The LM™90 is the largest of Boart Longyear’s underground diamond coring rigs and is suited for drilling deep holes.

Equipped with a 130kN feed frame, this drill provides high pullback force as well as a relatively quick rod-handling rate. The feed cylinder is reversible for increased up-hole drilling capacity.

The rig is modular in design with a number of options which make it easier to tailor to specific needs and to upgrade when requirements change. With the assistance of a positioner and a turntable the drill is capable of drilling holes in all angles from vertically up to vertically down. The drill uses an electric motor to power the hydraulics on the machine. The drill can be paired with an optional rod handler which reduces operator fatigue and can improve safety and productivity.
1 DIRECT COUPLED FEED FRAME
Direct coupled feed frame results in lower maintenance and smoother feed transmission

2 SEMI-AUTOMATED ROD HANDLING (OPTIONAL)
Semi-automated rod handler (optional) makes handling of rods safer and easier

3 HIGH TORQUE BREAKOUT
Automated high torque break out device breaks most rod joints automatically

4 FAIL SAFE ROD CLAMP
Hydraulic open and spring close rod clamp results in fail safe operation

LOAD SENSING HYDRAULICS
Load sensing hydraulics maximize efficiency and reduce heat

PROPORTIONAL CONTROLS
Proportional controls and lock levers provide optimum control of rpm and feed
### LM™90 TECHNICAL INFORMATION

#### Drill Depth Guidelines

<table>
<thead>
<tr>
<th>Drill Rod/Core Barrel</th>
<th>Hole Depth</th>
<th>Hole Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metric</td>
<td>U.S.</td>
</tr>
<tr>
<td></td>
<td>Up</td>
<td>Horizontal</td>
</tr>
<tr>
<td></td>
<td>Up</td>
<td>Horizontal</td>
</tr>
<tr>
<td>ARQTK*</td>
<td>820</td>
<td>1500</td>
</tr>
<tr>
<td>BQ</td>
<td>430</td>
<td>1500</td>
</tr>
<tr>
<td>NQ</td>
<td>260</td>
<td>1190</td>
</tr>
<tr>
<td>HQ</td>
<td>130</td>
<td>610</td>
</tr>
</tbody>
</table>

Note: Depth capacity includes allowance for force required to break core using 10 MPa rock strength

*** ARQ™TK capacity shown for comparison purposes only. It is not recommended drilling practice to drill over 1500 m ARQ™TK depth

#### Drill Depth Guidelines with Cylinder Reversed

<table>
<thead>
<tr>
<th>Drill Rod/Core Barrel</th>
<th>Hole Depth</th>
<th>Hole Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metric</td>
<td>U.S.</td>
</tr>
<tr>
<td></td>
<td>Up</td>
<td>Up</td>
</tr>
<tr>
<td>AQTK™</td>
<td>1500</td>
<td>4920</td>
</tr>
<tr>
<td>BQ™</td>
<td>930</td>
<td>3060</td>
</tr>
<tr>
<td>NQ™</td>
<td>620</td>
<td>2050</td>
</tr>
<tr>
<td>HQ™</td>
<td>360</td>
<td>1200</td>
</tr>
</tbody>
</table>

Note: Depth capacity includes allowance for force required to break core using 10 MPa rock strength

#### Drill Specification:

<table>
<thead>
<tr>
<th>Feed Frame (1300 Series)</th>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Stroke</td>
<td>1830 mm</td>
<td>72 in</td>
</tr>
<tr>
<td>Max. rated pushing force</td>
<td>70.3 kN @ 31 MPa</td>
<td>15700 lbf @ 4500 psi</td>
</tr>
<tr>
<td>Max. rated pulling force</td>
<td>141.3 kN @ 31 MPa</td>
<td>31600 lbf @ 4500 psi</td>
</tr>
<tr>
<td>Rated carriage speed</td>
<td>0.70 m/s per complete cycle</td>
<td>3 ft/s per complete cycle</td>
</tr>
<tr>
<td>Normal rod handling speed</td>
<td>Approximately 15 n/min.*</td>
<td>Approximately 50 ft/minute*</td>
</tr>
</tbody>
</table>

Note: The feed frame is reversible

*** Actual rod handling speed may vary with working conditions
### Chuck and Rod Holder

<table>
<thead>
<tr>
<th></th>
<th>HQ™ Chuck</th>
<th>PQ™ Rod Holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum opening</td>
<td>97.0 mm (3.82 in)</td>
<td>125 mm (4.875 in)</td>
</tr>
<tr>
<td></td>
<td>Diameter corresponding to the ID of the HQ™ guide bush</td>
<td>Diameter corresponding to the ID of the PQ™ guide bush</td>
</tr>
<tr>
<td>Type</td>
<td>Closed hydraulically</td>
<td>Closed mechanically</td>
</tr>
<tr>
<td></td>
<td>Opened mechanically</td>
<td>Opened hydraulically</td>
</tr>
<tr>
<td></td>
<td>Automatic synchronization with rod holder</td>
<td>Automatic synchronization with chuck Manual overdrive</td>
</tr>
<tr>
<td>Jaws</td>
<td>3 (same as used with chuck)</td>
<td>3 (same as used with chuck)</td>
</tr>
<tr>
<td>Max. rated axial holding capacity</td>
<td>85.0 kN* (19110 lbf*)</td>
<td>130 kN* (33750 lbf*)</td>
</tr>
<tr>
<td>Max. rated static torsional holding capacity</td>
<td>3900 N-m (2870 lbf*)</td>
<td>5800 N-m (4255 lbf*)</td>
</tr>
<tr>
<td>***</td>
<td>At 7 MPa (1015 psi) with new jaws and rods</td>
<td></td>
</tr>
</tbody>
</table>

### HQ™ Drill Head, HI torque

#### Forward Rotation

<table>
<thead>
<tr>
<th>Chuck Speed</th>
<th>1330 RPM, continuously variable. Speeds will vary with oil type and temperature and are approximate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuck torque output</td>
<td>371 N-m @ 1250 RPM 272 lb-ft @ 1250 RPM</td>
</tr>
<tr>
<td></td>
<td>1030 N-m @ 500 RPM 757 lb-ft @ 500 RPM</td>
</tr>
</tbody>
</table>

#### Reverse Rotation

<table>
<thead>
<tr>
<th>Chuck Speed</th>
<th>100 RPM, fixed to help prevent rod thread damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuck Torque output</td>
<td>3770 Nm with break-out device @ 28.5 MPa 2780 lb-ft with break-out device @ 28.5 MPa</td>
</tr>
</tbody>
</table>
### Hydrostatic Pumps

<table>
<thead>
<tr>
<th>Main Pump</th>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Variable displacement, axial piston w/pressure compensated load sensing control</td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Rexroth (Hydromatiik GmbH)</td>
<td></td>
</tr>
<tr>
<td>Operating conditions as used on LM90™ drill: Maximum pressure</td>
<td>31 MPa, forward rotation, reverse rotation, rod handling</td>
<td>4500 PSI, forward rotation, reverse rotation, rod handling</td>
</tr>
</tbody>
</table>

### Recirculation pump

<table>
<thead>
<tr>
<th>Oil cooling and charge pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Manufacturer</td>
</tr>
<tr>
<td>Maximum pressure operating conditions as used on LM90™ drill</td>
</tr>
<tr>
<td>Normal speed</td>
</tr>
<tr>
<td>Hydraulic tank volume</td>
</tr>
</tbody>
</table>

### Wireline Hoist (optional)

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>All hydraulic, with proportional spooling control power up, power down, hydraulically locked in neutral free wheel override, chain driven spooling device</td>
</tr>
<tr>
<td>Line Pull</td>
<td></td>
</tr>
<tr>
<td>Bare Drum</td>
<td>11.77 kN</td>
</tr>
<tr>
<td>Full Drum</td>
<td>4.51 kN</td>
</tr>
<tr>
<td>Line Speed</td>
<td></td>
</tr>
<tr>
<td>Bare Drum</td>
<td>0 - 100 m/min</td>
</tr>
<tr>
<td>Full Drum</td>
<td>0 - 254 m/min</td>
</tr>
<tr>
<td>Drum Capacity</td>
<td></td>
</tr>
<tr>
<td>5 mm</td>
<td>1400 m</td>
</tr>
<tr>
<td>6 mm</td>
<td>1000 m</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>895 m</td>
</tr>
</tbody>
</table>
# DIMENSIONS AND WEIGHTS

## Feed Frame (1300 Series)

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Frame</td>
<td>1520 kg (3344 lbs)</td>
</tr>
<tr>
<td>Rotation Unit w/chuck</td>
<td>235 kg (517 lbs)</td>
</tr>
<tr>
<td>PQ™ Rod Clamp Assembly</td>
<td>170 kg (374 lbs)</td>
</tr>
</tbody>
</table>

- **a** = 698 mm (27.50 in)
- **b** = 851 mm (33.50 in)
- **c** = 4894 mm (193 in)

  - **Working length**
    - 6410 mm (252.50 in)
  - **Working length fully extended**
    - 4108 mm (162.75 in)

## Control Panel

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Panel</td>
<td>46 kg (101 lbs) w/o hoses</td>
</tr>
<tr>
<td></td>
<td>Add 42 kg (92 lbs) for hoses</td>
</tr>
</tbody>
</table>

- **a** = 575 mm (23 in)
- **b** = 521 mm (20.50 in)
- **c** = 480 mm (19 in)

## Power Pack

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Pack</td>
<td>1520 kg (3344 lbs)</td>
</tr>
<tr>
<td></td>
<td>Includes electric motor and starter, but without towing group</td>
</tr>
</tbody>
</table>

- **a** = 1318 mm (52 in)
- **b** = 730 mm (29 in)
- **c** = 1526 mm (60 in)
- **d** = 1033 mm (41 in)
- **e** = 3893 mm (153.25 in)
- **f** = 2230 mm (87.75 in)
MINING AND EXPLORATION DRILLING PRODUCTS

Coring Rods
Coring Bits
Surface Coring Rigs

www.boartlongyear.com

March 2018