

## Safety and operating instructions Handheld hydraulic rock drills





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## Introduction

Thank you for choosing a product from Atlas Copco. Since 1873, we have been committed to finding new and better ways of fulfilling our customers' needs. Through the years, we have developed innovative and ergonomic product designs that have helped customers improve and rationalize their daily work.

Atlas Copco has a strong global sales and service network, consisting of customer centers and distributors worldwide. Our experts are highly trained professionals with extensive product knowledge and application experience. In all corners of the world, we can offer product support and expertise to ensure that our customers can work at maximum efficiency at all times.

For more information please visit: [www.atlascopco.com](http://www.atlascopco.com)

Construction Tools EOOD

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## About the Safety and operating instructions

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

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

## Safety instructions

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

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

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

## Safety signal words

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

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

## Personal precautions and qualifications

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

### Personal protective equipment

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

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

### Drugs, alcohol or medication

#### ▲ **WARNING** Drugs, alcohol or medication

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

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

## Installation, precautions

#### ▲ **WARNING** Whipping hose

Hoses under pressure can whip uncontrollably if screws loosen or are loosened. A whipping hose can cause severe injuries. To reduce this risk:

- ▶ Depressurise the system before loosening the connection of a hose.
- ▶ Tighten the nuts on the connections of the hoses to required torque.
- ▶ Check that the hose and the connections are not damaged.
- ▶ Never carry the machine by the hoses.

#### ▲ **WARNING** Ejected insertion tool

If the tool retainer on the machine is not in a locked position, the inserted tool can be ejected with force, which can cause personal injury.

- ▶ Never start the machine while changing the insertion tool.
- ▶ Before changing the insertion tool or accessories, stop the machine, switch off the power supply and bleed the machine by activating the start and stop device.
- ▶ Never point the inserted tool at yourself or anyone else.
- ▶ Make sure that the insertion tool is fully inserted and the tool retainer is in a locked position before the machine is started.
- ▶ Check the locking function by pulling the inserted tool outwards forcefully.

**▲ WARNING Moving or slipping insertion tool**

An incorrect dimension of the inserted tool's shank can result in that the inserted tool is lost or is slipping out during operation. Risk of severe injury or crushed hands and fingers.

- ▶ Check that the insertion tool has the shank length and dimensions that the machine is intended for.
- ▶ Never use an insertion tool without a collar.

**▲ DANGER Compressed gas, explosion hazard**

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

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

**▲ WARNING Hydraulic oil at high pressure**

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

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

**▲ WARNING Hydraulic oil**

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

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

**▲ CAUTION Skin eczema**

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

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

**▲ CAUTION Moving parts**

Risk for crushed hands and fingers.

- ▶ Never check bores or passages with hands or fingers.

## Operation, precautions

**▲ DANGER Explosion hazard**

If a warm insertion tool comes into contact with explosives, an explosion could occur. During operation with certain materials as well as use of certain materials in machine parts, sparks and ignition can occur. Explosions will lead to severe injuries or death.

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

**▲ WARNING Operating pressure**

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

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

**▲ WARNING Unexpected movements**

The inserted tool is exposed to heavy strains when the machine is used. The inserted tool may break due to fatigue after a certain amount of use. If the inserted tool breaks or gets stuck, there may be sudden and unexpected movement that can cause injuries. Furthermore, losing your balance or slipping may cause injury.

- ▶ Make sure that you always keep a stable position with your feet as far apart as your shoulder width, and keeping a balanced body weight.
- ▶ Always inspect the equipment prior to use. Never use the equipment if you suspect that it is damaged.
- ▶ Make sure that the handles are clean and free of grease and oil.
- ▶ Keep your feet away from the inserted tool.
- ▶ Stand firmly and always hold on to the machine with both hands.
- ▶ Never drill in an old hole.
- ▶ Never start the machine when it is lying on the ground.
- ▶ Never 'ride' on the machine with one leg over the handle.
- ▶ Never strike or abuse the equipment.

- ▶ Check regularly for wear on the insertion tool, and check whether there are any signs of damage or visible cracks.
- ▶ Pay attention and look at what you are doing.

#### **▲ WARNING Stalling hazard**

If the insertion tool gets caught during operation, the whole machine will start to rotate if you lose your grip on it. This unexpected rotation of the entire machine may cause serious injury or death.

- ▶ Stand firmly and always hold onto the machine with both hands.
- ▶ Make sure that the handle or handles are clean and free from grease and oil.
- ▶ Never drill in an old hole.

#### **▲ WARNING Trapping hazard**

There is risk of neck ware, hair, gloves and clothes getting dragged into or caught by a rotating insertion tool or accessories. This may cause choking, scalping, lacerations or death. To reduce the risk:

- ▶ Never grab or touch a rotating drill steel.
- ▶ Avoid wearing clothing, neck ware or gloves that may get caught.
- ▶ Cover long hair with a hair net.

#### **▲ WARNING Dust and fume hazard**

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

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

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

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

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

- ▶ Perform site-specific risk assessment. The risk assessment should include dust and fumes created by the use of the machine and the potential for disturbing existing dust.
- ▶ Use proper engineering controls to minimize the amount of dust and fumes in the air and to minimize build-up on equipment, surfaces, clothing, and body parts. Examples of controls include: exhaust ventilation and dust collection systems, water sprays, and wet drilling. Control dusts and fumes at the source where possible. Make sure that controls are properly installed, maintained and correctly used.
- ▶ Wear, maintain and correctly use respiratory protection as instructed by your employer and as required by occupational health and safety regulations. The respiratory protection must be effective for the type of substance at issue (and if applicable, approved by relevant governmental authority).
- ▶ Work in a well ventilated area.
- ▶ If the machine has an exhaust, direct the exhaust so as to reduce disturbance of dust in a dust filled environment.
- ▶ Operate and maintain the machine as recommended in the operating and safety instructions



- ▶ Select, maintain and replace consumables/ working tools/ other accessories as recommended in the operating and safety instructions. Incorrect selection or lack of maintenance of consumables/ inserted tools/ other accessories may cause an unnecessary increase in dust or fumes.
- ▶ Wear washable or disposable protective clothes at the worksite, and shower and change into clean clothes before leaving the worksite to reduce exposure of dust and fumes to yourself, other persons, cars, homes, and other areas.
- ▶ Avoid eating, drinking, and using tobacco products in areas where there is dust or fumes.
- ▶ Wash your hands and face thoroughly as soon as possible upon leaving the exposure area, and always before eating, drinking, using tobacco products, or making contact with other persons.
- ▶ Comply with all applicable laws and regulations, including occupational health and safety regulations.
- ▶ Participate in air monitoring, medical examination programs, and health and safety training programs provided by your employer or trade organizations and in accordance with occupational health and safety regulations and recommendations. Consult with physicians experienced with relevant occupational medicine.
- ▶ Work with your employer and trade organization to reduce dust and fume exposure at the worksite and to reduce the risks. Effective health and safety programs, policies and procedures for protecting workers and others against harmful exposure to dust and fumes should be established and implemented based on advice from health and safety experts. Consult with experts.
- ▶ Residues of hazardous substances on the machine can be a risk. Before undertaking any maintenance on the machine, clean it thoroughly.

### **▲ WARNING Projectiles**

Failure of the work piece, of accessories, or even of the machine itself may generate high velocity projectiles. During operating, splinters or other particles from the working material may become projectiles and cause personal injury by striking the operator or other persons. To reduce these risk:

- ▶ Use approved personal protective equipment and safety helmet, including impact resistant eye protection with side protection.
- ▶ Make sure that no unauthorised persons trespass into the working zone.
- ▶ Keep the workplace free from foreign objects.
- ▶ Ensure that the work piece is securely fixed.

### **▲ WARNING Splinters hazard**

Using the insertion tool as a hand struck tool can result in splinters hitting the operator and can cause personal injury.

- ▶ Never use an insertion tool as a hand struck tool. They are specifically designed and heat-treated to be used only in a machine.

### **▲ WARNING Slipping, tripping and falling hazards**

There is a risk of slipping or tripping or falling, for example tripping on the hoses or on other objects. Slipping or tripping or falling can cause injury. To reduce this risk:

- ▶ Always make sure that no hose or other object is in your way or in any other person's way.
- ▶ Always make sure you are in a stable position with your feet as far apart as your shoulders width and keeping a balanced body weight.

### **▲ WARNING Motion hazards**

When using the machine to perform work-related activities, you may experience discomfort in the hands, arms, shoulders, neck, or other parts of the body.

- ▶ Adopt a comfortable posture while maintaining secure footing and avoiding awkward off-balanced postures.
- ▶ Changing posture during extended tasks may help avoid discomfort and fatigue.
- ▶ In case of persistent or recurring symptoms, consult a qualified health professional.

**▲ WARNING Vibration hazards**

Normal and proper use of the machine exposes the operator to vibration. Regular and frequent exposure to vibration may cause, contribute to, or aggravate injury or disorders to the operator's fingers, hands, wrists, arms, shoulders and/or nerves and blood supply or other body parts, including debilitating and/or permanent injuries or disorders that may develop gradually over periods of weeks, months, or years. Such injuries or disorders may include damage to the blood circulatory system, damage to the nervous system, damage to joints, and possibly damage to other body structures.

If numbness, persistent recurring discomfort, burning sensation, stiffness, throbbing, tingling, pain, clumsiness, weakened grip, whitening of the skin, or other symptoms occur at any time, when operating the machine or when not operating the machine, stop operating the machine, tell your employer and seek medical attention. Continued use of the machine after the occurrence of any such symptom may increase the risk of symptoms becoming more severe and/or permanent.

Operate and maintain the machine as recommended in these instructions, to prevent an unnecessary increase in vibration.

The following may help to reduce exposure to vibration for the operator:

- ▶ Let the tool do the job. Use a minimum hand grip consistent with proper control and safe operation.
- ▶ If the machine has vibration absorbing handles, keep them in a central position, avoid pressing the handles into the end stops.
- ▶ When the percussion mechanism is activated, the only body contact with the machine you should have are your hands on the handle or handles. Avoid any other contact, for example supporting any part of the body against the machine or leaning onto the machine trying to increase the feed force. It is also important not to keep the start and stop device engaged while extracting the tool from the work surface.
- ▶ Make sure that the inserted tool is well-maintained (including sharpness, if a cutting tool), not worn out, and of the proper size. Insertion tools that are not well-maintained, or that are worn out, or that are not of the proper size result in longer time to complete a task (and a longer period of exposure to vibration) and may result in or contribute to higher levels of vibration exposure.
- ▶ Immediately stop working if the machine suddenly starts to vibrate strongly. Before resuming the work, find and remove the cause of the increased vibrations.
- ▶ Never grab, hold or touch the inserted tool when using the machine.

- ▶ Participate in health surveillance or monitoring, medical exams and training programs offered by your employer and when required by law.
- ▶ When working in cold conditions wear warm clothing and keep hands warm and dry.
- ▶ The exhaust air is strongly chilled and shall not make contact with the operator. Always direct the exhaust air away from hands and body.

See the "Noise and vibration declaration statement" for the machine, including the declared vibration values. This information can be found at the end of these Safety and operating instructions.

**▲ DANGER Electrical hazard**

The machine is not electrically insulated. If the machine comes into contact with electricity, serious injuries or death may result.

- ▶ Never operate the machine near any electric wire or other source of electricity.
- ▶ Make sure that there are no concealed wires or other sources of electricity in the working area.

**▲ WARNING Concealed object hazard**

During operating, concealed wires and pipes constitute a danger that can result in serious injury.

- ▶ Check the composition of the material before operating.
- ▶ Watch out for concealed cables and pipes for example electricity, telephone, water, gas and sewage lines etc.
- ▶ If the inserted tool seems to have hit a concealed object, switch off the machine immediately.
- ▶ Make sure that there is no danger before continuing.

**▲ WARNING Involuntary start**

Involuntary start of the machine may cause injury.

- ▶ Keep your hands away from the start and stop device until you are ready to start the machine.
- ▶ Learn how the machine is switched off in the event of an emergency.
- ▶ Stop the machine immediately in all cases of power supply interruption.

**▲ WARNING Noise hazard**

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

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

## Maintenance, precautions

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**▲ WARNING Machine modification**

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

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

**▲ CAUTION Hot working tool**

The tip of the working tool can become hot and sharp when used. Touching it can lead to burns and cuts.

- ▶ Never touch a hot or sharp working tool.
- ▶ Wait until the working tool has cooled down before carrying out maintenance work.

**▲ WARNING Working tool hazards**

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

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

## Storage, precautions

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- ◆ Keep the machine and tools in a safe place, out of the reach of children and locked up.

## Overview

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

## Design and function

Handheld hydraulic rock drills are sturdy and reliable rock drills designed for working together with Atlas Copco hydraulic power packs, by means of an Atlas Copco LFD oil flow divider or with most hydraulic excavators, backhoe loaders, and tractors.

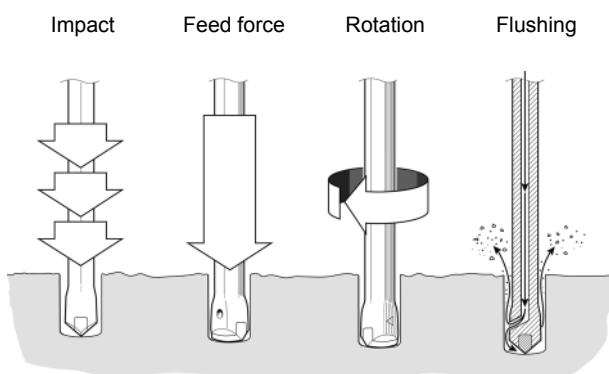
There are no limitations on the ambient temperature on the working place as soon as the used hydraulic fluid keeps the needed parameters.

The LHD 23 M is a hydraulic rock drill designed for drilling of blast holes, anchor holes, and for test drillings in for example granite and concrete. It is suited for hole diameters from Ø 25-50 mm (1-2") and will, when using hollow drill steels of the ISO-series 11-17, work efficiently down to a maximum depth of 6 m (19,7 ft), depending on the material. The drilling dust is removed from the drill hole by means of compressed air. No other use is permitted. To choose the correct insertion tool, see the spare part list or accessories catalogue.

A built-in torque limiter ensures that the operator can hold the rock drill, if the drill steel gets stuck.

All handheld rock drills are delivered with tail-hoses with 'Flat-Face' quick-release couplings for easy connection to the Atlas Copco power packs.

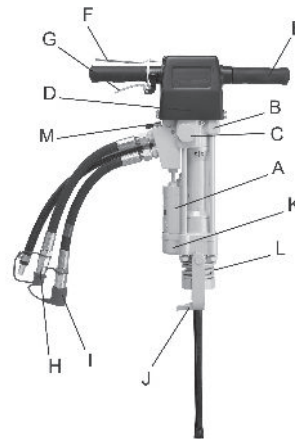
### Working principle of a rock drill



### Flushing

Flushing is ducted through an air inlet nipple. This means that flushing air is provided as soon as the compressed air is switched on.

## Main parts

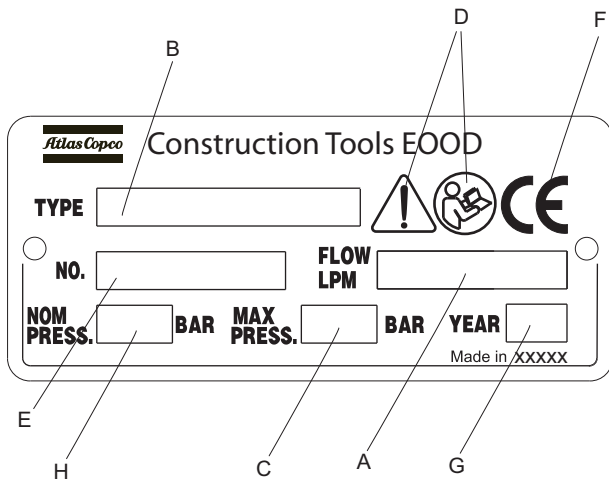


- A. Hydraulic motor
- B. Valve housing
- C. Sockets
- D. Accumulator
- E. Handles
- F. Trigger
- G. Safety trigger
- H. Outlet oil
- I. Inlet oil
- J. Tool retainer
- K. Gear flange
- L. Spring
- M. Air valve

## Labels

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

## Data plate



- A. Maximum permitted hydraulic oil flow
- B. Machine type
- C. Maximum relief valve setting
- D. The warning symbol together with the book symbol means that the user must read the safety and operating instructions before the machine is used for the first time.
- E. Serial number (is also stamped in the valve housing).
- F. The CE symbol means that the machine is EC-approved. See the EC declaration which is delivered with the machine for more information.
- G. Year of manufacture.
- H. Maximum nominal operating pressure

## Accumulator



The accumulator must only be charged with Nitrogen.  
**NOTICE** Only certified personnel are allowed to work with the accumulator.

## EHTMA

The European Hydraulic Tool Manufacturers Association (EHTMA) has categorised hydraulic power packs and tools in terms of flow rate and working pressure. See section "Technical data".

## EHTMA category

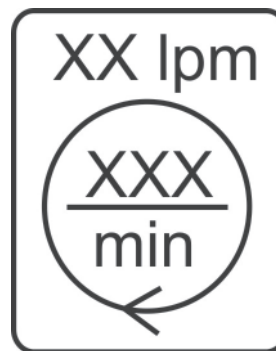
The machine is clearly marked with EHTMA categories. It is important that any power source used is in a compatible category. If any doubt, consult an authorised supervisor.



## Safety label



## RPM label



## Installation

### ▲ WARNING Whipping hose

Hoses under pressure can whip uncontrollably if screws loosen or are loosened. A whipping hose can cause severe injuries. To reduce this risk:

- ▶ Depressurise the system before loosening the connection of a hose.
- ▶ Tighten the nuts on the connections of the hoses to required torque.
- ▶ Check that the hose and the connections are not damaged.
- ▶ Never carry the machine by the hoses.

## Hoses

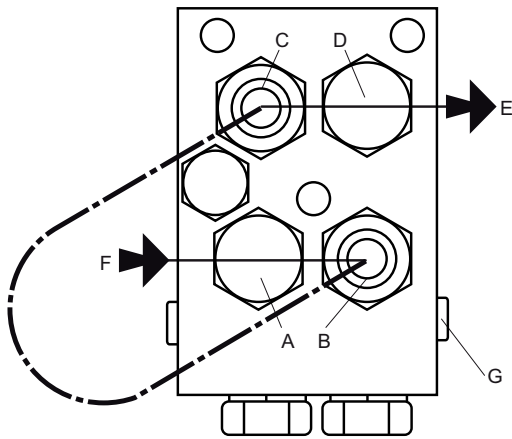
For connection on the machine, the hydraulic hose must be approved for a working pressure of at least 172 bar (2,500 psi) and have a 12.7 mm (½ in.) inner diameter. To resist exterior wear and tear, we

recommend using a 2-layer hydraulic hose. The machine connection marked P (pump) is the oil inlet, and the connection marked T (tank) is the oil outlet. Always connect both hoses and make sure that all hose connections are tight. Never carry the machine by the hose.

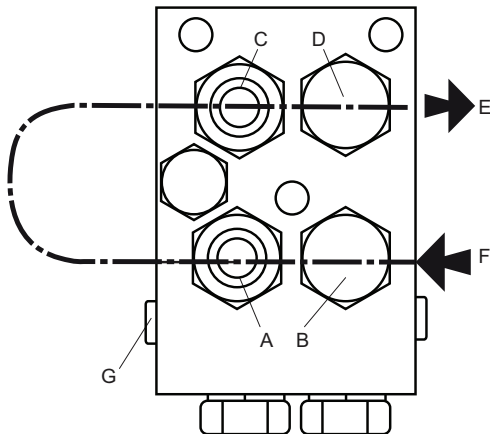
## Connections

### Connection for rotation in one direction

- ◆ For **counter-clockwise** rotation direction (when seeing the rock drill from above), connect a hose between the hydraulic ports B and C.



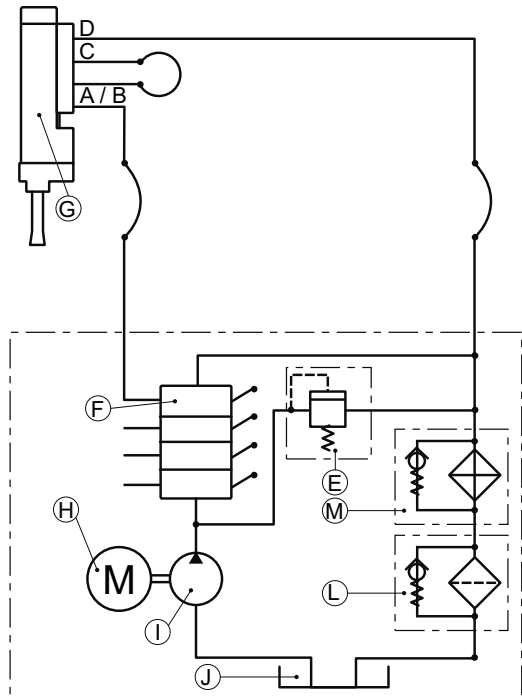
- ◆ For **clockwise** rotation direction (when seeing the rock drill from above), connect a hose between the hydraulic ports A and C.



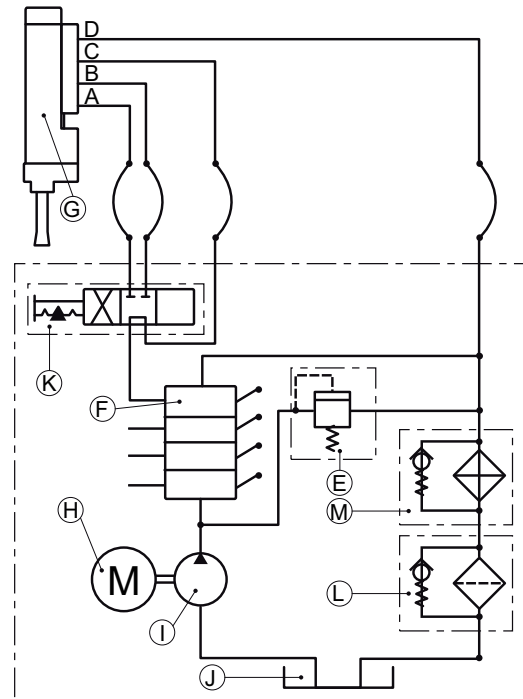
- A. Hydraulic port, lower and left
- B. Hydraulic port, lower and right
- C. Hydraulic port, upper and left
- D. Hydraulic port, upper and right
- E. To tank
- F. From pump
- G. Active torque limiter

Connection with remote control

- ◆ For one direction of rotation, connect without an operating valve (K).



- ◆ For reversible direction of rotation, connect with an operating valve (K).



- A. Hydraulic port
- B. Hydraulic port
- C. Hydraulic port
- D. Hydraulic port
- E. Pressure relief valve
- F. Valve block
- G. Rock drill
- H. Motor
- I. Pump
- J. Oil tank
- K. Operating valve
- L. Oil filter (with a filter rating of 10-25µ)
- M. Oil cooler

**NOTICE** To ensure that the accumulator and rock drill are not overloaded, the pressure relief valve must be set in accordance with the technical data. If that is not possible, a separate pressure relief valve must be installed. In case of doubt, contact an authorized dealer.

**NOTICE** Oil coolers must be able to stand a pressure of minimum 10 bar and must be provided with a by-pass valve opening at a pressure of 2 bar in case of pulsations in the return line.

## Quick-release couplings

The original hydraulic hoses are fitted with Flat-Face quick-release couplings that are strong and easy to clean. The quick-release couplings are fitted so that the male connection supplies oil and the female connection receives oil.

**NOTICE** Wipe all couplings clean before connecting. Ensure that couplings are clean and correctly engaged before operation. Failure to do so may result in damage to the quick couplings and cause overheating and cause foreign matter to enter the hydraulic system.

## Hydraulic oil

In order to protect the environment, use of biologically degradable hydraulic oil is recommended. No other fluids must be used.

- ◆ Viscosity (preferred) 20-40 cSt.
- ◆ Viscosity (permitted) 15-100 cSt.
- ◆ Viscosity index minimum 100.

Standard mineral or synthetic oil can be used. Make sure to only use clean oil and filling equipment.

When the machine is used continuously, the oil temperature will stabilise at a level which is called the working temperature. This will, depending on the type of work and the cooling capacity of the hydraulic system, be between 20-40°C (68-104°F) above the ambient temperature. At working temperature, the oil viscosity must be within the preferred limits. The viscosity index indicates the connection between viscosity and temperature. A high viscosity is therefore preferred, because the oil can then be used within a wider temperature range. The machine must not be used, if oil viscosity fails to remain within the permitted area, or if the working temperature of the oil does not fall between 20°C (68°F) and 70°C (158°F).

## Drill steel

### Before fitting the drill steel

Check that the tool shank is of the correct size and length for the chuck used. The tool shank must be clean and the drill steel must be in good condition. Tool shanks which are chipped, rounded, out of square, or too hard on the striking end will operate inefficiently and cause premature piston failure.

Inspect the drill steel:

A dull drill steel will slow down the drilling speed and overstrain the drill mechanism. When changing drill steel make sure that the new one is of the correct size to follow the previous bore.

Before drilling, check that the flushing hole in the drill steel is not blocked.

### ▲ CAUTION Hot working tool

The tip of the working tool can become hot and sharp when used. Touching it can lead to burns and cuts.

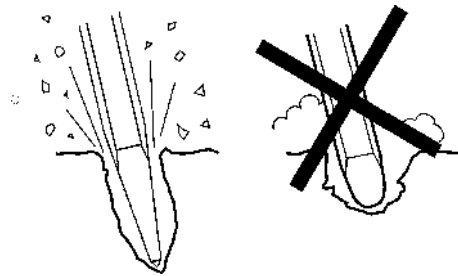
- ▶ Never touch a hot or sharp working tool.
- ▶ Wait until the working tool has cooled down before carrying out maintenance work.

**NOTICE** Never cool a hot insertion tool in water, it can result in brittleness and early failure.

### ▲ WARNING Vibration hazard

Using inserted tools that do not fulfil the criterias mentioned below, will result in a longer time to complete a task, and may result in higher levels of vibration exposure. A worn tool will also cause increased working time.

- ▶ Make sure that the inserted tool is well-maintained, not worn out and of the proper size.
- ▶ Always use a sharp tool in order to work efficiently.

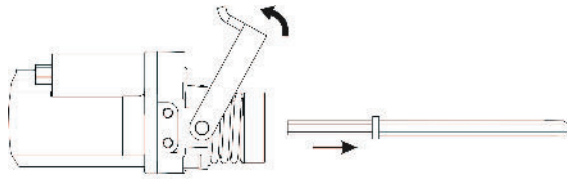


### Changing drill steel

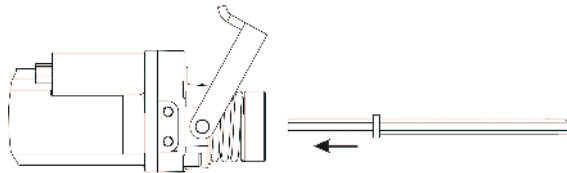
Whenever changing a drill steel the following instructions must be observed:



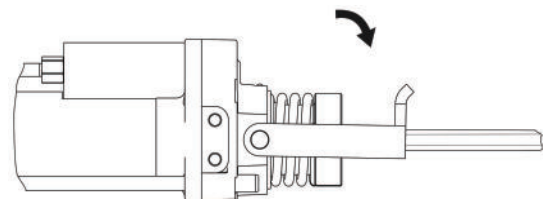
1. When removing the drill steel. Push the tool retainer outwards, ensure that the tool retainer is fully up.



2. Insert the drill steel in the chuck.



3. When the drill steel bottoms, push back the tool retainer to lock it.



## Operation

### ▲ WARNING Involuntary start

Involuntary start of the machine may cause injury.

- ▶ Keep your hands away from the start and stop device until you are ready to start the machine.
- ▶ Learn how the machine is switched off in the event of an emergency.
- ▶ Stop the machine immediately in all cases of power supply interruption.

## Preparations before starting

### Check the drilling equipment

The following checks must be made before start using the rock drill. All these checks concern the serviceability of the rock drill. Some concerns your safety:

- Clean all labels. Replace any that are missing or cannot be read.
- Inspect the hoses generally for signs of damage.
- Inspect the drill steel for wear and damage. Do not use an excessively worn or damaged drill steel.

- Check that the flushing holes in the drill steel and drill bit are not blocked, and that the flushing air flows through without obstruction.
- The drill steels must be from the same ISO-series, if different lengths are used in the same drill hole.
- Connect the machine.
- Remove the protective caps from the quickrelease couplings.
- Ensure that the hydraulic couplings are clean and fully serviceable.
- If you need to change direction of the rotation, contact your nearest authorised workshop.
- Ensure that any power source you plan to use is compatible with the rock drill, see the "Technical data". Atlas Copco recommends using an LFD oil flow divider, if the flow from the power source can exceed the maximum allowed oil flow.

### Weight block

The rock drill is provided with threaded holes for mounting of a weight block or a supporting root. When using a weight block of 12-15 kg (26½-33 lb) as additional weight, you must not apply any feed force. Which is particularly advantageous, if the job takes a long time.

The weight block is fitted to the rock drill by means of brackets.

### Connection to air compressor

When air flushing is required, the rock drill can be connected to most air compressors. The required minimum compressor capacity will in most cases depend on the working situation. If the holes to be drilled are not deep, and the drilling dust is dry, a small compressor capacity will often be sufficient, while drilling deeper holes with moist dust will require a higher compressor capacity in order to achieve sufficient air flushing.

Independent of the working situation, the following compressor capacity is required:

- Q (air flow) 0.4-1.2 m<sup>3</sup>/min (14.1-42.4 foot<sup>3</sup>/min).
- P (pressure) 1-2 bar (15-30 psi).

Connection can be made by means of standard air components and hoses approved for minimum 10 bar. The hose diameter should not be less than ½" in order to prevent pressure loss.

## Start and stop

### Starting the rock drill

- Check that the drill steel is in good condition and pushed fully home in the nose of the rock drill.
- Check that the tool retainer is locked, so that the drill steel does not fall out.
- Place the rock drill vertically (at an angle of 90°) on the surface, in which the hole is to be made and activate the trigger. Avoid small irregularities on the surface. These will break easily and cause either a wrong working angle or blank firing.
- Press the rock drill firmly against the material to be drilled.
- Activate the trigger. Keep pressing down the rock drill while the drill steel penetrates the material.
- Use just enough feed force to have the rock drill run regularly.
- Never exceed the maximum relief valve setting stated on the rock drill.
- Keep hands away from chuck and drill bit.

### Stopping the rock drill

- Release the trigger.
- Stop the power source.
- Disconnect the hoses and fit the protective caps to the quick-release couplings.

## Operating

### Drilling

- ◆ Use protective shoes, gloves, helmet, ear protectors and impact resistant eye protection with side protection.
- ◆ Stand firmly and always hold the machine with both hands.
- ◆ Hold the inserted tool firmly against the work surface before starting the machine.

## When taking a break

- ◆ During all breaks you must place the machine in such a way that there is no risk for it to be unintentionally started. Make sure to place the machine on the ground, so that it can not fall.
- ◆ In the event of a longer break or when leaving the workplace: Switch off the power supply and then bleed the machine by activating the start and stop device.

## Maintenance

Regular maintenance is a basic requirement for the continued safe and efficient use of the machine. Follow the maintenance instructions carefully.

- ◆ Before starting maintenance on the machine, clean it in order to avoid exposure to hazardous substances. See "Dust and fume hazard".
- ◆ Use only authorised parts. Any damage or malfunction caused by the use of unauthorised parts is not covered by warranty or product liability.
- ◆ When cleaning mechanical parts with solvent, comply with appropriate health and safety regulations and ensure there is satisfactory ventilation.
- ◆ For major service of the machine, contact the nearest authorised workshop.
- ◆ After each service, check that the machine's vibration level is normal. If not, contact the nearest authorised workshop.

## Every day

- ◆ Clean and inspect the machine and its functions each day before start working.
- ◆ Check the tool retainer for wear and function.
- ◆ Conduct a general inspection for leaks and damage and wear.
- ◆ Change damaged parts immediately.
- ◆ Replace worn components in good time.
- ◆ Make sure that all the attached and related equipment, such as hoses and flow dividers are properly maintained.
- ◆ The tool drive system may not rotate without being lubricated. It must therefore be filled every 8 hours of operation, with Atlas Copco recommended grease, through the grease nipple.

## Every three month

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- ◆ Check tightness of nuts, bolts, screws, and hose fittings. When retightening, see the correct torque in the spare part list.
- ◆ Check the bushing in the nose for wear and damage.

## Every 600 hours of operation or every year

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- ◆ The rock drill must be dismantled and all parts be cleaned and checked. This work must be performed by authorised staff, trained for this task.
- ◆ Check moving parts, seals, bushing, and bolts for wear and cracks. Replace if necessary.
- ◆ Check the function of the rock drill.
- ◆ The accumulator is checked and re-charged.

## Tightening torques

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- Screw M10 x 30 mm: 70 Nm (52 lbf/ft), use Loctite® 245™ (Loctite is a registered trademark of Henkel Corporation. 245 is a trademark of Henkel Corporation.)
- Screw M8 x 50 mm: 27 Nm (20 lbf/ft), use Loctite® 245™.
- Nut M14 x 1.5 mm: 120 Nm (89 lbf/ft).
- Guide socket (P): 100 Nm (74 lbf/ft).
- Guide socket (T): 100 Nm (74 lbf/ft).

## Storage

- ◆ Disconnect the machine's hoses from the power source, see "Start and stop".
- ◆ Make sure that the machine is properly cleaned before storage.
- ◆ In case of long-term storage, the striking piston must be protected against corrosion. This is done by pushing it (through the bushing) to its upper position while the machine is placed up-side-down. As the quick-release couplings are blocked when disconnected, the striking piston must be pushed upwards with the hoses mounted but the power pack inactivated.
- ◆ Store the machine in a dry place.

## Disposal

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

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

# Troubleshooting

Problem	Cause	Solution
Rock drill does not work. Pressure is not built up when throttle lever is activated.	No or incorrect flow or pressure.	Contact an authorised Atlas Copco workshop.
	P and T hoses interchanged.	Check connection. Standard connection has oil flowing from male quick-release coupling (the tail-hose of the breaker P connection is fitted with female coupling).
	Insufficient activation of throttle lever.	Adjust throttle lever (if adjustable) or replace defective parts.
	Main spool jammed or damaged.	Remove and check.
	Striker piston seized.	Remove and check for 'pick-up' on piston feeder or barrel. Replace any damaged parts.
	The drill steel is not fully home in the nose of the rock drill. The twist handle on the rock drill was not in neutral position when the power pack was started.	Push the drill steel fully home in the nose of the rock drill and lock the tool retainer. Put the twist handle in neutral position and re-start the power pack.
Rock drill lacks drilling power.	Insufficient available pressure.	Check main relief valve.
	Low accumulator gas pressure (normally associated with violent shaking of hoses).	Re-charge the accumulator.
Rock drill runs weakly or irregularly.	Insufficient flow.	Check flow and pressure.
	Cold oil.	Warm up the oil supply. Optimum temperature 20–70° C (68–158° F).
	Incorrect oil.	Use only hydraulic oil according to specification.
	Back pressure too high.	Make direct tank connection. Maximum back pressure 10-15 bar (150-200 psi) measured at rock drill.
	Quick-release coupling in return line defective.	Locate and replace defective coupling.
Rock drill runs hot.	Inadequate cooling of hydraulic oil.	Check that the oil supply has adequate cooling. Temperature must not exceed 80° C (176° F).
Rock drill leaks water through the water outlet located near the throttle lever.	The sealing rings in the flush housing are worn out and need to be replaced.	Stop the rock drill as soon as possible and contact an authorised Atlas Copco workshop.

## Technical data

### Machine data

Type	Shank dimension mm (in)	Weight* kg (lb)	Impact freq. Hz (blows/min)	Accumulator pressure bar (psi)	Operating pressure bar (psi)	Flow rate l/m (gal/min)	EHTMA category
LHD 23 M	22 x 108 (7/8 x 4 1/4)	26 (57)	40-50 2400-3000	40 (580)	100-140 (1450-2031)	20-25 (4.4-5.5)	C

\*Weight includes tail-hoses andmoil point

Type	Direction of rotation	Maximum hydraulic returnline pressure bar (psi)	Maximum relief valve setting bar (psi)	Revolutions rpm	Torque Nm (lbf/ft)
LHD 23 M	Clockwise	15 (218)	172 (2495)	320-400	30 (22)
LHD 23 M CC	Counter clockwise	15 (218)	172 (2495)	320-400	30 (22)

### Noise and vibration declaration statement

Guaranteed sound power level **L<sub>w</sub>** according to EN ISO 3744 in accordance with directive 2000/14/EC.

Sound pressure level **L<sub>p</sub>** according to EN ISO 11201, EN 500-4.

Vibration value determined according to EN 500-4. See table "Noise and vibration data" for the values etc.

These declared values were obtained by laboratory type testing in accordance with the stated directive or standards and are suitable for comparison with the declared values of other machines tested in accordance with the same directive or standards. These declared values are not suitable for use in risk assessments and values measured in individual work places may be higher. The actual exposure values and risk of harm experienced by an individual user are unique and depend upon the way the user works, in what material the machine is used, as well as upon the exposure time and the physical condition of the user, and the condition of the machine.

We, Construction Tools EOOD, cannot be held liable for the consequences of using the declared values, instead of values reflecting the actual exposure, in an individual risk assessment in a work place situation over which we have no control.

This machine may cause hand-arm vibration syndrome if its use is not adequately managed. An EU guide to managing hand-arm vibration can be found at <http://www.humanvibration.com/humanvibration/EU/VIBGUIDE.html>

We recommend a programme of health surveillance to detect early symptoms which may relate to vibration exposure, so that management procedures can be modified to help prevent future impairment.

## Noise and vibration data

	Noise			Vibration	
	Declared values			Declared values	
	Sound pressure	Sound power		Three axes values	
	EN ISO 11203	2000/14/EC		EN ISO 28927-10	
Type	Lp r=1m dB(A) rel 20µPa	Lw guaranteed dB(A) rel 1pW	Lw measured dB(A) rel 1pW	A m/s <sup>2</sup> value	B m/s <sup>2</sup> spreads
LHD 23 M	104	118	115	11.7	1.7

# EC Declaration of Conformity

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

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

Handheld hydraulic rock drills	Pmax (bar)
LHD 23 M	172

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Rousse, 2012-04-25











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