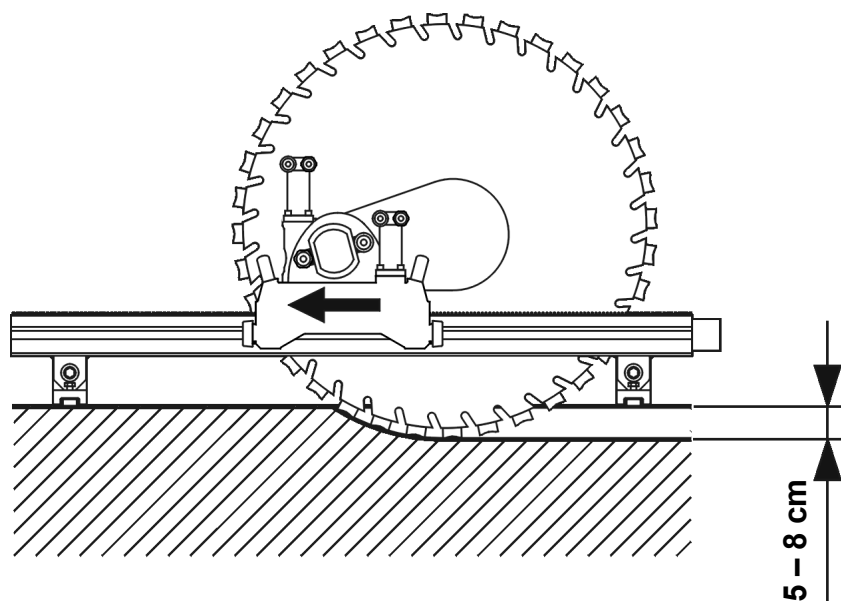


Fig. 6-14 Precut

Starting:

- The working pressure should be set at approximately 100 – 120 bar
- Move the saw head to the starting position
- The sawing process can now be started

6.4.2.11 Sawing

If the cutouts are performed with overcuts, please note table 6-21. The length of the overcut is directly related to the cutting tool diameter selected, the plunging depth of the cutting tool and the thickness of the concrete.

If the cutouts are performed without overcut, the tool is used to cut as far as the corners and then the remaining cut is performed with the corner saw.

Sawing can now commence

Feed after the precut or guide cut

Following the precut or guide cut more than 5-8 cm can be fed. The possible cutting depth depends on the level of reinforcement, the aggregates in the concrete, the size of the cutting tool, the blade specification and the drive assembly power.

The optimum depth of cut can be between 8 and 12 cm.

Reinforcements in the longitudinal direction

When cutting it must be ensured that when plunged the tool is not in a reinforcement that runs alongside the cut.

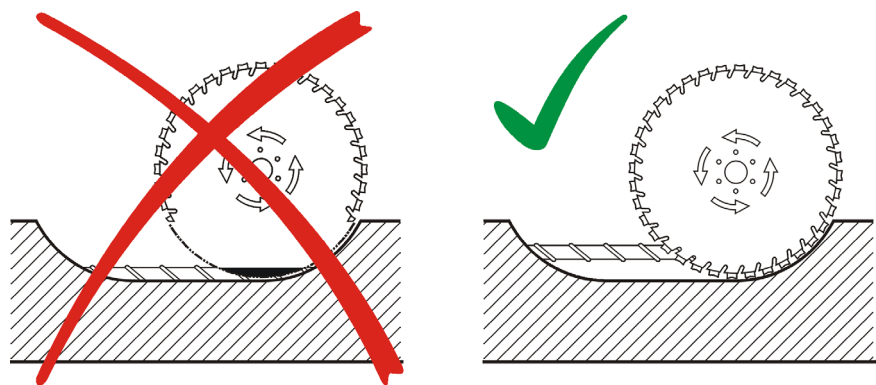


Fig. 6-15 Longitudinal bars in the precut



Information	
	<p>The depth of the precut must be selected to guarantee that any reinforcements running alongside the cut are completely cut through.</p> <p>If the cutting tool runs along in the reinforcement, there is a danger of the cut drifting with heavy wear of the tool rendering it defective.</p>



Information

In sections where there are reinforcements reduce the speed of the drive motor.

Always withdraw from a cut with the cutting tool running.

If the saw blade jams

- Carefully withdraw from the cut with travelling or swivelling motions.
- If this is not possible: Disassemble cutting tool from saw head and remove cutting tool alone from the cut.

At the end of each cut

- Withdraw from the cut with the cutting tool running
- Move the rotating swivel arm to the uppermost position

Wall cutout cutting example

Before the cut (left, vertical) steel wedges must be fitted (see diagram). This prevents the cutout sections both from toppling over and from falling out. At the same time it makes removal easier.

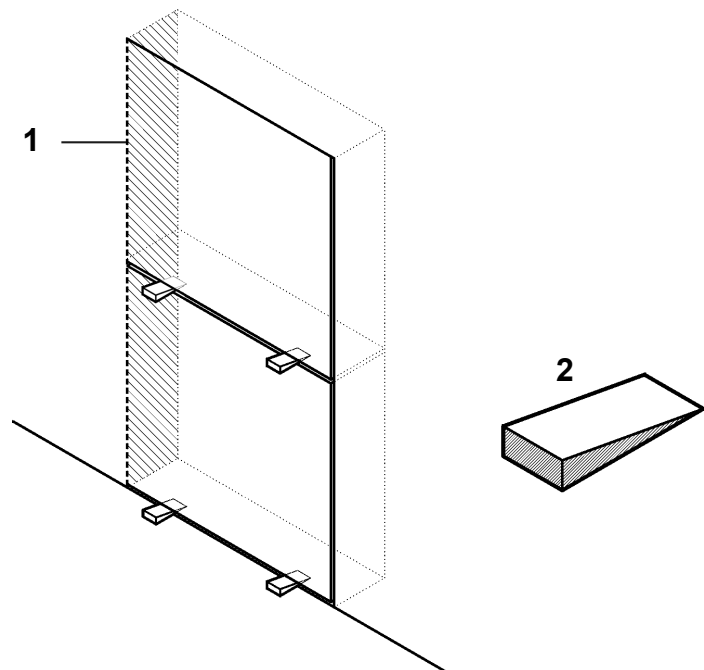


Fig. 6-16 Use of wedges

- 1 Cut
- 2 Steel wedge

Terminating the work

To terminate sawing work correctly, proceed as follows:

- switch off the Wall saw system completely
- Depressurise hoses
- Clean Wall saw system (e.g. by spraying with water)

6.4.2.12 Dismantling the Wall saw system

Dismantling of the Wall saw systems takes place as follows:

- Remove power connections
- Remove blade guard
- Disassemble cutting tool
- Disassemble saw head
- Disassemble guide rail and rail supports
- Disassemble anchoring blocks

6.5 Removing the structural blocks

Removal of the structural blocks must be performed with particular care and prudence.

1 m³ concrete weighs between 2,400 and 2,700 kg.



Danger

Hazard from falling building structures to which the Wall saw system has been secured.

The building structure must be properly secured (see Operating Instructions in this Safety Manual).

Failure to observe this regulation may lead to serious physical injury, possibly even death, and to property damage.

If slightly conical cuts are made, then the direction of removal must be taken into account prior to sawing. See following illustration.

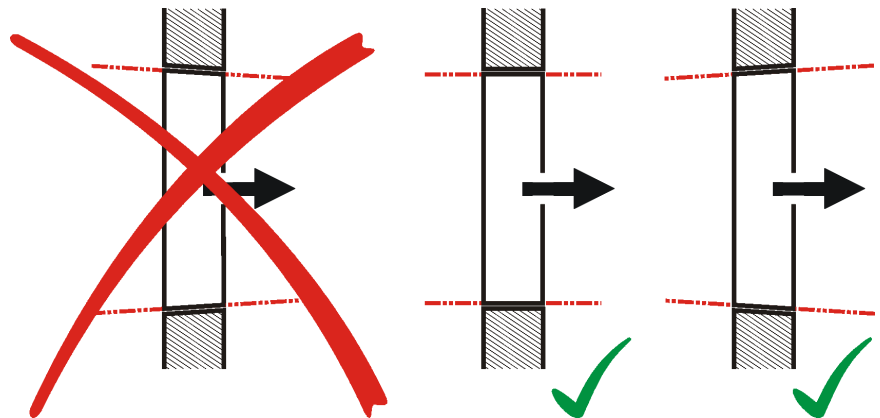


Fig. 6-17 Removal with straight and slightly conical cuts

6.5.0.1 Removal with the help of a concrete block lift

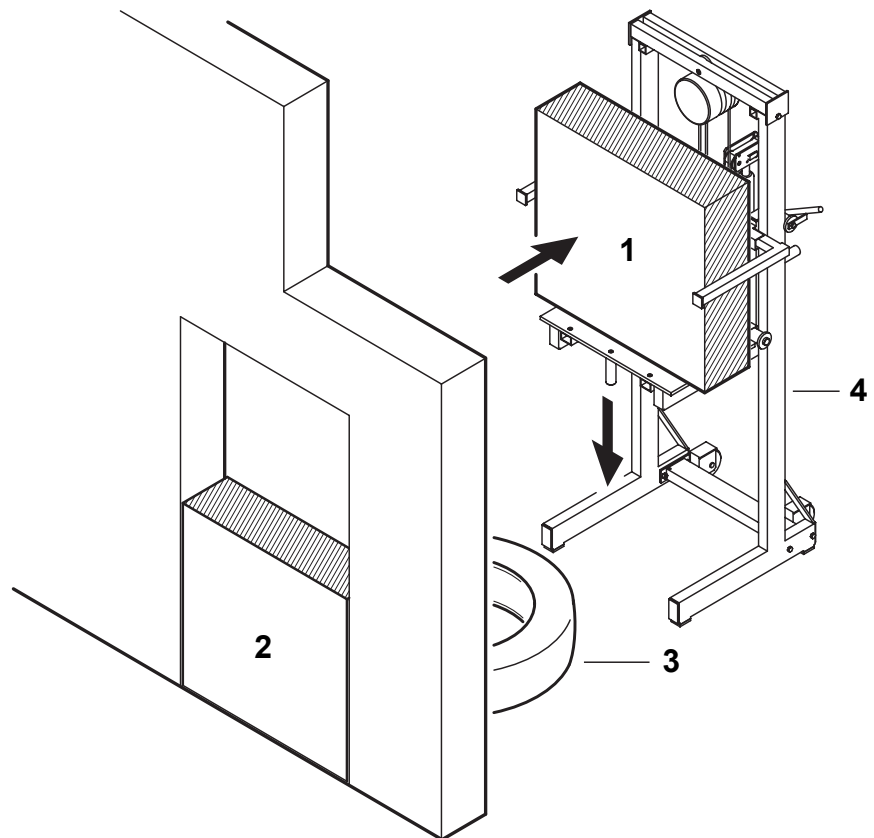


Fig. 6-18 Removal of wall cutouts with a concrete block lift

- 1 Removal of the uppermost cutout section
- 2 Removal of lower cutout section (overturning onto tyres)
- 3 Car tyres (for large cutout sections a stack of tyres)
- 4 Concrete lift

Warning: Note floor loading.

6.5.0.2 Removal with the help of a block and tackle

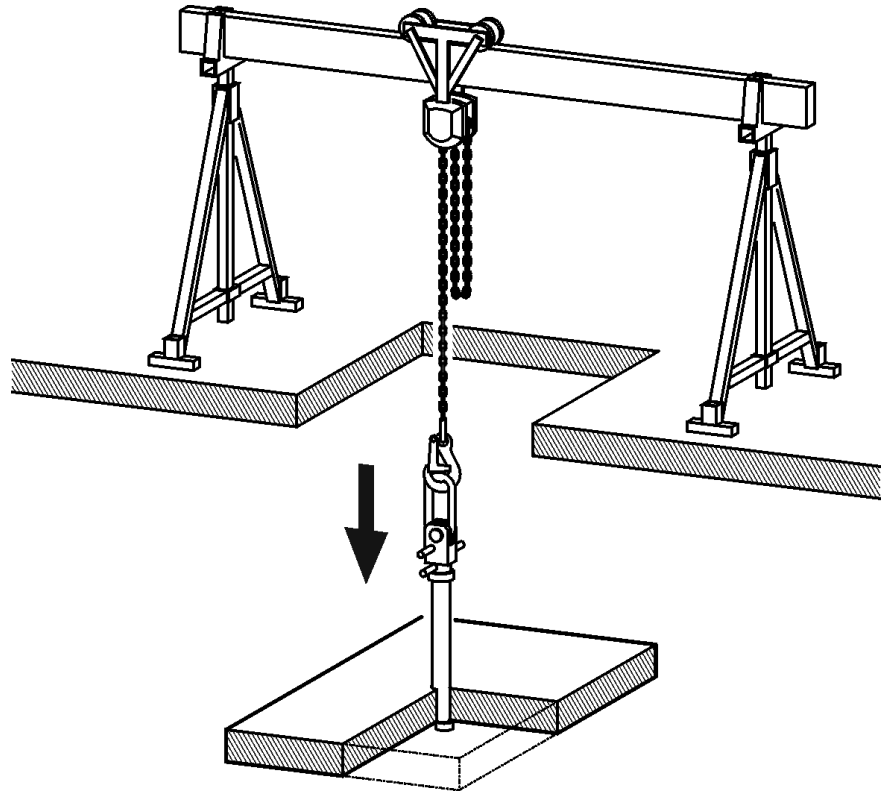


Fig. 6-19 Floor cutout cutting example

6.5.0.3 Using the correct load hook

2.5 t suspension device

4.0 t suspension device

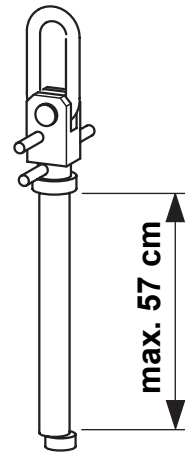
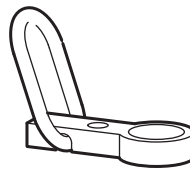


Fig. 6-20 Suspension devices for various suspended loads

6.6 Securing of floor or ceiling cutouts

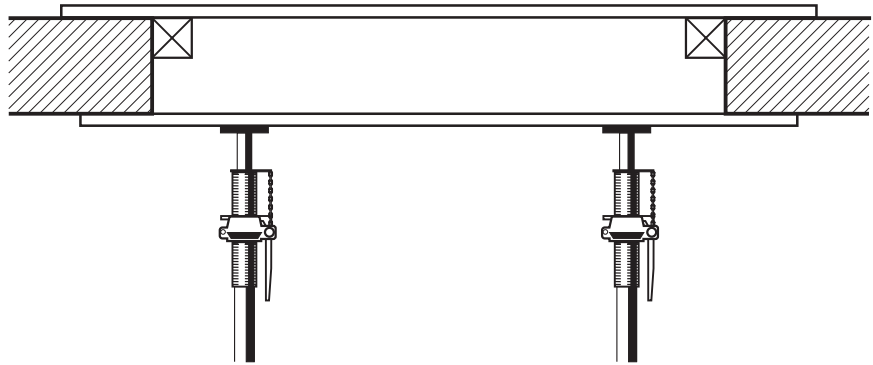


Fig. 6-21 Covering of floor or ceiling cutouts

6.6.1 Securing of large floor or ceiling cutouts

If a floor or ceiling cutout cannot be secured as shown in Figure 6-22, then it is essential that it is secured as follows.

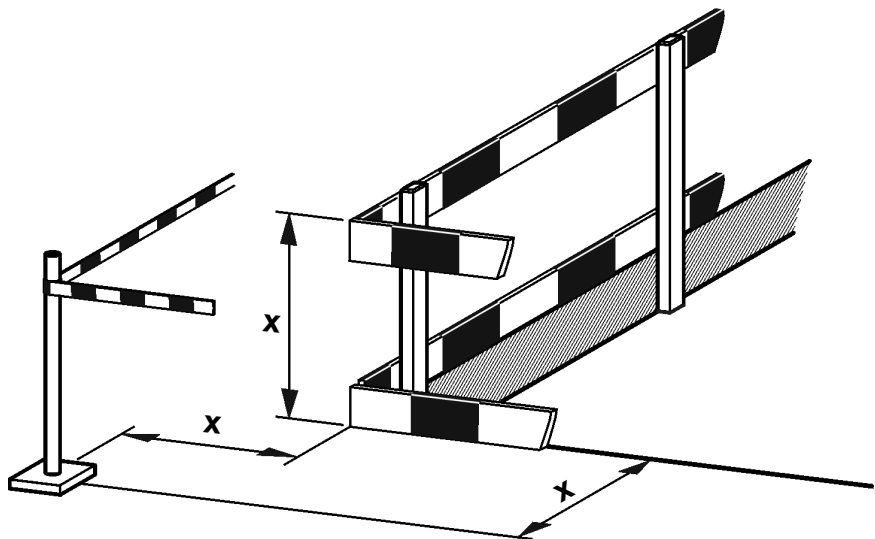


Fig. 6-22 Possibilities for barriers at hard edges

x Dimension in accordance with local regulations

6.6.2 Disposal of sawing sludge

The sawing sludge contains all the cut materials. Some of these are harmful to the environment. Therefore the sawing sludge must be collected in suitable containers and disposed of according to the local and national regulations.

6.7 Troubleshooting

Proceed systematically when looking for the causes of a fault. Refer to the Operating Instructions of the corresponding system components when doing this.

The following table will help you to narrow down and rectify the source of the fault.

6.7.1 General Malfunctions

Malfunction	Possible cause	Solution
Saw head does not move or only moves jerkily on the guide rail	Carriage guide or guide rollers tightened too hard	Loosen carriage guide slightly so that the carriage (without sawing) starts to move at 20 bar.
	Rail tothing soiled	Clean rail
	Prisms worn	Exchange prisms
	Keyway of rail warped	Replace rail
	Misaligned rail joint	Use rail lock
	Wrong or defective feed motor	see Operating Instructions
	Defective feed gears	see Operating Instructions
	Hoses incorrectly coupled	see Operating Instructions
	Defective drive unit	see Operating Instructions
Swivel arm does not move or only moves jerkily	Wrong or defective feed motor	Exchange motor
	Defective swivel gears	Change swivel gears, contact TYROLIT Hydrostress after-sales service
	Hoses / cables incorrectly connected	see Operating Instructions
	Defective drive assembly	see Operating Instructions
Saw blade does not rotate when main circuit is switched on	Saw blade jams	Lift saw blade from cut slightly
	Defective drive unit	see Operating Instructions
	Incorrectly connected	see Operating Instructions
	Defective drive belts or gears	see Operating Instructions

Malfunction	Possible cause	Solution
No water on saw blade	Water valve shut off	Open water valve.
	Water hose incorrectly connected	Couple water hose, locking ring must slide forwards
	Water pressure too low	Water pressure: min. 1 bar
	Water supply interrupted	Check the water supply
	Pipes frozen	Thaw pipes
	Defective seal between shaft and blade hub	see Operating Instructions
Sawing power is too low, despite correctly selected main motor	Defective main motor	see Operating Instructions
	Defective feed motor	see Operating Instructions
	Defective drive assembly	see Operating Instructions
	Incorrect saw blade	contact TYROLIT Hydrostress after-sales service
	Incorrect segments	Segments too hard, use softer segments
	Cutting untrue	Tension or pretension saw blade Contact TYROLIT Hydrostress after-sales service
	Cutting speed too high	In the case of hard aggregates or a lot of reinforcements, reduce the speed
	Saw blade polished	Sharpen saw blade with sharpening block
Jamming	Tool is jammed	Release tool and start up again

6.7.2 Faults on hydraulic versions

Fault	Possible cause	Solution
Main pressure fluctuates wildly	Speed too low	Mount correct main motor according to motor table
	Main motor worn out	see Operating Instructions
	Defective drive unit	see Operating Instructions
	Wrong or defective feed motor	see Operating Instructions
Saw motor heavily fouled by oil	Defective saw motor shaft sealing ring	see Operating Instructions
	Wrong leakage oil connection for size 3 motor	see Operating Instructions
	Leaky seals, lines or couplings (FD)	Change seal, lines or couplings, contact TYROLIT Hydrostress after-sales service
Coupling leaks	Defective seal	Replace seal
	Coupling defective	Replace coupling
The hydraulic oil is turbid and light and the tank overflows	Oil cooler defective	Contact TYROLIT Hydrostress after-sales service Warning: Do not continue operating the unit otherwise the hydraulic elements could be damaged
No power although electric motor is running and valves are open	The direction of rotation of the electric motor is wrong, the rotary field monitoring relay is defective	Replace the rotary field monitoring relay
	Pump defective	Replace the pump
No pressure build-up in feed circuit	Potentiometer defective	Replace potentiometer
	Proportional valve amplifier defective	Contact TYROLIT Hydrostress after-sales service
The drive unit does not run although the mains cable is connected.	No voltage on drive unit since: <ul style="list-style-type: none"> • Automatic circuit breaker in electric controller has tripped • Defective mains lead • No voltage present at the power supply to the building site • Phases of the power supply at the building site are incorrectly connected 	<ul style="list-style-type: none"> • Wait until the automatic circuit breaker has cooled down • Replace mains cable • Check the power supply at the building site • Turn the forward/reverse switch to the other direction
The electric motor buzzes after switch-on but delivers no power	Motor only runs with 2 instead of 3 phases	<ul style="list-style-type: none"> • Check fuses on the power supply • Inform an electrician
Power unit starts and then switches off again	Power supply fuse at the building site triggers	<ul style="list-style-type: none"> • Protection too weak • Use another power supply

Fault	Possible cause	Solution
The drive unit stops suddenly	Power supply interruption, protective motor switch has triggered because of: <ul style="list-style-type: none"> • Undervoltage in the power supply • Overvoltage in the power supply • Cross section of the power cable is too small • Defective plug connections • Winding thermostat triggers since electric motor heated up too much 	Check power supply <ul style="list-style-type: none"> • Check power supply • Check power supply • Use a mains cable with the correct cross-section • Check plug connections, replace if necessary • Check water circuit, check power circuit.
Electric motor does not run	Remote controller contact element	<ul style="list-style-type: none"> • Use the continuity tester • Replace contact element
	Remote control cable	<ul style="list-style-type: none"> • Use the continuity tester • Replace cable
	Thermal protection has triggered	<ul style="list-style-type: none"> • Allow the motor to cool down, • Check water feed
	Emergency Stop pushbutton pressed or relay defective	<ul style="list-style-type: none"> • Deactivate Emergency Stop pushbutton • If relay defective: Contact TYROLIT Hydrostress after-sales service
Remote controller does not function	Transformer fuse defective	<ul style="list-style-type: none"> • Replace fuse in the remote controller
	Cable defective	<ul style="list-style-type: none"> • Use the continuity tester • Replace cable
Pulse buttons do not function (plunge-cutting)	Remote controller contact element defective	<ul style="list-style-type: none"> • Use continuity tester • Replace contact element
Selection switch does not function	Remote controller contact element defective	<ul style="list-style-type: none"> • Use the continuity tester • Replace contact element

6.7.3 Faults on electric versions

Fault	Possible cause	Solution
Emergency Stop	If danger over: Release Emergency Stop pushbutton by turning, and restart	Release Emergency Stop by turning it
Emergency Stop cannot be reset by releasing the Emergency Stop pushbutton	Loose cable in the control unit	See circuit diagram
The control unit is defective, reacts in an "unusual way", e.g.: <ul style="list-style-type: none"> When feed is switched on saw motor is running Display shows unidentifiable characters Saw motor is running as soon as main switch is switched on 	Control unit was connected to over-voltage	Return control unit to TYROLIT Hydrostress after-sales service for inspection to prevent further damage.
Overheating	Electric motor overheats Allow to cool down and restart	Reduce power (see "Power reduction" in the Operating Instructions)
		Check the water flow
Overload when idling shortly after motor is switched on	Higher power consumption due to overvoltage when just idling.	On 60 Hz motors the theoretical current (current 1, 2, 3, 4) can be set up to 20% higher without danger.
Phase missing	A phase is missing Check mains	Check line
"Phase missing", although a check of the mains shows that all three phases are present.	Loose cable on main switch in the controller.	see Operating Instructions
	Defective fine-wire fuse	see Operating Instructions
Wrong phase	Direction of rotation is wrong Swap phases on plug or at mains	see Operating Instructions
Overload	Saw motor overloaded, Allow time to cool and restart	Check water cooling of saw motor
Undervoltage	minimum permitted: 340 V measured value: 339 V Check mains voltage	Make sure that the power supply displays the voltage set in the control unit.
Overvoltage	maximum permitted: 440 V measured value: 441 V Check mains voltage	Make sure that the power supply displays the voltage set in the control unit.
Frequency converter not ready	Mains voltage is not available	Check mains voltage on all 3 phases (Reference value: 3 x 400 V / 50 Hz)
	Fuse defective	Replace fuses

Fault	Possible cause	Solution
Temperature too high	Water circulation not available or inadequate, temperature of cooling water too high	Ensure that the cooling water circuit is in order. (min. 5 litres/min. at max. 25 °C)
Current fault	High motor peak consumption	Confirm with OK and restart
	Short-circuit or earth fault on the saw motor connecting cable	Replace saw motor connecting cable
	Fault between turns of the saw motor winding	Replace saw motor
Frequency converter fault	Fault in frequency converter triggers a group interrupt	Confirm with OK and restart
	Voltage in frequency converter too low	Send control unit to TYROLIT Hydrostress after-sales service
Frequency converter fault (spinning tool)	Power feedback in braking operation too high	Confirm with OK and restart
Mains frequency	Frequency does not correspond with the parameter in the setup	see Operating Instructions
Electric motor runs, but saw blade does not accelerate	Defective centrifugal clutch	see Operating Instructions
	Defective toothed belt	see Operating Instructions
Electric motor does not start	Cable for the remote controller is faulty	Replace cable
	Defective contactor	Replace contactor
	A contact element on the remote controller is defective	See remote controller diagnostics
Machine has very low power	High power consumption (apparent current) due to overvoltage The controller, however, tries to reach the theoretical current and sets the servo at zero.	On 60 Hz motors the theoretical current (current 1, 2, 3, 4) can be set up to 20% higher without danger. On 50 Hz motors there is barely any room for manoeuvre. Here the overvoltage should, for example, be reduced by long lines.
Jamming, although the tool is not jammed	Overvoltage	see Operating Instructions
	Permitted maximum current already exceed when idling for 3 seconds due to strong undervoltage.	see Operating Instructions
Saw motor	Electric motor does not run or overload protection has tripped. Switch on or wait.	see Operating Instructions
An error is shown on the display	See corresponding description on the display	Perform changes shown, acknowledge, switch off control unit and start up again.

Fault	Possible cause	Solution
The display foil has been damaged	Various causes, including use of force	Return control unit to TYROLIT Hydrostress after-sales service for inspection or repair to prevent further damage.
Wrong code	This function is only accessible to authorised users.	Enter the correct code before you take action in the change menu.
Display remains dark	There is no voltage at the power supply	Check power supply
	Fuses defective, due to moisture penetrating the remote controller.	Dry remote controller, replace fuses
	One or more phases missing	Check all 3 phases to see if voltage is present
	Faulty electronics	Change interface card or ribbon cable
Display is illegible, flickers or displays unrecognisable characters	Display is faulty	Change display assembly
	Electronics will not operate correctly So-called watchdog monitoring	Change display assembly
Display is present No response from the drive motor and the servomotors	Incorrect earthing	Check control unit earthing
	Computer fault	Reinitialise controller
A feed motor is not working Display shows complete feed bar as black.	Motor or control unit defective	If the other motor is not running either, the control unit is defective. Send control unit to TYROLIT Hydrostress after-sales service for inspection
Feed motor	Feed motor not inserted	see Operating Instructions
	Feed motor or cable disconnected	see Operating Instructions
	Emergency Stop operated	see Operating Instructions
	"Wall saw" mode although only one feed is being used	see Operating Instructions
Feed motor does not operate Display shows feed bars.	Defective feed motor	Swap the feed motor connections to check if it is the feed motor or the control unit that is faulty. If the motor does not exhibit any defect, a voltage and current test must be performed on the control unit.
Feed motor does not operate Nothing showing on the display	Defective remote controller cable or a contact element on the remote controller is defective	see Operating Instructions
	Contact element on the remote controller is defective	Replace contact element
	Relay on interface card defective	Replace relay

Fault	Possible cause	Solution
Feed motor runs in only one direction	Defective remote controller cable or a contact element on the remote controller is defective	see Operating Instructions
	Servo amplifier defective	Replace servo amplifier
	Relay on interface card defective	Replace interface card
Feed motor has less power than normal	Basic setting on the servo amplifier has moved	Perform a check on the output voltage and the current
		Voltage test on the feed cable of the control unit.
		see Operating Instructions

If you are unable to remedy a fault, please call our service centre (see Manufacturer's address ☐-II on the reverse of the title page).

To guarantee a rapid and professional solution to the problem, it is important that you have prepared as follows before calling:

- Try to describe the fault as accurately as possible
- Note the type and index of your system components.
- Have the Operating Instructions close to hand

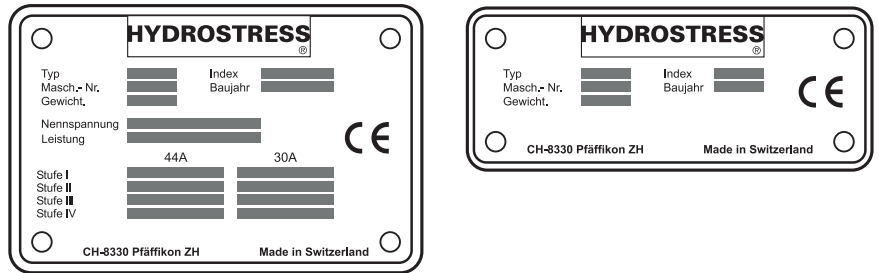


Fig. 6-23 Name plate

7 Maintenance

7.1 General

7.1.1 Safety instructions

Before proceeding read Chapter 2 “Safety instructions”, 2-1 in this Safety Manual. Be sure also to take note of all the danger information given here and follow the instructions on how to avoid physical injury and damage to property.



Warning

Danger from sharp cutting tool edges

Touching a cutting tool whilst it is still in motion is prohibited.

When touching cutting tools at a standstill it is recommended that protective gloves are worn.

Failure to adhere to this regulation may result in cut wounds to the hands.



Warning

Danger of allergic reactions if skin comes into contact with hydraulic oil.

Persons who have an allergic reaction to hydraulic oil must wear protective gloves and goggles when carrying out work where they come into contact with hydraulic oil. Any areas of the skin affected must be rinsed immediately with copious amounts of water.

Failure to adhere to this regulation may result in allergic reactions or injuries to the eyes.

7.1.2 Personnel qualifications

The Wall saw systems should not be operated by unauthorised persons. Personnel are only authorised where they meet the following requirements:

- have successfully completed, and hold a certificate from, user training at **TYROLIT Hydrostress AG** or corresponding technical courses at regional professional associations and federations.
- the safety instructions in Chapter 2 must have been read and understood.
- are familiar with all the general rules of architecture

7.2 Maintenance interval table

The following maintenance work must be performed according to the specified cycles. Wear parts that are not subject to particular maintenance intervals should also be checked regularly for wear and adjusted or exchanged as necessary. For combustion motors the maintenance activities must be performed according to the separate maintenance instructions of the motor manufacturer.

		Before each start-up	Upon completion of work	Weekly	Annually	In the event of malfunction	In the event of damage
Overall system	Visual check	X				X	X
	Clean		X				
Hydraulic system For drive assemblies see Operating Instructions	Hydraulic hose inspection (tightness / cleanliness)	X	X			X	X
	Coupling inspection (tightness / cleanliness)	X	X			X	X
Water economy	Water line (tightness/ cleanliness)	X	X			X	X
	Blow out water (frost hazard)		X				
Water nozzles and feed hoses / cable For control unit see Operating Instructions	Clean		X				
	Inspection	X					
Cutting tool (saw blade / diamond chain)	Inspection	X				X	
	Change						X
Accessible nuts and bolts	Retighten			X			
Flanges and blade seat	Clean		X				
	Change						X
Toothed belt / Toothed wheels (oil)	Inspection	X		X		X	X
	Change				X		X
Major service	Performed by TYROLIT Hydrostress after-sales service				X		

7.3 Inspection

Inspection activities are understood to be the work involved in checking wear parts, in order to exchange these where they show unacceptable levels of wear before they are able to cause a defect and a costly system failure.

Inspection activities are described in the Operating Instructions of the individual machines.

7.4 Maintenance

Maintenance activities are understood to be the maintenance work that must be performed in order to be able to guarantee trouble-free operation of the system. These activities usually consist of: cleaning, oiling, greasing, tool sharpening, etc.

Maintenance activities are described in the Operating Instructions of the individual machines.

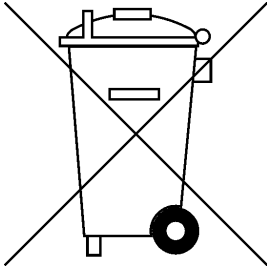
7.5 Servicing

Servicing activities are understood to be independently performed repair work. These may be a result of inspection if unacceptable levels of wear are detected in wear parts, or if defects arise.

Servicing activities are described in the Operating Instructions of the individual machines.

8 Disposal

8.1 General



The operator can recycle or dispose of the Wall saw system himself provided he observes the statutory provisions. In order to dismantle the Wall saw system correctly and to properly remove the materials some knowledge in the area of mechanics and knowledge about differentiation of waste materials is necessary.

If during correct disposal doubts arise that represent a hazard for persons or the environment,

- the after-sales service of **TYROLIT Hydrostress AG** will be happy to provide information

8.2 Safety instructions

Before proceeding read Chapter 2 “Safety instructions”, 2-1 in this Safety Manual. Be sure also to take note of all the danger information given here and follow the instructions on how to avoid physical injury and damage to property.



Danger

Voltage warning

Before working in an area identified in this way, the installation or device must be fully disconnected from the power (voltage) and secured against being accidentally powered up again.

Failure to heed this warning may lead to death or serious injury.

8.3 Personnel qualifications

Only personnel with basic technical training and who are in a position to identify the various material groups should be involved in disposal.

8.4 Disposal regulations

The normal local and regional rules and guidelines must be observed when disposing of the machines making up the Wall saw systems.

8.5 Disposal of installation components

8.5.1 Disposal regulations

The normal local and regional rules and guidelines must be observed during disposal.

8.5.2 Disposing of installation components

To allow proper disposal the components must be dismantled. This is performed by the client's personnel.



Warning

Danger of injury from electric shock

Capacitors can still discharge in part of an installation even once all voltage supplies have been disconnected.

The dismantled parts of the installation are sorted by material and sent separately to the appropriate collection points. Ensure that the following parts in particular are properly disposed of.

The Wall saw system consists of the following materials:

Cast aluminium	Rolled aluminium products
Bronze	Steel
Rubber	Rubber / Nylon fabric
Synthetic grease	Plexiglas

8.6 Obligation of notification

When a Wall saw system is taken out of service and disposed of the manufacturer **TYROLIT Hydrostress AG** or the corresponding service centre must be informed of this.