Concept and characteristics

- High engine output with automatic engine speed control
- Controlled entirely from cab
- Sturdy and solid rig design
- Solid parallel kinematics on the basic machine
- High pull and push forces
- High torque
- Completely self-rigging (no auxiliary machines required)
- Large range of working tools (all common drilling works can be performed)
- Stepless leader inclination 5° forward - 15° backward depending on type of equipment
- Automatic vertical alignment
- High alignment forces
- Simultaneous control of several movements via Load-sensing multi-circuit hydraulics
- Quick assembly of rotary possible through quick connection
- Equipment design according to latest European regulations and standards
- All components designed to fulfill the special requirements of a drilling rig
- High manufacturing quality through quality control by PDE®-system
**Dimensions**

**Basic machine LB 20**

**Technical data**

- Total height: 21.23 m
- Max. pull, leader on ground: 300 kN
- Max. torque: 209 kNm
- Stepless leader inclination
- Lateral inclination: ±8°
- Forward inclination: 5°
- Backward inclination: 15°

**Operating weight**

- Total weight with 700 mm 3-web grousers: 68.5 t
- Total weight with 800 mm 3-web grousers: 68.9 t

The operating weight includes the basic machine (with rotary and Kelly bar MD 20/3/24) and 8 t counterweight.
Transport dimensions and weights

Transport - leader folded*
includes the basic machine (ready for operation) with leader, without working tools (such as rotary, Kelly bar etc.) and without counterweight.

Dimensions and weights
Leader length ——— 17.91 m
Weight complete without counterweight ——— 51.1 t

Transport - standard
includes the basic machine (ready for operation) with leader, without working tools (such as rotary, Kelly bar etc.) and without counterweight.

Dimensions and weights
Leader length ——— 17.91 m
Weight complete without counterweight ——— 51.1 t

Transport - leader folded with rotary**
includes the basic machine (ready for operation) with leader and rotary, without other working tools (such as Kelly bar etc.) and without counterweight.

*) Folding cylinder for leader top recommended
**) Folding cylinder for leader top and leader bottom required

Dimensions and weights
Leader length ——— 17.91 m
Weight complete, with rotary and without counterweight ——— 56.9 t
## Transport dimensions and weights

### Transport basic machine
ready for operation, without counterweight.

| Transport weight | 32.8 t |

### Counterweight

| Weight | 8.05 t |

### Rotary

| Transport weight | BA 200 | 5.3 t |

### Transport leader
includes the leader without working tools (such as rotary, Kelly bar etc.).

Weights can vary with the final configuration of the machine. The figures in this brochure may include options which are not within the standard scope of supply of the machine.

### Dimensions and weights

| Leader length | 17.91 m |
| Weight complete | 18.3 t |
| Lower part of the leader | 1.2 t |
| Upper part of the leader with leader top | 2.1 t |
Rotary BA 200 with shock absorber

- 2-stage-gear drive for flexible adaptation to soil conditions
- Due to stepless speed control via joystick optimum and precise alignment and rock drilling is possible even at low speed levels; it is not required to preselect an operating mode
- Kelly shock absorber and rubber bearing relieve the material and reduce noise emission
- Thanks to the Kelly shock absorber the Kelly bar is guided at greater length
- Various drive adapters provide compatibility with other systems
**Kelly drilling**

**Technical data**
- Drilling drive - torque: 1st gear 209 kNm
- Drilling drive - speed: 1st gear 34 rpm
- Drilling drive - torque: 2nd gear 109 kNm
- Drilling drive - speed: 2nd gear 66 rpm

**Performance data**
- Max. drilling diameter*: 1500 mm uncased
- Max. drilling diameter*: 1200 mm cased

*) Other drilling diameters available on request.

**Kelly bars**

<table>
<thead>
<tr>
<th>A (mm)</th>
<th>X (mm)</th>
<th>Drilling depth (m)</th>
<th>Weight (t)</th>
<th>Kelly Ø (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD 20/3/24</td>
<td>9800</td>
<td>6900</td>
<td>22.3</td>
<td>4.1</td>
</tr>
<tr>
<td>MD 20/3/27</td>
<td>10800</td>
<td>5900</td>
<td>25.3</td>
<td>4.5</td>
</tr>
<tr>
<td>MD 20/3/30</td>
<td>11800</td>
<td>4900</td>
<td>28.3</td>
<td>4.8</td>
</tr>
<tr>
<td>MD 20/3/33</td>
<td>12800</td>
<td>3900</td>
<td>31.3</td>
<td>5.2</td>
</tr>
<tr>
<td>MD 20/4/36</td>
<td>11360</td>
<td>5400</td>
<td>34.3</td>
<td>6.3</td>
</tr>
<tr>
<td>MD 20/4/42</td>
<td>12950</td>
<td>3800</td>
<td>40.3</td>
<td>6.9</td>
</tr>
<tr>
<td>MD 20/4/48</td>
<td>14450</td>
<td>2300</td>
<td>46.3</td>
<td>7.6</td>
</tr>
<tr>
<td>MD 20/4/54</td>
<td>15950</td>
<td>800</td>
<td>52.3</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Other Kelly bars available on request.
When using a casing oscillator, value X has to be reduced by 1500 mm.
Continuous flight auger drilling

**Technical data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Gear</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling drive - torque</td>
<td>1st</td>
<td>209 kNm</td>
</tr>
<tr>
<td>Drilling drive - speed</td>
<td>1st</td>
<td>34 rpm</td>
</tr>
<tr>
<td>Drilling drive - torque</td>
<td>2nd</td>
<td>109 kNm</td>
</tr>
<tr>
<td>Drilling drive - speed</td>
<td>2nd</td>
<td>66 rpm</td>
</tr>
</tbody>
</table>

**Performance data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling depth with auger cleaner*</td>
<td>13.0 m</td>
</tr>
<tr>
<td>Drilling depth without auger cleaner*</td>
<td>13.6 m</td>
</tr>
<tr>
<td>Drilling depth with 6 m Kelly extension, without auger cleaner</td>
<td>19.6 m</td>
</tr>
<tr>
<td>Max. pull force (crowd winch and Kelly winch)</td>
<td>660 kN</td>
</tr>
<tr>
<td>Max. push force (weight of rotary and auger to be added)</td>
<td>150 kN</td>
</tr>
<tr>
<td>Max. drilling diameter**</td>
<td>900 mm</td>
</tr>
</tbody>
</table>

*) Without Kelly extension

**) Other drilling diameters available on request.
Double rotary drilling
Model DBA 80

Technical data

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Gear</th>
<th>Torque (kNm)</th>
<th>Speed (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling drive I</td>
<td>1st</td>
<td>83</td>
<td>14</td>
</tr>
<tr>
<td>Drilling drive I</td>
<td>2nd</td>
<td>41</td>
<td>28</td>
</tr>
<tr>
<td>Drilling drive II</td>
<td>1st</td>
<td>62</td>
<td>19</td>
</tr>
<tr>
<td>Drilling drive II</td>
<td>2nd</td>
<td>31</td>
<td>38</td>
</tr>
</tbody>
</table>

Max. drilling diameter*: 620 mm
Max. drilling depth: 13.6 m
Max. pull force: 500 kN

*) Other drilling diameters available on request.
Twin mix equipment
Model DMA 35

Technical data

<table>
<thead>
<tr>
<th></th>
<th>1st gear</th>
<th>2nd gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling drive - torque</td>
<td>35 kNm</td>
<td>17.5 kNm</td>
</tr>
<tr>
<td>Drilling drive - speed</td>
<td>38 rpm</td>
<td>76 rpm</td>
</tr>
<tr>
<td>Max. drilling depth</td>
<td>13.6 m</td>
<td></td>
</tr>
<tr>
<td>Max. drilling diameter*</td>
<td>700 mm</td>
<td></td>
</tr>
</tbody>
</table>

*) Other diameters available on request.
Technical description

**Engine**

Power rating according to ISO 9249, 270 kW (362 hp) at 2000 rpm  
Engine type ——— Liebherr D 936 L A6  
Fuel tank ——— 700 l capacity with continuous level indicator and reserve warning  
Engine complies with NRMM exhaust certification EPA/CARB Tier 3 and 97/68 EC Stage III A.

**Hydraulic system**

The main pumps are operated by a distributor gearbox. Axial piston displacement pumps work in open circuits supplying oil only when needed (flow control on demand). The hydraulic pressure peaks are absorbed by the integrated automatic pressure compensation, which relieves the pump and saves fuel.

Pumps for working tools ——— 2x 240 l/min  
Separate pump for kinematics ——— 137 l/min  
Hydraulic oil tank ——— 600 l  
Max. working pressure ——— 350 bar  

The cleaning of the hydraulic oils occurs via an electronically monitored pressure and return filter. Any clogging is shown on the monitor in the cab. The use of synthetic environmentally friendly oil is also possible.

**Crawlers**

Propulsion through axial piston motor, hydraulically released spring loaded multi-disc brake, maintenance free crawler tracks, hydraulic chain tensioning device.

Drive speed of telescopic undercarriage ——— 0 – 1.8 km/h  
Track force ——— 438 kN  
Width of 3-web grousers ——— 700 mm  
Transport width ——— 3000 mm  

Option:  
Width of 3-web grousers ——— 800 mm  
Transport width ——— 3400 mm  

**Swing**

Consists of triple-row roller bearing with external teeth and one swing drive, fixed axial piston hydraulic motors, spring loaded and hydraulically released multi-disc holding brake, planetary gearbox and pinion. Selector for 3 speed ranges to increase swing precision. Swing speed from 0 – 3.5 rpm is continuously variable.

**Control**

The control system - developed and manufactured by Liebherr - is designed to withstand extreme temperatures and the many heavy-duty construction tasks for which this machine has been designed. Complete machine operating data are displayed on a high resolution monitor. A GSM modem allows for remote inquiry of machine data and error indications. To ensure clarity of the information on display, different levels of data are shown in enlarged lettering and symbols. Control and monitoring of the sensors are also handled by this high technology system. Error indications are automatically displayed on the monitor in clear text. The machine is equipped with proportional control for all movements, which can be carried out simultaneously. Two joysticks are required for operation. Pedal control can be changed to hand control.

Options:  
- PDE*: Process data recording  
- GSM modem

**Kelly winch with freewheeling**

Line pull effective (2nd layer) ——— 180 kN  
Rope diameter ——— 28 mm  
Line speed ——— 0-79 m/min

**Auxiliary winch**

Line pull effective (1st layer) ——— 80 kN  
Rope diameter ——— 20 mm  
Line speed ——— 0-71 m/min

**Rope crowd system**

Crowd force (push/pull) ——— 300/300 kN  
Line pull (effective) ——— 150 kN  
Rope diameter ——— 24 mm  
Travel of working tool ——— 14.5 m  
Line speed ——— 0-78 m/min

The winches are noted for compact, easily mounted design. Propulsion is via a maintenance-free planetary gearbox in oil bath. Load support by the hydraulic system; additional safety factor by a spring-loaded, multi-disc holding brake. All line pull values are effective values. The efficiency factor of approx. 25% has already been deducted.

**Noise emission**

Noise emissions correspond with 2000/14/EC directive on noise emission by equipment used outdoors.
**Process data recording system - PDE®** (additional equipment)
The Liebherr process data recording system PDE® constantly records the relevant process data during the working process.

Depending on the application the recorded and processed data are displayed on the PDE® touchscreen in the operator’s cab, e.g. in the form of an online cast-in-place pile.

At the same time the PDE® is operated using this touchscreen. The operator can enter various details (e.g. jobsite name, pile number, etc.) and start and stop recordings. A recording of every start-stop cycle carried out in the PDE® is established on a CompactFlash memory card.

The PDE® can be configured in a number of ways, e.g. for the connection of external sensors, for the generation of a simple protocol as graphic file and/or for a printout directly in the operator’s cab.

**Process data reporting - PDR** (additional equipment)
Comprehensive data evaluation and generation of reports on a PC is possible using the software SCULI PDR.

**Recordings management** - The recordings generated by the PDE® system can be imported and managed in SCULI PDR. The data can be imported directly from the CompactFlash card or via the Liebherr telematics system LiDAT. Certain recordings, e.g. for a particular day or jobsite, can be found using filter functions.

**Viewing data** - The data in each record is displayed tabularly. Combining several recordings provides results, for example, regarding the total concrete consumption or the average depth. Furthermore, a diagram editor is available for quick analysis.

**Generating reports** - A vital element of SCULI PDR is the report generator, which allows for the generation of individual reports. These can be printed out directly or stored as pdf files. In the process the size, colour, line thickness or even the desired logo can be configured. Moreover, the reports can be displayed in different languages, e.g. in English and in the national language.