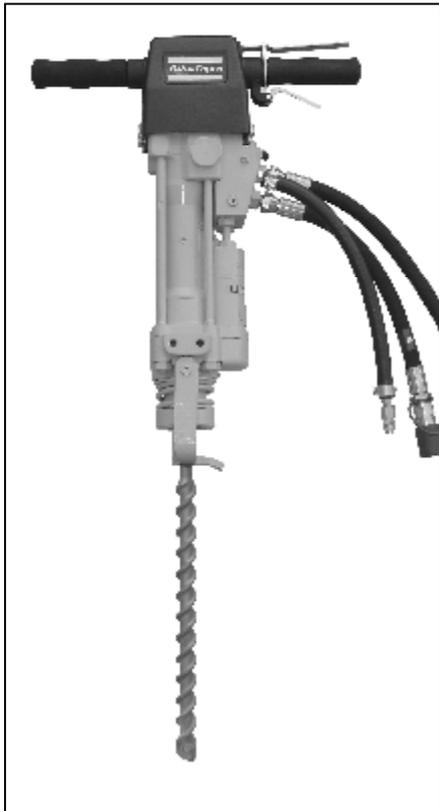


Operator's Instructions
Instructions pour l'opérateur
Bedienungsanleitung
Instrucciones para el operario
Instruções de operação
Istruzioni per l'uso
Bedieningsinstructies
Odhgiew gia ton xeiristq
Käyttöohje
Betjeningsvejledning
Bruksanvisning
Instruktionsbok

Hydraulic Rock drill
Marteau perforateur hydraulique
Hydraulischer Bohrhammer
Martillo perforador hidráulico
Martelo hidráulico perfurador
Trapano a percussione idraulico
Hydraulisk borehammer

LHD 23 M



Safety regulations

These instructions contain important sections dealing with safety.

Special attention must be paid to all framed safety text that begins with a warning symbol (triangle) followed by a signal word, as shown below



denotes a hazard or hazardous procedure which CAN lead to serious or life-threatening injuries if the warning is not observed.



denotes a risk or risky procedure which CAN lead to personal injury or damage to equipment if the caution is not observed.

Also observe the following general safety rules:

- Before starting the product, read through **these instructions** carefully.
- For reasons of product safety, the product must not be modified.
- Use approved personal protective equipment.
- Use Atlas Copco Genuine Parts only.
- Replace damaged or worn plates.
- Only trained personnel may work on the product.

About this handbook

To operate the A/C hydraulic rock drill efficiently and safely you must know the rock drill and have the skill to use it. You must also be a competent operator of the machine supplying the rock drill with hydraulic power.

This handbook is designed to give you a good understanding of the rock drill and its safe

operation. Using this handbook

Read this handbook from front to back before using the rock drill for the first time. Particular attention must be given to all the safety aspects of operating and maintaining the rock drill.

Rock drill model and serial number for identification

The serial number of your rock drill is stamped on the barrel and on the ID tag, as shown. It is important to quote the serial number when making repairs or ordering parts. Identification of the serial number is the only means of ensuring that you receive the correct part for your particular rock drill.

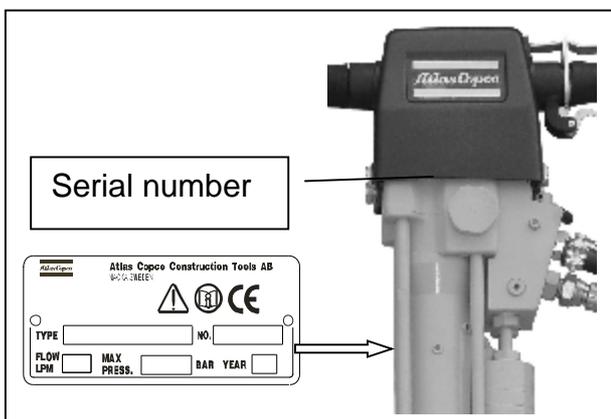
The LHD 23 M is a hydraulic rock drill designed for the drilling of blast holes and anchor holes and for test drillings etc. in granite and concrete. It is suited for hole diameters from Ø 25-50 mm and will, when using hollow drills of the ISO-series 11-17, work efficiently down to a max. depth of 6 m, depending on the material. The drilling dust is removed from the drill hole by means of compressed air.

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

The LHD 23 M rock drill requires an oil flow of 20-25 l.p.m. and then works at a pressure of 100-140 bar.

EHTMA categorization

The A/C hydraulic rock drill are categorized by the EHTMA as Category C and can be safely used on any hydraulic powerpack displaying the green EHTMA C decal as shown below.



Personal protective equipment



WARNING

Long-term exposure to loud noise can cause permanent damage to hearing if ear protectors are not used.



WARNING

Long-term exposure to vibration can cause progressive injury to the fingers, hands and wrists. Do not use the machine if you are experiencing discomfort, cramp or pain. Consult your doctor before continuing to work with the machine



WARNING

Working in some materials can generate dust which can adversely affect the health of the operator. When working in dust generating environments an approved dust mask shall be worn.

Always use approved personal protective equipment. The following applies to operators and other personnel in the immediate vicinity of the working zone:

- Protective helmet
- Ear protectors
- Protective goggles
- Dust mask in dusty environments
- Protective gloves
- Protective footwear

Vibration from hand-held machines is transmitted into the hands via the handles.

Do not use the rock drill longer than prescribed in your local environmental working regulations. The operator should be attentive to falling material when drilling upwards or horizontally and he should always be aware of his own risk of slipping or falling down.

Note that the outside of the rock drill itself might be over 30°C warmer than the air temperature. So always wear protective clothing including gloves.

Working zone



WARNING

Do not use the hydraulic rock drill in an explosive environment.

Make sure that no other personnel trespass into the working zone.

Keep the place of work clean, and free of foreign objects.

Safety check list

Maintenance safety



WARNING

Hydraulic fluid

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.



WARNING

Hydraulic pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, isolate the hydraulic supply.



WARNING

Damaged hoses can cause serious personal injury. Inspect hoses regularly. If any of the following are found, the hose shall be replaced:

- Damaged connections
- Damaged outer casing
- Blisters on the outer casing
- Folds or damage from clamping
- Exposed inner reinforcement



WARNING

Hot surfaces

DO NOT operate the rock drill at hydraulic oil temperatures higher than 60°C (140°F). Higher temperatures will be transmitted to the rock drill controls and may burn.



WARNING

Accumulator

The rock drill incorporates a pressure accumulator. This accumulator is pressurized even when there is no hydraulic pressure to the rock drill. Attempting to dismantle the accumulator without first releasing the pressure can cause injury or death. This procedure must be carried out by a qualified person.



CAUTION

Repairs and maintenance

Do not try to do repairs or any other maintenance work you do not understand.



WARNING

The hydraulic rock drill is not insulated against electric current. Should the tool or rock drill come in contact with the electrical power sources, there is a risk of personal injury.



WARNING

Modifications and welding

Non-approved modifications can cause injury and damage.

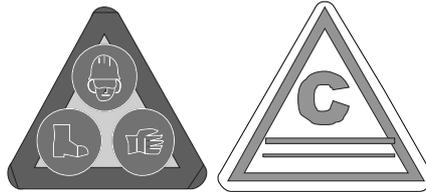
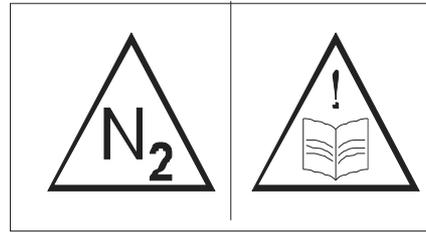


CAUTION

Only use lubricants and hydraulic fluids recommended by the manufacturer.

Safety decals

Decals on the rock drill warn you of particular hazards. Read, and make sure you understand the safety message, before you work with the rock drill. Keep all decals clean and readable. Replace lost or damaged decals. The decals on the rock drill are as shown.



Connecting/disconnecting the rock drill

Connecting the rock drill

- 1 Ensure that the hydraulic supply meets the requirements of the rock drill (see **Specification Section**).

Note: The A/C hydraulic rock drill can be connected to any supply suitable for this particular piece of equipment (see Technical data Section).

- 2 Connect the hydraulic hoses. Make sure the hoses are clean before connecting them. The connectors are of the 'quick release' type. Make sure they lock in place.

Disconnecting the rock drill



WARNING

Hydraulic oil at pressure can injure you. Follow the instructions below for disconnecting the hoses.

- 1 Isolate the hydraulic supply. Stop the engine.
- 2 Disconnect the hoses by pulling up the knurled locking rings and pulling up the couplings. Fit blanking caps to the hoses.

Hydraulic hoses

For connecting the rock drill, the hydraulic hose shall be approved for a working pressure of at least 140 bar and have a 1/2" inner diameter. To resist exterior wear and tear we recommend using a 2-layer hydraulic hose.

The connection on the rock drill marked with a P (pump) is the entry point for oil, and that marked with a T (tank) is the exit point.

Quick release couplings

In the original, hydraulic hoses are fitted with Flat-Face quick release couplings.

This kind of quick release coupling is stronger and easier to clean. The quick release couplings are fitted so that the male connection supplies the oil and the female connection receives the oil.

Quick release couplings shall be approved for a minimum 140 bar working pressure.

Changing drill.



WARNING

Always isolate the rock drill from the power source when changing tools.



WARNING

Never rest the point of the drill in a rock drill on your foot or against your body.



WARNING

Do not lean against the rock drill in order not to lose foothold, if the drill should break by accident or suddenly penetrate the material.

A - Remove a drill.

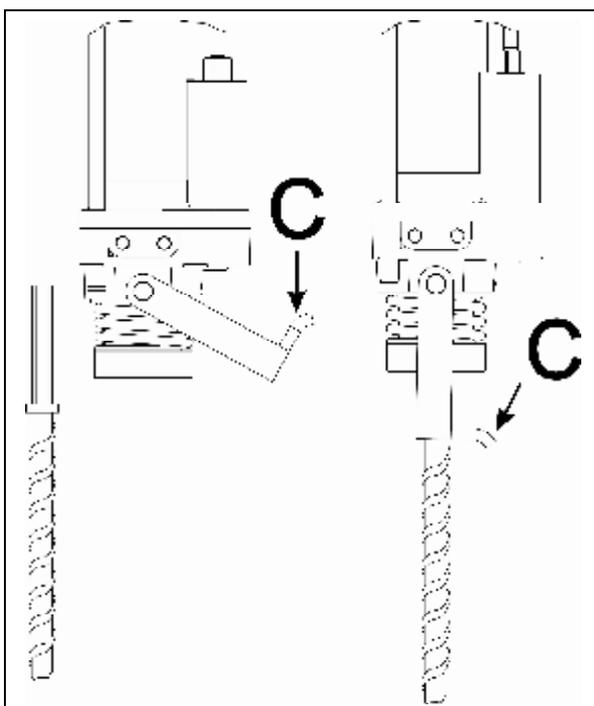
- 1 Swing the retainer (C) fully up to release the drill.

B - Fit a drill

- 1 Ensure the retainer (C) is fully up.
- 2 Insert the drill into the rock drill as shown.
- 3 Swing the retainer (C) fully down.

A

B



Using a rock drill

This section is intended as a guide to using the rock drill.



WARNING

Please read the maintenance instructions carefully before using the hydraulic rock drill for the first time.

When working in some materials particles can fly. Make sure no one else is within the work area.

Use recommended protective clothing and equipment to protect yourself from flying particles.

Disconnect the hydraulic power source before the tool is replaced or before the rock drill is serviced.

Always use tools with the correct shank hexagons for the rock drill.

Tools that break during use can cause injury. Never use drills that are much worn or are damaged on shanks or shafts.

Always wear protective goggles, protective footwear and ear protectors when using the rock drill.



WARNING

Maintain a balanced posture during rock drill operation to avoid overbalancing if rock drill should fail.



CAUTION

Equipment limits

Operating the rock drill beyond its design limits can cause damage. It can also be dangerous. Do not operate the rock drill outside its limits. Do not try to upgrade the rock drill's performance by unapproved modifications.



CAUTION

Do not operate the rock drill without pressure being applied e.g. Do not press the trigger with the rock drill in the air. Such repeated action may result in damage to the rock drill. If the energy supply to the rock drill is interrupted, release the trigger immediately to prevent damage.

Correct working methods

Note: Low/High Temperatures.In cold conditions, warm up the rock drill by light use for a few minutes before starting work.

Starting

1. Check that the drill bit is intact and sharp and that the drill is pressed fully home in the nose part. Always use the correct drill for the rock drill (see item 6).
2. Remove the protective caps from the quick-release couplings.
3. Clean the quick-release couplings if needed and connect the tail-hoses to the extension hoses of the power source (see manual).
4. 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 lever. Avoid small irregularities on the surface. These will break easily and cause either a wrong working angle or blank firing.
5. Use just enough feed force to have the rock drill run regularly.
6. The drills must be from the same ISO-series, if different lengths are used in the same drill hole.
7. Do not invert the rock drill without first isolating the hydraulic supply.
8. When drilling, make sure you are able to keep safely balanced. Do not overreach. Keep arms and legs clear of the drill, if a drill breaks during operation the rock drill with a projecting broken shank will suddenly drop.
9. Press the rock drill firmly against the material to be drilled.
10. Activate the trigger. Keep pressing down on the rock drill as the steel penetrates the material.
11. Avoid activating the rock drill when it is removed from the material. This will lead to increased hydraulic oil temperatures and seal wear.
12. Take care when laying the rock drill down that the control trigger on top of the handle is not accidentally operated. DO NOT invert the rock drill without first isolating the hydraulic supply.
13. Do not continue to work if the hoses vibrate abnormally.
14. Do not "ride" the machine, e.g. with one leg slung over the handle. This could result in injury.
15. Investigate the contents of the material in which you are going to work. Look out for hidden cables and pipes, e.g. electricity, telephone, water, gas, or sewage lines.
16. If you suspect that the tool has struck a hidden object, stop the machine immediately. Make sure there is no danger before continuing with the work.

17. Only use the machine for the jobs for which it is intended.

Stopping

1. Release the trigger lever.
2. Stop the power source (see operating manual).
3. Disconnect the hoses and fit the protective caps to the quick-release couplings.

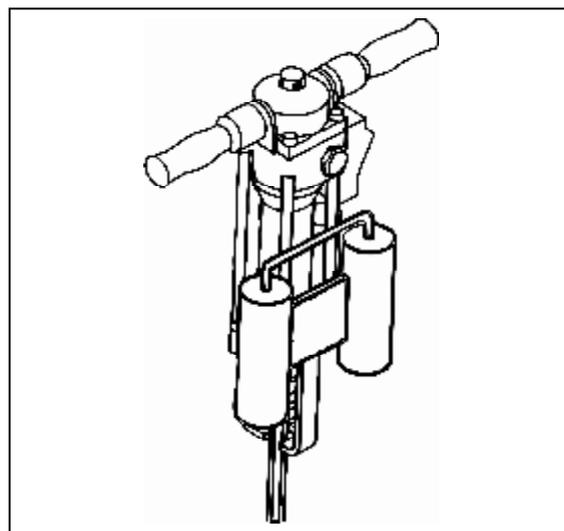
IMPORTANT

1. Make sure that the rock drill is supplied with correct flow and pressure according to the technical data.
2. Avoid free blows (the piston does not hit the drill), as this will lead to unnecessary heating of the oil and in the long run damage both seals and rock drill.
3. When drilling without air flushing, a hollow drill with open air hole may not be used, as this might cause dust accumulation round the piston.

Weight block

The rock drill is provided with thread holes for the mounting of a weight block or a supporting root. When using a weight block of 12-15 kg as additional weight, it is not necessary for the operator to apply any feed force, which is particularly advantageous, if the job takes long.

The weight block is fitted to the rock drill by means of brackets as shown on the illustration.



Be alert

Always concentrate on what you are doing. Use common sense. Never operate the machine when you are tired or under the influence of drugs, alcohol or other substances which might affect your vision, reaction ability or judgment.

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, whereas the drilling of 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 m³/min.
- P (pressure) 5-10 bar

Connection can be made by means of standard air components and hoses approved for min. 10 bar. The hose diameter should not be less than 1/2" in order to prevent pressure loss.

Technical data LHD 23

Weight without hoses and drill	24.5 kg
Service weight (incl. 0.4 m tail-hose and drill)	28.3 kg
Steel size (standard)	Hex 22x108 mm
Oil flow range	20-25 l.p.m.
Working pressure	100-140 bar
Max. back pressure in return line (measured at rock drill).....	15 bar
Hydraulic oil working temperature	30-70°C
Accumulator charging pressure (Nitrogen).....	40 bar
Pressure relief valve setting (max.)	160 bar
Blow frequency.....	40-50 Hz (2400-3000 1/min.)
Impact energy (ISO 2787)	32-38 Joule
Revolutions.....	320-400 r.p.m.
Torque.....	65 Nm
Direction of rotation	Clockwise
Vibration level (ISO 8662-5)	a = 9.6 m/s ² (H/A) or L _A = 140 dB(H/A)
Sound pressure level at work station (ISO 11203)	L _{PA} = 86 dB
Sound power level (EEC 84/537)	L _{WA} = 97.5 dB
Connections P and T.....	Standard 1/2" BSP (alternatively 3/4" JIC)
Required cooling capacity (in case of alternative power source).....	Approx. 2 kW
Air flushing: Consumption.....	Min. 0.4 m ³ /min.
Pressure.....	Min. 5 bar

Service schedules



WARNING

Maintenance work must only be done by competent personnel



CAUTION

Only use lubricants and hydraulic fluids recommended by Atlas Copco.

To make sure your rock drill keeps working to maximum efficiency, it is essential that it is properly and regularly maintained in accordance with the service schedules included in this handbook.

Badly maintained equipment can be a danger to the operator and the people working around him. Make sure that the regular routine maintenance and lubrication jobs listed in the service schedules are done to keep the equipment in a safe and efficient working condition.

Do not use equipment which is due for a service. Make sure that any defects found during the regular routine maintenance checks are rectified before you use the equipment.

Scrapping worn-out machines

Worn-out machines should be scrapped so that as much material as possible is recovered and to cause as little environmental impact as possible.

NB. Before a worn-out hydraulic rock drill is scrapped it must be emptied and cleaned of all hydraulic oil. Waste hydraulic oil shall be handled in such a way as to cause no environmental impact.

Recommended hydraulic oil

In order to protect the environment Atlas Copco recommends the use of biologically degradable hydraulic oil.

Viscosity (preferred)	20 – 40 cSt
Viscosity (permitted)	15 – 100 cSt
Viscosity index	Min. 100

Standard mineral or synthetic oil can be used. When the rock drill is used continuously the oil temperature will stabilize at a level which is called the working temperature. This will be, depending on the type of work and the cooling capacity of the hydraulic system, between 20 - 40°C above the ambient temperature.

At working temperature oil viscosity must lie within the preferred limits. The viscosity index indicates the connection between viscosity and temperature. This is the reason why a high viscosity is preferred,

because then the oil can be used within a wider range of temperatures.

The rock drill shall 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 and 70°C.

Daily

Clean

- 1 The rock drill, its drills and hoses.

Check (Rock drill disconnected)

- 2 All hydraulic connections.
- 3 For damage to the rock drill, its drills and its hoses.
- 4 The chisel drive system may not rotate without being lubricated, and it must therefore every 8 hours of operation be filled with A/C recommended grease, through the grease nipple.

Storage

In case of long-term storage, the striking piston must be protected against corrosion.

That is done by pressing it (through the bushing) to its upper position by means of a drill placed upside-down. As the quick-release couplings are blocked when disassembled, the striking piston must be pressed upwards with the hoses mounted but the powerpack inactivated.

Monthly

Check (Rock drill disconnected)

- 1 Torque tightness of all fasteners.
- 2 The hexagon bush in nose casting for wear or damage.
- 3 Wear on the drill.

Lubricate

- 4 Spray the trigger and all contact surfaces with suitable lubricant.

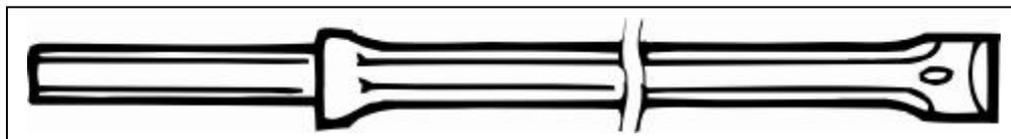
Every 600 operating hours or yearly (whichever occurs first)

The rock drill must be repaired / serviced by suitable qualified and competent persons only.

- 1 Overhaul the rock drill – refer to the **overhauling instructions**.
- 2 The accumulator is checked and re-charged (dismantling involves a safety risk).
- 3 Moving parts, bushing, seals and bolts are checked and replaced if necessary.
- 4 The function of the rock drill is checked.

DRILLS AND ACCESSORIES

Standard dimension Hex 22x108 mm.



Integral steel	ISO-Series 11	L = 400 mm	D = Ø 34 mm	714-0635, 05-02
Integral steel	ISO-Series 11	L = 800 mm	D = Ø 34 mm	714-0834, 05-02
Integral steel	ISO-Series 11	L = 1600 mm	D = Ø 33 mm	714-1633, 05-02
Integral steel	ISO-Series 13	L = 400 mm	D = Ø 41 mm	714-0434, 05-02

For more information see www.atlascopco.com/products on line/ rock drilling tools/ integral drill rods

Standard dimension Hex 22x108 mm.

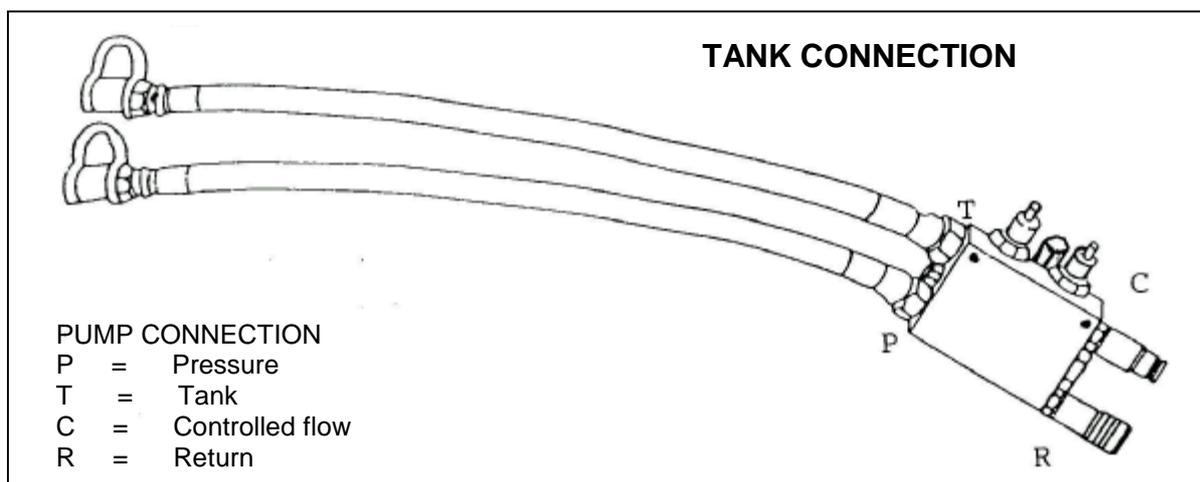


Hammer drill	L = 720 mm	D = Ø 32 mm	3375232720
Hammer drill	L = 720 mm	D = Ø 42 mm	3375242720
Hammer drill	L = 1200 mm	D = Ø 42 mm	3375242721

Oil flow divider type 20-25

Max. inlet flow 60 l.p.m.

Standard setting: 20 l.p.m./150 bar (adjustable)



Fault finding



WARNING

Maintenance must be done only by suitable qualified and competent persons.

Symptom	Possible fault	Remedy
Rock drill fails to operate.	No flow from supply.	Check output with flow and pressure tester.
	Hoses incorrectly fitted.	Check that pressure feed is connected to P port on the rock drill.
	Insufficient movement of trigger valve.	Adjust trigger lever or replace defect points.
	Main spool jammed or damaged.	Remove and check. Clean all associated parts.
	Striker piston seized	Remove and check for 'pick-up' on piston feeder or barrel. Replace any damaged parts.
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 – refer to Service Manual.
	Hexagon bush in nose casting loose.	Apply Loctite 648 and press back.
Rock drill runs slow	Insufficient flow	Check that the flow rate is correct.
	Cold oil.	Warm up the oil supply. Optimum temperature 20–70° C (68–158° F).
	High return line back pressure.	Check return line back-pressure. Pressure should not exceed 15 bar.
	Incorrect oil	Use only Hydraulic Oil according to spec.
	Q.R. coupling defect	Locate and replace defect coupling.
Rock drill runs hot.	Inadequate cooling of hydraulic oil.	Check oil supply has adequate cooling. Temperature should not exceed 80°C (176°F).