



**BOART  
LONGYEAR**

***LMA90 Automated  
Diamond Drill  
System***

***LMA90 delivers fully automated drilling  
and semi-automated rod handling for  
increased machine availability and  
reduced operating costs***



# **LMA90**

## **Automated Diamond Drill System**

**A is for 'Automated'. A drill system that leaves you free to get on with what needs to be done. The LMA90 Auto Drill Controller monitors and controls the drilling process for you. It delivers fully automated drilling and semi-automated rod handling for efficient and productive drill utilisation.**

### **More Core, More Savings**

Automated drilling increases drilling productivity by freeing the driller to get on with other tasks. Equipment preparation, core barrel emptying, bit and reamer fitting and shift change-overs can be carried out while the LMA monitors key drilling parameters and carries on drilling.

Automated drilling is kind to your downhole equipment. You'll save money because the LMA90 constantly monitors drilling conditions avoiding situations that cause equipment damage.

### **Automated Rechucking, Automatic Drill Shutdown**

The LMA90 features automated rechucking. At the end of a feed stroke the drill head automatically moves rearward, regrips the rod string and continues drilling. The LMA90 monitors key drilling parameters including bit penetration rate, bit weight, water pressure and rotation speed. If a drilling fault occurs the Auto Drill Controller shuts down the drill to avoid bit, rod string and drill damage.

### **Operator Safety**

In addition to the obvious benefits for one person operation the LMA90 allows less experienced or trainee drillers to operate drills with confidence. An experienced driller can preset the automated drilling parameters. Built in safety barriers will warn the driller of unsafe actions.

Automated control provides benefits even when the drill is used manually. The drill monitors conditions to prevent dropped rods, provides deceleration at the end of handling strokes, displays drilling conditions and provides other features to reduce human error.

### **Power and Flexibility**

The LMA90 has plenty of power for your drilling needs and power in reserve to operate an hydraulic water pump, essential for fully automated drilling. As always with Boart Longyear's LM drills there is mix and match compatibility with a range of feedframes and options for every drilling need.

**LMA90 - Increases drill utilisation by free**



### **LMA90 Highlights**

- Fully automated drilling
- Increased drill utilisation
- User set drilling parameters
- End of stroke rechucking
- End of stroke hole flushing
- Semi-automated rod handling
- Reduces operator error danger
- Automatic shutdown
- Emergency shutdown (manual)
- Manual control always available
- Displays key drilling information
- Displays warning messages
- Provides self diagnosis information
- Field proven 'LM' quality

Boart Longyear's LMA90 Automated Drilling System is a natural progression from the field proven LM family of drills. It's more powerful, more productive and easier to use than ever before.

**ing the operator from the control panel**



## Power and Control

**The power to tackle any drilling task plus the labour saving features of Boart Longyear's fully integrated Auto Drill Controller. At the heart of the LMA90 is a powerful 90kW motor direct coupled to an efficient load sensing hydraulic pump.**

### Better Drilling Control

LMA90's Auto Drill Controller gives you more control of the drilling process than ever before. The Auto Drill Controller is a fully integrated system consisting of a Programmable Logic Controller (PLC), pressure and proximity sensors and a solenoid switched valve block. The PLC stores the drilling parameters you set and gathers data from the sensors. Information about equipment and drilling conditions is immediately relayed back to you.

### A display provides read-out on:

- Feed Pressure
  - Hold-back Pressure
  - Rod Weight
  - Bit Load
  - Gauge Pressure
  - Head Position
  - Feed Rate
  - Rotation Speed
  - Bit Penetration Rate
- plus a series of operation and error messages for information and trouble shooting.



The Programmable Logic Controller (PLC) is easy to trouble shoot and field service. Controller modules simply unplug for immediate replacement.



The control panel features a message display unit that displays drill parameters, operating status and diagnostic messages. A keypad is used to select operating messages.

Manual control of the valve block is available for troubleshooting in the absence of the control panel.



At the heart of the powerpack is a powerful 90kW electric motor direct coupled to a load sensing hydraulic pump. Hydraulic oil is delivered via a solenoid controlled valve block with a Programmable Logic Controller (PLC) interface to the control panel.

FEED RATE LOW

WATER PRESSURE HIGH

BIT WEIGHT 1800 K

CHUCK SPE

### Familiar Manual Control

The LMA90 allows you full manual control. You'll recognise the familiar layout of the LMA control panel even though some of the levers have become switches. It still has the comfortable ergonomic design and clear control labelling you've grown familiar with. Electric solenoid control means the control panel is lighter and easier to move than ever before. And even when operated manually the Auto Drill Controller provides features that protect your equipment from unintentional damage.

### Set & Forget Automated Drilling

Automated drilling is easy. You set the drilling parameters, start drilling then push the 'Auto Drill' button and the LMA90 takes over.

The LMA90 will continue to drill, rechucking the rod and maintaining essential drilling conditions, until the selected rod length has been used or 'Auto Drill' is cancelled. Pressing 'Auto Drill' again will return you to manual drilling.

### Maximum Bit Life

Optimum fluid flow is essential for getting the best performance from impregnated bits. The LMA90 provides plenty of power for an hydraulic water pump and constantly monitors fluid pressure. If fluid pressure deviates outside the low or high presets the drill shuts down instantly.

### Built-in System Checks

Pressure checking and troubleshooting the hydraulic circuit is simplified by the integrated monitoring equipment. Main control valves can be manually operated by built in levers, allowing the operator to check for possible solenoid malfunction. The PLC is readily field serviceable and features replaceable modules for rapid recommissioning.

A comprehensive operations and service manual which clearly identifies all service, maintenance and troubleshooting procedures is provided.

### Hydraulic Oil Conditioning

For convenience all oil conditioning filters and accessories are located in a service bay. A warning message is displayed on the control panel if a filter becomes blocked.

Oil temperature is also monitored by the Auto Drill Controller to guard against dangerous operating conditions. If the oil temperature rises above the preset, warning of impending high temperature is displayed on the control panel.

### Fully Featured Starter

An optional, fully integrated starter enclosure has been specially designed for the LMA90. It is available as an enclosure only or fully fitted with your requirements of power control and component warning devices.



Oil conditioning equipment is located in a convenient service bay on the electric starter side of the powerpack. Integrated circuit monitoring equipment enables simplified, on-site pressure checking and trouble shooting.

The LMA control panel retains the user friendly LM ergonomic layout. Hydraulic valve blocks and hoses have been replaced with switches and cables making the panel easier to manoeuvre than ever before.



16

ED 1000 RPM

## Feedframes and Options

**The LMA90 continues the LM tradition of mix & match compatibility. A variety of feedframes, rotation units, rod holders and options is available to enable you to tailor your drilling solutions.**

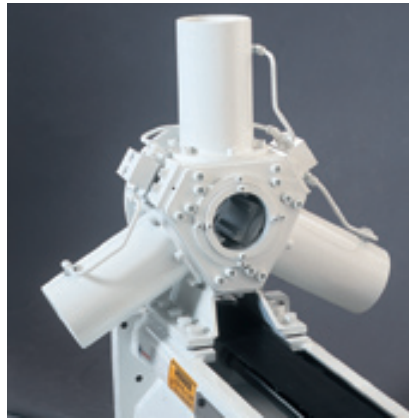
### High Capacity Feedframes Now Depth Rated

The feedframes offered with the LMA90 are designated by their nominal BQ downhole depth capacity. The 700 Series frame is engineered for 700 metres BQ drilling while the 1300 Series frame is built to withstand the forces associated with deep hole drilling to 1300 metres.

An essential feature of new Series feedframes is the integration of a linear transducer to supply system information on the rotation unit carriage position to the powerpack's PLC unit.

### Semi-automated Rod Handling

The LMA90 provides semi-automated rod handling operated via a pendant remote controller.



The PQ Tri-lobe rod holder is one of the options available on Series feedframes for the LMA90. Gripping pressure is maintained by high capacity springs acting on three tungsten carbide insert jaws.

The pendant remote control enables operator input from next to the feedframe. The controller activates either rod pulling or rod feeding. The operator either lifts the drill rod onto or off the feedframe and starts or disengages the thread. The Auto Drill Controller then takes over providing thread making or breaking and a feeding or pulling stroke. Each press of a button activates one rod cycle.

### Automated Features Prolong Equipment Life

LMA90's automation extends many benefits to the feedframe. Controlled acceleration and deceleration of the carriage reduces feedframe jarring. Power assisted carriage float automatically occurs when making and breaking threads to minimise thread damage. Rod make-up and break-out forces are controlled to protect rod threads and shoulders.

### Rotation Unit Options

Standard and high torque rotation unit designs are available to match depth and hole size requirements. For more information ask for the feedframe tech data sheets which outline the full range of options.

Feedframe options for the LMA90 include the 700 Series direct coupled frame shown below. It can be fitted with either standard or high torque rotation units.



## Optional Equipment

### Automated High Torque Rod Break-out Device

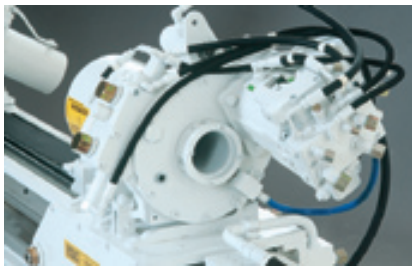
All rotation units include Boart Longyear's patented rod break-out device for a torque boost when unscrewing tight rod joints. Elimination of the need to break rods by hand greatly improves rod handling efficiency and provides for automation of the rod handling cycle.

### Superior Strength Rod Holder

A spring closed, hydraulically opened rod holder is standard on all Series feedframes.

The PQ version features the superior gripping power of the tri-lobe design.

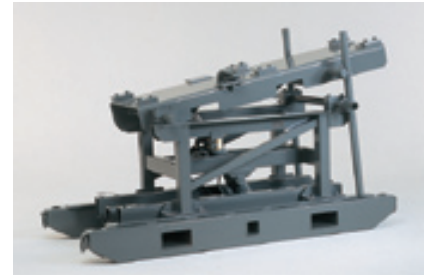
The rod string is always held by either the rod holder or the chuck. Accidental loss of hydraulic pressure results in the immediate closing of the rod holder.



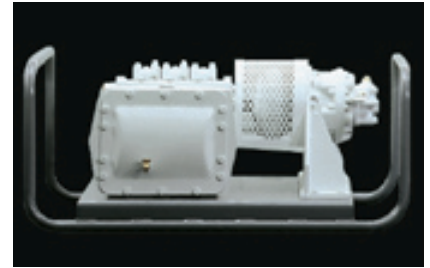
The drill head is driven by a bent axis, variable displacement, hydraulic motor for maximum power over the wide speed range. It is equipped with Boart Longyear's patented, high torque rod break-out device.

**Circuitry is built into the LMA90 to allow for the connection of a full range of options to suit your drilling requirements. Each option has been designed to enhance the productivity of the LMA90 system.**

Options include wireline hoists, water pumps, feedframe positioners, towing groups, service equipment, underground lighting systems and transportation aids.



An hydraulic feedframe positioner simplifies set up and provides a stable platform for correct drill operation.



An hydraulic water pump is essential for automated drill operation. Boart Longyear recommends the 535 Water Pump.



The wireline hoist offers smooth powered operation controlled from the control panel. The hoist has a freewheel mode as standard and an optional cable levelling winder is also available.



With the addition of a pendant controller semi-automated rod handling can be carried out conveniently from beside the feedframe.

## **Boart Longyear**

### **Boart Longyear Quality & Service**

Boart Longyear has been supplying high performance, quality products to the exploration and mining industry for over 100 years. Boart Longyear's products are manufactured under a quality system certified to AS/NZS 9001.

Technical support is available worldwide to assist with the commissioning of new drills, training of operators and service personnel, supply of genuine spare parts and to demonstrate how to achieve the maximum performance from Boart Longyear products.

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**For complete product specifications and a list of system accessories please refer to the Boart Longyear Tech Data sheets or contact your local Boart Longyear marketing centre.**

Boart Longyear is constantly striving to improve its products and must, therefore, reserve the right to change designs, materials, specifications and price without prior notice.

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