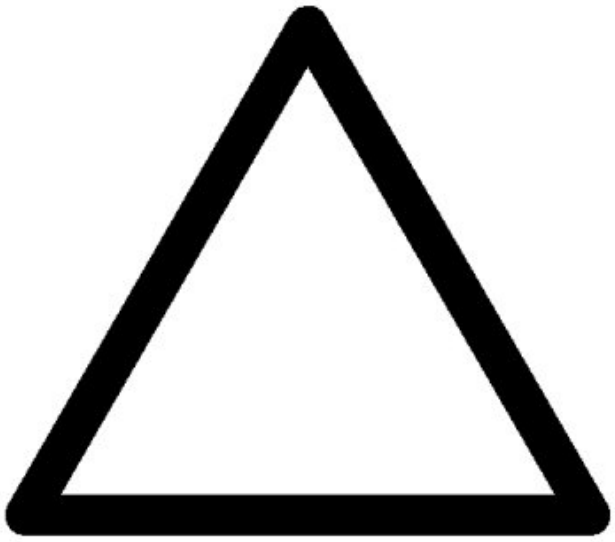
Epiroc

Safety



PM No. 9852 2466 01d

Epiroc

SAFETY INSTRUCTIONS

- **Before starting, read all instructions carefully.**
- **Special attention must be paid to information alongside this symbol.**

- **Only use genuine Epiroc parts.**

Epiroc Stonetec S.r.l.
12031 Bagnolo Piemonte (CN), Italy

Safety

1. Foreword

Rig documentation

The complete rig documentation consists of:

- a manual for the rig
- instructions for different components
- a spare parts catalogue for the rig
- spare parts lists for different components
- diagrams

2. Table of contents

Contents, Target Group and Objective

The Safety section contains safety-related information intended to be used by every- one operating the rig and its peripheral equipment.

The objective of the safety chapter is to prevent accidents by providing information on the safety aspects concerning the rig and its peripheral equipment.

3. Safety regulations

General Safety Regulations

- Read all instructions and follow them.
- Special attention must be paid to the Safety section and all the warnings in the manual.
- Only personnel trained for the equipment are permitted to use it.
- It is essential that personnel observe general and local safety, health and traffic regulations.
- The equipment may only be used for the purpose described in these instructions. •

Locate the fire extinguisher(s) and ensure they are filled.

- Always use a helmet, hearing protection and protective safety glasses during tramming, drilling and other work on the rig. Observe local safety regulations.
- Always check the safety equipment and emergency stop after moving the rig and also before the start of each shift.
- Engine exhaust gases are toxic. Good ventilation is essential when the engine is running.
- Switch off the engine before refueling. Do not handle flammable liquids near hot surfaces, sparks or a naked flame.
- The drill rig must only be used, maintained and repaired by personnel well conversant with the equipment and the dangers involved.
- Never carry out service or maintenance work while the drill rig is running.
- Checks and adjustments that need to be made while the rig is running must be performed by the two people. One person must then be in the operating position and have a good overview of the work being carried out and be able to reach an emergency stop easily.
- Only step on designated areas when servicing the drill rig. Never stand on open service hatches.
- Ensure that pneumatic, water and hydraulic systems are depressurised before starting any maintenance work on the system.
- To prevent injury during service and maintenance work, components that could move or fall down must be securely supported or strapped in place.
- Do not use any equipment if a fault is indicated by the system, call for service personnel.
- Observe the drill rig warning signals whenever you are in the vicinity of the drill rig.
- Before starting to use the drill, make sure there is nobody inside the risk area of the drill rig, that the drill rig has been maintained in accordance with the maintenance schedule in force, that all control levers, emergency stops and fire extin-

guishers are working satisfactorily, that warning signs and safety labels are in place, clean and fully legible. Report any damage and defects immediately. Do not operate the system before all the faults have been rectified.

- All work performed with the drill rig involves impact on the surrounding environment, e.g. in the form of vibrations and landslide. Work must always be carried out with great caution and in accordance with safety regulations in force.
- When replacing hydraulic hoses, make sure the new ones are fitted with crimped couplings, are in the right quality category and are the correct dimension.
- When handling drill bits and drill steel on the rig the rotation must be off. Rock drill rotation must not be used during manual handling of bits and rods.
- All hatches must be closed during operation so that they do not disrupt the flow of cooling air or reduce noise suppression. A hatch may only be kept open for a short period of time, e.g. for inspection or adjustment.

Intended Use

The drill rig is only designed for drilling, e.g. in stone quarries and construction sites. All other use shall be considered as undesignated and forbidden.

Examples of undesignated and forbidden use:

- Lifting and transporting goods
- Lifting and transporting people
- Supporting objects
- Cleaning stopes and drill locations using the feeder
- Using the boom to help the drill rig climb inclines

The manufacturer is not responsible for damage caused thereby and warns against incorrect use. Correct use also involves following the operation, service and maintenance instructions prescribed by the manufacturer.

Guarantee

- Use only Epiroc original parts. Any damage or operational interruptions caused by using spare parts of other manufacture than Epiroc will not be covered by warranty or product liability.
- Epiroc renounces any responsibility for damage caused by unauthorised modification to the rig and its equipment.
- Overloading of the rig could result in damage to the machinery which is not noticed during normal usage. Such damage is not covered by guarantee.
- The manufacturer is not liable for damage caused by inappropriate use.

- Damage that occurs as a result of substandard repairs, as well as injury to personnel or damage to equipment that is attributable to older unrepaired damage, is not covered by the guarantee.

Warnings

Description

The manual contains warnings. The warnings are framed and contain a safety text preceded by a warning symbol and a cue word (danger, warning and caution).

Figure: Warning symbol

Heading

- The Danger heading indicates an imminent risk of serious or lethal injury if the warning is not heeded.
- The Warning heading indicates a risk or dangerous course of action that can lead to serious or lethal injury if the warning is not heeded.
- The Caution heading indicates a risk or dangerous course of action that can lead to personal injury or damage to property if the warning is not heeded.

4. Risk area of the rig

Description

The risk area of the rig is a zone within or around the rig where a person is exposed to risk of injury and health hazards.

The following points must be observed for the risk area of the factory delivered rig to apply:

- good ventilation must be provided while the diesel engine is running.
- hearing protection, protective safety glasses and helmet must be used in the vicinity of the rig when the rig is operating.

Risk Area

Repositioning

Note

Observe the following when moving the drill rig:

- *Make sure nobody is in front of the drill rig's direction of travel*
- *Make sure nobody is within the risk area of the drill rig*

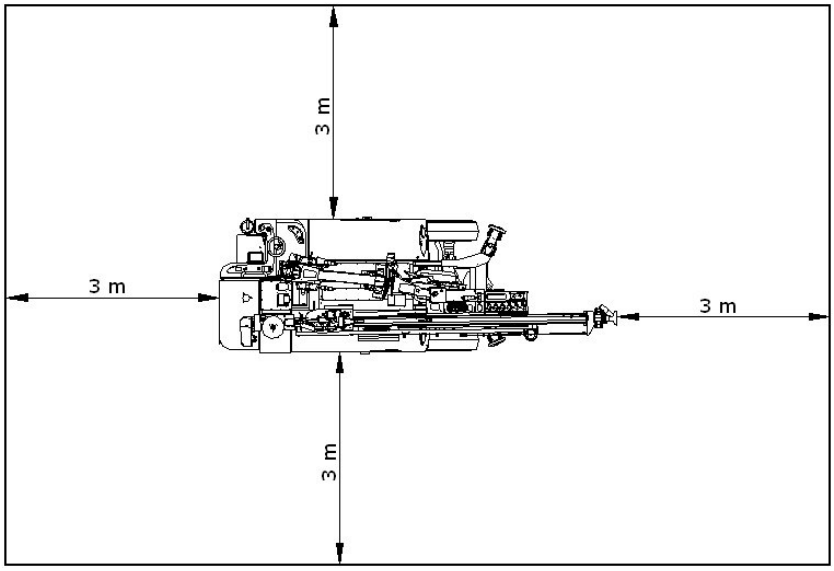


Figure: Risk area while tramming

Floor drilling

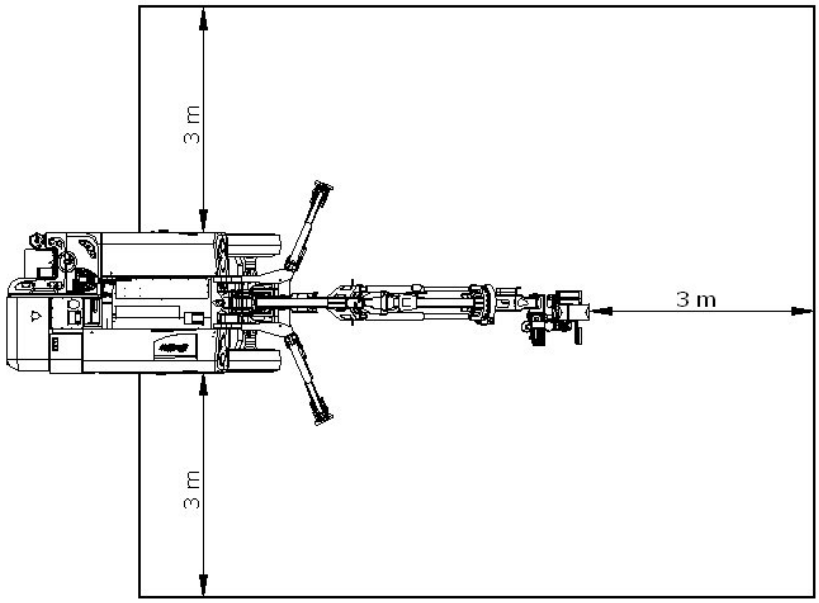


Figure: Risk area while floor drilling

Bottom-hole drilling

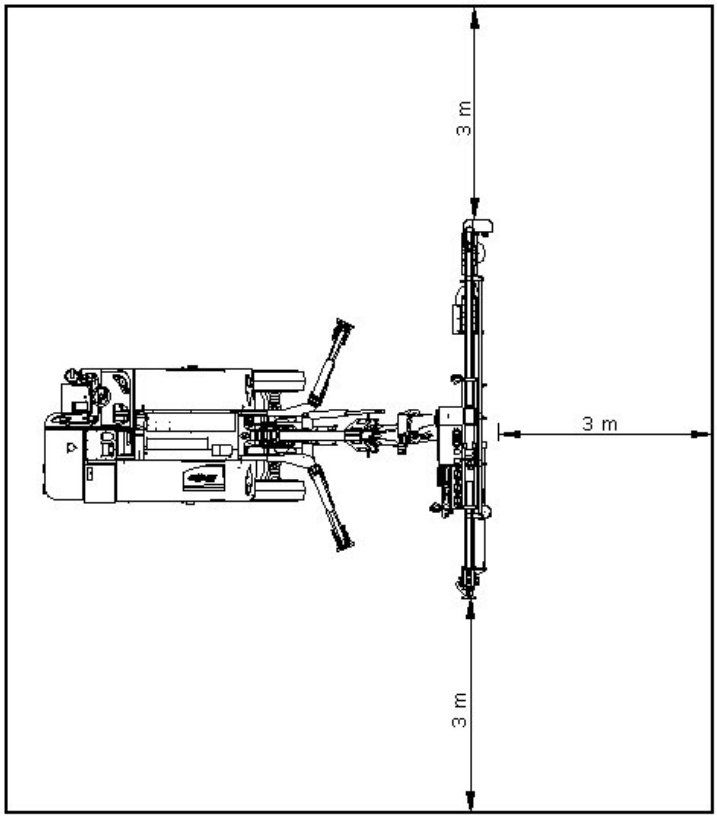


Figure: Risk area during bottom-hole drilling

Working in the risk area of the rig

Description

Fault finding or working in the rig's risk area involves risk. Accordingly, always carry out the fault finding or the work with great care and accuracy. For further safety regulations, *see Safety, Safety regulations.*

Note

Pay attention to the rig's warning signals when you are in the vicinity of the rig, see Safety, Warning signals.

Special Procedures

Exercise extra caution and accuracy when diagnosis or work is to be performed at the same time as one or more of the following points are applicable:

- the diesel is engine started
- the hydraulic pumps are running
- the hydraulic system is pressurised
- the pneumatic system is pressurised

Special measures must be taken in cases where one or more of the above criteria must be fulfilled in order to conduct troubleshooting or complete a certain task:

- The work must be carried out by at least two people, one of which must be at the operating station and have a good view of the work.

5. Emergency stop

Function

In the event of a hose fracture, accident or other emergency situation the diesel engine, and thus the hydraulic pumps, can be stopped immediately by pressing one of the drill rig's emergency stops.

Emergency stop location

Drill rig.

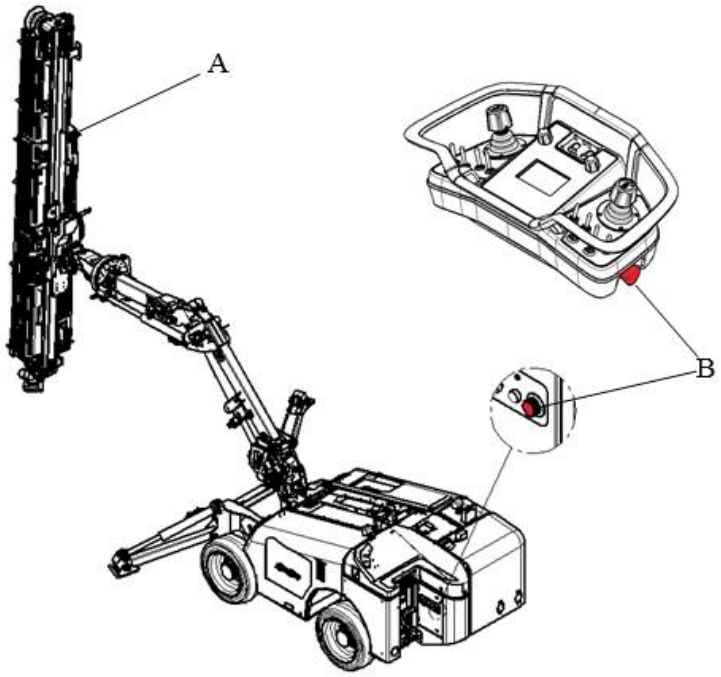


Figure: Emergency stop location

A	Emergency stop cable or safety cover
B	Emergency stop button

6. Residual Risks

Residual Risks

It is necessary to pay attention to the following residual risks that are present when using the machine and must not be eliminated.

	Only properly trained and informed personnel must use the machine. Please carefully read all the manuals provided. Risk of injury to personnel and equipment in case non-informed personnel use the machine. Risk of confusing commands and symbols on the controls.
	**WARNING: HYDRAULIC OIL** Risk of coming into contact with hydraulic oil in maintenance situations. Always wear PPE. Attached to this manual, the safety data sheet of the oil, which must be kept attached to it at all times.
	**WARNING: NOT SHIELDED HYDRAULIC HOSES**. Some pressure hydraulic hoses are not shielded. Observe the safety distances from the machine.
 	**CAUTION: RISK OF INHALATION OF DUST** Drilling operations produce a lot of dust, for the most part sucked by the dust suction system. And it is the responsibility of the employer to ensure that the filters are replaced with the required frequency and that operators' work with the DCT on, continuously and efficiently. We recommend the use of the mask when performing maintenance on the filters. We recommend the use of a sac for the collection of dust resulting from the DCT.
	**WARNING: LOW LIGHT** During drilling operations and maintenance ensure that there is proper lighting. During maintenance operations use a portable lamp. It is prohibited to use.
	**CAUTION: RISK OF LOSS OF LOAD.** When lifting accessories the machine must be handled scrupulously following the instructions given in the manual of the machine.
	**CAUTION:** Care must be taken in the case of works being performed in two phases during maintenance or during processing. Both operators must be trained, have read the manuals and someone from the post must help but also supervise the work of the partner.

	**CAUTION: RISK OF FALLING FROM THE MAINTENANCE POSITION.** During maintenance operations on the rear platform there is risk of falling from the machine. Pay attention: the rear platform can't be used during tramming, can be used only for maintenance. The machine producer declines all responsibilities of injuries deriving by a wrong use of the platform.
	**CAUTION: RISK OF BEING CAUGHT BY SHAFT OF ROTATION.** Pay attention to the shaft of rotation during all drilling operations, change of shaft and maintenance on the drill point. Observe during drilling operations the safety distance from the column. Never eliminate the emergency rope on the side of the drill.
	**CAUTION: RISK OF TIPPING OF THE MACHINE** Make sure that the ground on which the machine is settled is not unstable but can withstand the stresses imposed by the machine in work operations. The pressure of the stabilizers on the ground must not exceed 0.5 MPa. In that case check the stability of the ground and add tabilizers below with 500x500mm plates of at least 10mm thick. Adhere to the inclination angles allowed imposed by the instruction manual.
	**CAUTION: RISK OF COLLAPSES AND JETS IN THE ROCK DRILLING.** Always check the wall of rock on which it must act in the case of horizontal drilling. Wear a helmet and follow the instructions related to the safety zone.
	**CAUTION: RISK OF IMPACT AGAINST THE SURFACE, PROJECTIONS AND CORNERS OF THE MACHINE.** Always use personal protective equipment. The risk is also present at the change of shaft.
	**CAUTION:** During operation and maintenance do not manually lift weights over 25 kg or 15 kg if difficult to grasp and handle.
	**CAUTION:** The machine is controlled remotely. Always check carefully before you move the machine that no one is nearby. Never lie under the car when it is moved on slopes. Danger of tipping over and crushing.

	**CAUTION: RISK OF BEING HIT OR CRUSHED BY THE ARM AND THE COLUMN ON THE MOVE.** During drilling operations and moving the boom pay particular attention to their position and the risk of being hit or crushed. Adhere strictly to the indications concerning the safety zone.
	**CAUTION: DANGER OF CRUSHING.** During the drilling operations in horizontal never lie between the machine and rock: Always observe safety distances.
	**CAUTION: RISK DURING MAINTENANCE TO BECOME ENTANGLED WITH TRANSMISSION DRIVE.** Follow the instructions in the safety and maintenance manual. The shutter of the engine compartment must be kept closed during handling and drilling. Only experienced personnel are authorized to perform maintenance on the engine while running. When doing maintenance secure the machine and take out the key from the ignition. In the case of maintenance with the engine running enclose the area, provide some signs that signal maintenance operations, and keep at hand the remote control and pay attention to rotating parts.
	**CAUTION**: **RISK OF CRUSHING AND STAY CAUGHT WHILE HORIZONTAL DRILLING.** Such drilling requires special attention.
	**CAUTION: BATTERIES.** Risk of explosion of the batteries, keep away from open flames and sparks.
	**CAUTION: EXPLOSION HAZARD.** The machine is not designed to work in ATEX environment. It could cause electrostatic discharges or sparks during drilling operations. Do not use the machine in a potentially explosive atmosphere.
	**CAUTION: RISK OF BURNS.** It is mandatory to use gloves especially in the maintenance phase, but also during manoeuvres. Some surfaces could be extremely hot.

	**CAUTION: FIRE HAZARD.** In the case where there are losses of oil that could end on the motor and produce a fire. Read carefully the instructions on how to use the fire extinguisher. In the event that there are oil leaks in the hydraulic system, stop the machine and, if necessary, call for service.
	**OBLIGATION TO USE EARPIECES.** The noise level of the machine is 128 dB (A). There is risk of serious and irreversible hearing problems. It is required to use earpieces.
	**CAUTION: PRESENCE OF EXHAUST GAS**. The machine must be used only in situations of good ventilation.
	**CAUTION:** In the case drilling operations are interrupted by weather, raise the stabilizers and, if possible, put the machine away. There is a danger that the machine can be struck by lightning.
	**CAUTION:** Do not use ladders or stools during maintenance operations. Even the highest points of the column can be achieved by placing the column horizontally. In the case where it is necessary to use a ladder two persons must work together so that one person can hold the ladder while the other climbs up.
	**CAUTION: POOR VISIBILITY**. There is a risk in driving situations, to hit someone because of the lack of visibility. If in the manoeuvring area people may be around, the operator must announce its manoeuvres with the acoustic signalling using the switchgear, panel work and radio control.
	**CAUTION: PROTRUSION OF ELEMENTS.** When manoeuvring the arm must be retracted and the column in position to manoeuvre. There is risk of rolling over and colliding with protruding of obstacles.
	**CAUTION:** During maintenance of the hydraulic system, pneumatic and motor only qualified personnel must perform this task.
	**CAUTION:** The maintenance on the hydraulic system must not be done in the quarry but in a dust and contaminants free area. Collect the oil in a container and do not release it to the environment but deliver it for disposal in specialized centres where most of it can be recycled.
	**CAUTION:** Do not raise the column or the boom or operate the rig in the vicinity of electrical power lines. Operating too close or contacting a power line with any part of a drill rig can result in electrocution. Contacting power lines with any part of your drill rig will cause death! Keep at least 10 feet (3 meters) away from power lines. If there appears any danger of wind or other obstruction closing the distance, do not drill in that area.

7. Fire-fighting

Fire Extinguishers

Description

The rig can be equipped with handheld fire extinguishers for fires of class ABC.

Note

If the fire extinguisher has been used, it must be replaced with a new one immediately.

Check regularly that the needle on the gauge is within the green zone and make sure that the fire extinguisher is replaced as soon as the needle approaches the red zone.

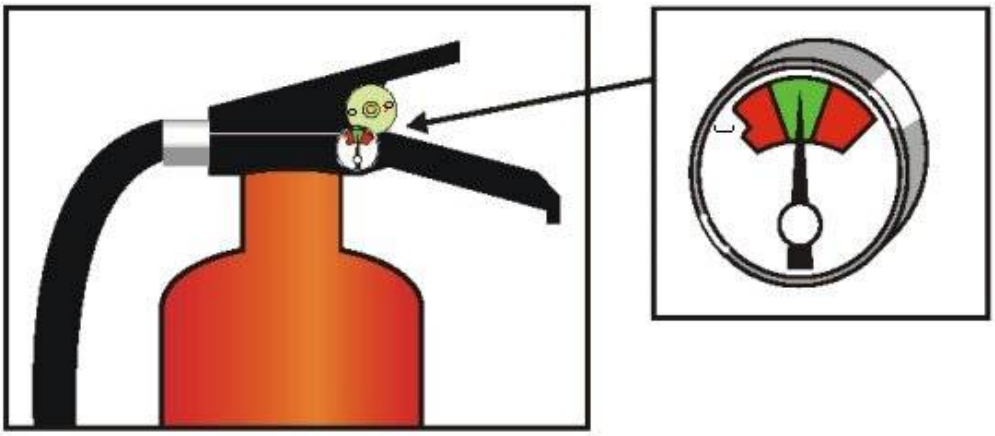


Figure: Fire extinguisher gauge

Location of Fire Extinguisher

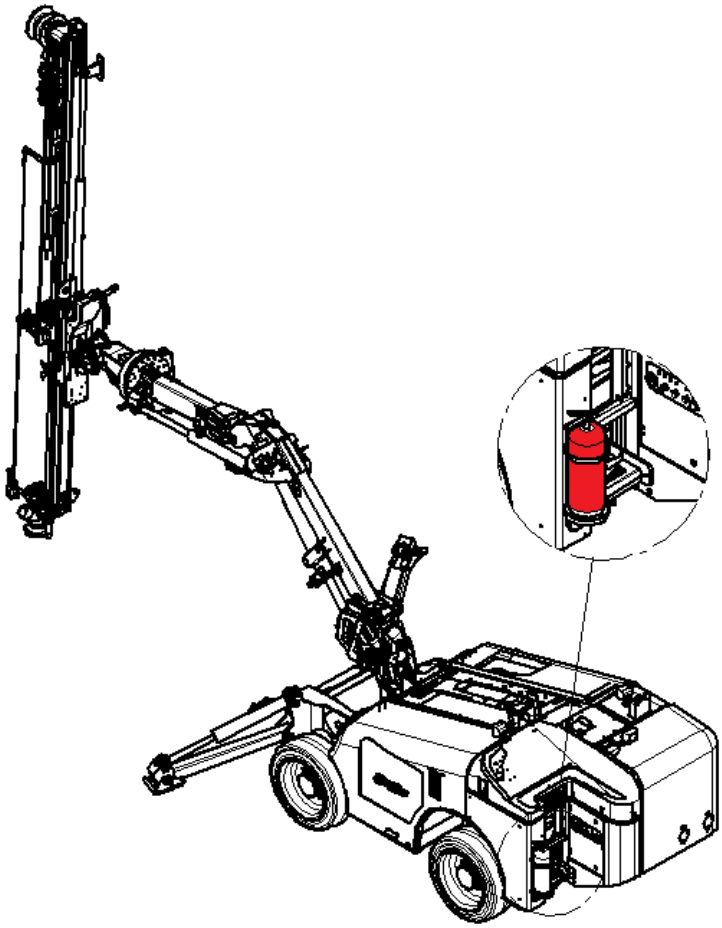


Figure: Location of Fire Extinguisher

The drill rig is equipped with a fire extinguisher (A-B-C powder).

The fire extinguisher is fitted vertically at the rear of the rig on the left-hand side.

Class A-B-C fires can be put out.

Note

In some countries the rig can be provided without fire extinguisher. When it is supplied the variant of the fire extinguisher depends on the different national regulations. It is therefore essential to follow the instructions on the fire extinguisher.

Note

The fire extinguishers supplied with the drill rig should be considered as "Delivery fire extinguishers". If the fire extinguishers are not approved by local stipulations, they must be replaced with locally approved ones.

In Case of Fire

Fire Extinguishers

Note

First of all, local regulations and legislation must be followed in case of fire.

1. Activate the emergency stop by depressing the button for the fastest method of stopping the rig.
2. Use a fire extinguisher to put out the fire, following the manufacturer's instructions.
3. Carry out the following points if possible without danger:

   a. Switch off the rig's battery switch. b. Cut

   off the rig's fuel supply.
4. Do not restart the rig until the cause of the fire has been established and any faults rectified.
5. After extinguishing the fire, replace used fire extinguishers with approved new ones.

8. Noise

The noise test on the machine has been done according to standard UNI EN 791 starting from standards ISO 3744, ISO 11201 and ISO 11203 (at 1 m distance, free field) and ISO 2631-1.
Test has not been done again for the new standard EN 16228 because we think that this standard doesn't change in a significant way regarding noise matter.
Noise power matches with the guaranteed noise power level foreseen by the standard 2000/14/CE related to machines and facilities used in open field.
Test measurement are attached below:

Sound power

Sound power level in dB(A) rel 1pW

Description	According to standard	Result [dB(A)]
High Idle 2500 rpm	ISO 3744:1994	117
Drilling	ISO 3744:1994	124.5
Guaranteed Sound power level, Drilling	2000/14/EC	128

Sound pressure average around rig 1m distance

Sound power level in dB(A) rel 20 µPa

Description	According to standard	Result [dB(A)]
High Idle 2500 rpm	ISO 11203	96 ± 6
Drilling	ISO 11203	104.5 ± 6

9. Signs

General

It is essential that all the rig signs are in the correct locations, are clean and are fully legible.

Prohibition Signs

Table: Prohibition Signs

Symbol	Description
	**Prohibition** sign • No admittance. • No admittance to unauthorised personnel. • Violation can cause personal injury.

Warning Signs

General warning signs

Table: General warning signs

Symbol	Description	Symbol	Description
	**Warning** sign • Danger of swinging and crushing parts. • Could cause severe injuries. • Keep out of the hazardous area during operation.		**Warning** sign • Risk of scalding • Can cause serious personal injury

Symbol	Description	Symbol	Description
	**Warning** sign • Risk of falling objects • Can cause serious personal injury.		**Warning** sign • High voltage • Incorrect handling can be fatal. • All work on the electrical system must be carried out by electricians accredited for the purpose.

Stability

Table: Warning sign, stability

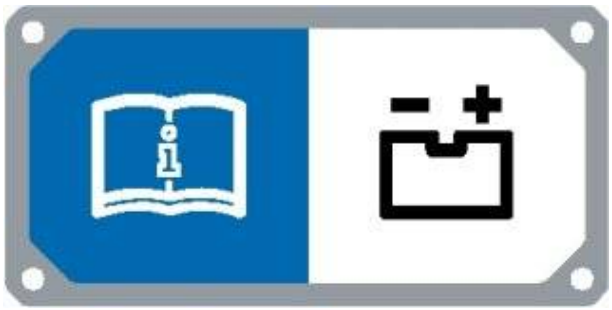
Symbol	Description
	**Warning** sign • Permitted tilt angles. • Read the instructions.

Regulatory Signs

General regulatory signs

Table: General regulatory signs

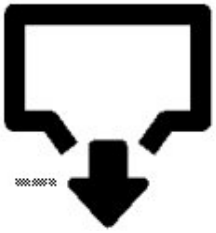
Symbol	Description	Symbol	Description
	**Regulatory** sign • Read the instructions. • Incorrect use of the machine may cause personal injury and damage to machinery. • Observe the indications given by the warning signs and follow the instructions given in order to avoid serious injuries.		**Regulatory** sign • Protective equipment • Use a helmet, protective safety glasses and hearing protection.

Symbol	Description
	**Regulatory** sign • Read the instructions. • This rig is equipped with a battery switch.

Information Signs

Table: Information Signs

Symbol	Description	Symbol	Description
	**Information** sign Fire Extinguishers		**Information** sign Main switch
	**Information** sign Fuel		**Information** sign Load securing
	**Information** sign Compressor		**Information** sign Air filter
	**Information** sign Hydraulic oil level		**Information** sign Hydraulic oil filter
	**Information** sign Hydraulic oil reservoir		**Information** sign Fuel filter

Symbol	Description	Symbol	Description
	**Information** sign Oil level, engine		**Information** sign Air filter, engine
	**Information** sign Coolant, engine		**Information** sign Coolant level, engine
	**Information** sign Draining		

ID plate

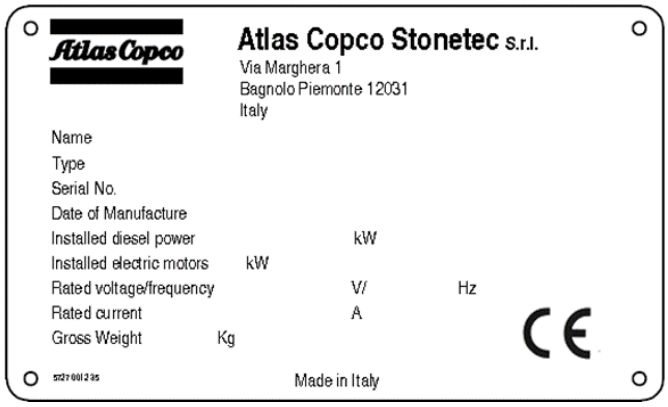


Figure: the drill rig's ID plate

The plate advises:

- Address
- Type of drill rig
- Serial number
- Installed power
- Total weight of drill rig
- CE marking
- Identity plates

10. Rig stability

Drill rig spirit level

CAUTION

- **The gradient meter shows the chassis frame angle and not the actual ground incline.**

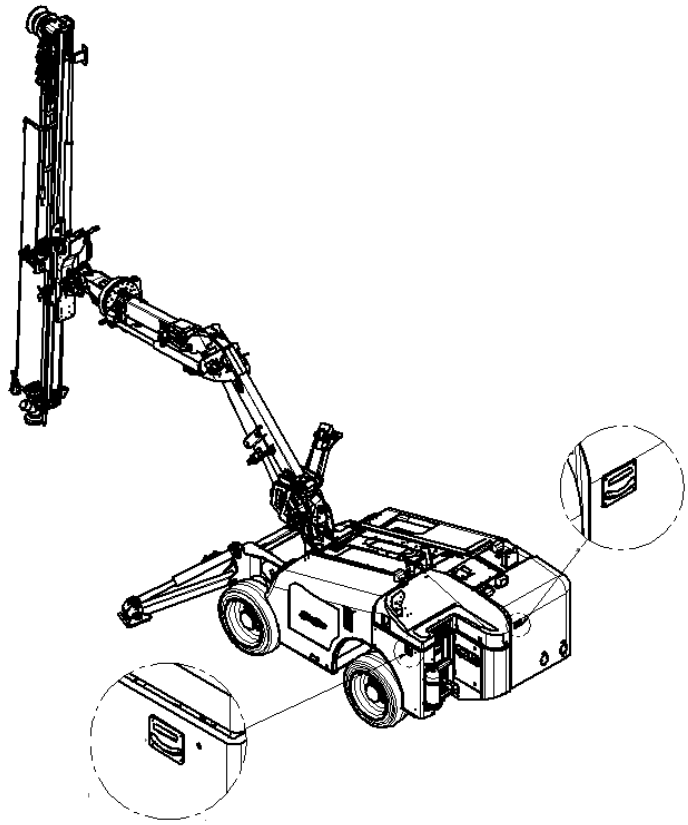


Figure: Location of drill rig spirit level

The drill rig spirit level indicates the angle at which the drill rig is standing. The drill rig can tip over if the specified tilt angles for the drill rig are exceeded. The tilt angles are described in the section on technical data.

11. Declaration

EC - Declaration of Conformity

Note
Only applies to rigs delivered within the EU.

Individual machine and safety components

We, Epiroc Rock Drills AB, Örebro, Sweden, declare that the machine to which this declaration relates is in conformity with demands specified in the Council of the European Union Directive of 22 June 1998 relating to harmonisation of the legisla- tion of the Member Countries concerning machinery (98/37/EEC).

Other applicable directives

- 73/23/EEC
- 89/336/EC
- 97/23/EC
- 2000/14/EC

Harmonised standards which have been applied

- EN 16228
- EN 60204-1
- EN ISO 12100-1,-2
- EN 280
- EN 418

Issuer

The issuer's signature, position, place and date of issuance will be found on the original.