**Concept and characteristics**

The rigid leader absorbs high torque and is fitted with a rope crowd system for high pull forces.

All winches are mounted on the leader, which provides a direct view of the main winch from the operator’s cab.

The rotary drive of the BAT series combines exceptional torque with optimum operating comfort.

The powerful Liebherr diesel engine is low in emission and economical through SCR technology.

The robust universal machine for a wide variety of applications:

- Kelly drilling
- Auger drilling
- Full displacement drilling
- Double rotary drilling

The solid undercarriage offers excellent stability and low ground bearing pressure.

The uppercarriage with its small swing radius enables operation in restricted space.

Parallel kinematics with a large working area allow to fold back the leader.
The Litronic control with assistance systems supports the operator:

- Cruise Control for the drilling process
- Joystick control for all machine functions
- Automatic shake-off function for working tools
- Leader inclination memory etc.

Sophisticated solutions provide safe operation and maintenance of the machine.

- Cab design for optimum visibility
- Acoustic and optic warning
- Safety rails on top of the uppercarriage
- Rear and side view cameras etc.

Liebherr Kelly bars feature strongly overlapping elements resulting in less wear.

Precise and robust Liebherr casings and drilling tools provide excellent drilling performance.
### Dimensions

**Technical data LB 16-180**

- **Total height**: 17.83 m
- **Max. pull, leader on ground**: 200 kN
- **Continuous rig inclination adjustment**
  - Lateral inclination: ± 8°
  - Forward inclination: 5°
  - Backward inclination: 15°

**Technical data LB 16-180 Low Head**

- **Total height**: 12.47 m
- **Max. pull, leader on ground**: 200 kN
- **Continuous rig inclination adjustment**
  - Lateral inclination: ± 8°
  - Forward inclination: 5°
  - Backward inclination: 15°

**Operating weight LB 16-180**

- **Total weight with 600 mm 3–web shoes**: 52.8 t

The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 20/3/24) and 6.0 t counterweight, without equipment for casing oscillator.

**Operating weight LB 16-180 Low Head**

- **Total weight with 600 mm 3–web shoes**: 50.8 t

The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 20/3/15) and 6.0 t counterweight, without equipment for casing oscillator.
Technical data LB 16-180 CFA Drilling

- Total height: 27.46 m
- Max. pull, leader on ground: 520 kN
- Continuous rig inclination adjustment:
  - Lateral inclination: ± 3°
  - Forward inclination: 3°
  - Backward inclination: 3°

Operating weight LB 16-180 CFA Drilling

- Total weight with 600 mm 3-web shoes: 60.6 t
- The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 16/3/10) and 6.0 t counterweight, without equipment for casing oscillator.

Technical data LB 16-180 Ultra Low Head

- Total height: 6.9 m – 8.17 m
- Max. pull, leader on ground: 200 kN
- Continuous rig inclination adjustment:
  - Lateral inclination: ± 8°
  - Forward inclination: 5°
  - Backward inclination: 15°

Operating weight LB 16-180 Ultra Low Head

- Total weight with 600 mm 3-web shoes: 48.2 t
- The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 16/3/10) and 6.0 t counterweight, without equipment for casing oscillator.
**Transport dimensions and weights**

**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**

<table>
<thead>
<tr>
<th>Length</th>
<th>15.36 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight complete without counterweight</td>
<td>37.8 t</td>
</tr>
</tbody>
</table>

**Transport option 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**

<table>
<thead>
<tr>
<th>Length</th>
<th>13.2 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight complete without counterweight</td>
<td>37.8 t</td>
</tr>
</tbody>
</table>

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

**Dimensions and weights**

<table>
<thead>
<tr>
<th>Length</th>
<th>15.37 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight complete without counterweight</td>
<td>42.8 t</td>
</tr>
</tbody>
</table>

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

Dimensions and weights
Length: 12.93 m
Weight complete without counterweight: 36.9 t

Transport Ultra Low Head
includes the basic machine (ready for operation) with leader and 6.0 t counterweight, without working tools (such as rotary, Kelly bar etc.).

Dimensions and weights
Length: 12.93 m
Weight complete with counterweight: 41.0 t

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

Dimensions and weights
Length: 17.15 m
Weight complete without counterweight: 41.4 t

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.
**Transport dimensions and weights**

**Transport basic machine**
- without counterweight.
- Transport weight: 24.8 t

**Counterweight (optional equipment)**
- Counterweight: 4 t

**Counterweight (standard)**
- Counterweight: 6 t

**Rotary**
- Transport weight: 5.1 t

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

**Dimensions and weights**
- Length: 15.36 m
- Weight complete: 13.0 t
- Lower part of the leader: 1.1 t
- Upper part of the leader with leader top: 2.3 t
Technical description

**Engine**

- Power rating according to ISO 9249, 230 kW (308 hp) at 1700 rpm
- Engine type: Liebherr D 944 A7-04
- Fuel tank: 470 l capacity with continuous level indicator and reserve warning
- Engine complies with 97/68 EC Stage IV or NRMM exhaust certification EPA/CARB Tier 4f.

**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 272 l/min
- Separate pump for kinematics: 130 l/min
- Hydraulic oil tank: 500 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 display 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: 0 – 1.8 km/h
- Track force: 438 kN
- Width of 3-web grousers (option 800 mm): 600 mm

**Swing**

Swing ring with single row ball bearing, internal 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 screen. A GSM/GPRS telematics module allows for remote inquiry of machine data and operational conditions. 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.
- Option: PDE®: Process data recording

**Kelly winch with freewheeling for Ultra Low Head**

- Line pull effective (3rd layer): 110 kN
- Rope diameter: 20 mm
- Line speed: 0-91 m/min

**Kelly winch with freewheeling**

- Line pull effective (2nd layer): 160 kN
- Rope diameter: 24 mm
- Line speed: 0-75 m/min

**Auxiliary winch**

- Line pull effective (1st layer): 50 kN
- Rope diameter: 14 mm
- Line speed: 0-85 m/min

**Rope crowd system**

- Crowd force: 200/200 kN
- Line pull (effective): 100 kN
- Travel: 12 m
- Line speed: 0-90 m/min

- Crowd cylinder system for Ultra Low Head:
  - Crowd force: 207/207 kN
  - Travel: 2.8 m
  - Crowd speed up/down: 16.5/13 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.
- Guaranteed sound pressure level L_p in the cabin: 76.3 dB(A)
- Guaranteed sound power level L_W: 110 dB(A)
- Vibration transmitted to the hand-arm system of the machine operator: < 2.5 m/s²
- Vibration transmitted to the whole body of the machine operator: < 0.5 m/s²

Noise emissions correspond with 2000/14/EC directive.
Rotary BAT 180 with shock absorber

Automatic gearbox for best operating comfort
- No stopping required to change gears
- No interruption of the drilling process
- Automatic torque adjustment
- Continuous optimization of speed
- Four electronically adjustable speed ranges

Highest availability through easy set-up
- No mechanical shift gearbox
- Higher availability thanks to less moving parts
- Less maintenance required
- No pressure lubrication necessary
- No interferences through defective lubrication pump
- Simplified hydraulics
- Lower risk of hydraulics leakages

Flexibility through modular design
- Exchangeable drive adapters for use of other Kelly bars
- Exchangeable cardan joint for other casing drivers
- Quickly exchangeable equipment for other methods of operation

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- Quickly exchangeable equipment for other methods of operation
Kelly drilling
LB 16-180

**Technical data**
- Rotary drive - torque: 0 – 180 kNm
- Rotary drive - speed: 0 – 52 rpm

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

*) Other drilling diameters available on request
Other Kelly bars available on request
When using a casing oscillator, value X has to be reduced by 1200 mm.

**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 20/2/18</td>
<td>10700</td>
<td>2700</td>
<td>16.5</td>
<td>3.4</td>
</tr>
<tr>
<td>MD 20/3/18</td>
<td>7800</td>
<td>5600</td>
<td>16.5</td>
<td>3.4</td>
</tr>
<tr>
<td>MD 20/3/21</td>
<td>8800</td>
<td>4600</td>
<td>19.5</td>
<td>3.7</td>
</tr>
<tr>
<td>MD 20/3/24</td>
<td>9800</td>
<td>3600</td>
<td>22.5</td>
<td>4.1</td>
</tr>
<tr>
<td>MD 20/3/27</td>
<td>10800</td>
<td>2600</td>
<td>25.5</td>
<td>4.5</td>
</tr>
<tr>
<td>MD 20/3/30</td>
<td>11800</td>
<td>1600</td>
<td>28.5</td>
<td>4.8</td>
</tr>
<tr>
<td>MD 20/4/36</td>
<td>11360</td>
<td>2100</td>
<td>34.5</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Kelly drilling
LB 16-180 Low Head

**Technical data**
- Rotary drive - torque: 0 – 180 kNm
- Rotary drive - speed: 0 – 52 rpm

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

*) Other drilling diameters available on request
**) Assist crane required for mounting/dismounting

**Kelly bars**

<table>
<thead>
<tr>
<th></th>
<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 20/3/15</td>
<td>6800</td>
<td>1200</td>
<td>13.5</td>
<td>3.0</td>
<td>368</td>
</tr>
<tr>
<td>MD 20/3/18**</td>
<td>7800</td>
<td>200</td>
<td>16.5</td>
<td>3.4</td>
<td>368</td>
</tr>
</tbody>
</table>

Other Kelly bars available on request
Kelly drilling
LB 16-180 Ultra Low Head

Technical data
- Rotary drive - torque: 0 – 180 kNm
- Rotary drive - speed: 0 – 52 rpm
- Kelly winch (Ultra Low Head): 110 kN
- Rope diameter: 20 mm
- Line speed: 0 – 91 m/min
- Crowd cylinder push/pull: 0 – 200 kN
- Crowd speed: 0 – 23 m/min

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

Kelly bars

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>X</th>
<th>Drilling depth</th>
<th>Weight</th>
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<tbody>
<tr>
<td>MD 16/3/10</td>
<td>4600</td>
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<td>8.7</td>
<td>2.25</td>
<td>368</td>
</tr>
<tr>
<td>MD 16/4/13</td>
<td>4600</td>
<td>1700</td>
<td>11.5</td>
<td>2.52</td>
<td>368</td>
</tr>
</tbody>
</table>

When working at max. radius X will be reduced by 1200 mm, drilling depth will be increased by 1200 mm. Other Kelly bars available on request

*) Other drilling diameters available on request
Continuous flight auger drilling

Technical data
- Rotary drive - torque: 0 – 180 kNm
- Rotary drive - speed: 0 – 52 rpm

Performance data
- Drilling depth with 6 m Kelly extension, with auger cleaner: 21.4 m
- Max. pull force (crowd winch and Kelly winch): 520 kN
- Max. drilling diameter*: 800 mm

*) Other drilling diameters available on request
Double rotary drilling
Model DBA 90

Technical data

- Rotary drive I - torque
  1st gear: 90 kNm
  2nd gear: 45 kNm

- Rotary drive I - speed
  1st gear: 16 rpm
  2nd gear: 32 rpm

- Rotary drive II - torque
  1st gear: 68 kNm
  2nd gear: 34 kNm

- Rotary drive II - speed
  1st gear: 22 rpm
  2nd gear: 44 rpm

Performance data

- Max. drilling diameter*: 508 mm
- Max. drilling depth: 11.5 m
- Max. pull force: 360 kN

*) Other drilling diameters available on request
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 PDR.

Recordings management - The recordings generated by the PDE® system can be imported and managed in 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 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.