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

- Walkways on the uppercarriage
- 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 28-320

<table>
<thead>
<tr>
<th>Total height</th>
<th>84 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous rig inclination adjustment</td>
<td>± 5°</td>
</tr>
<tr>
<td>Lateral inclination</td>
<td>± 5°</td>
</tr>
<tr>
<td>Forward inclination</td>
<td>5°</td>
</tr>
<tr>
<td>Backward inclination</td>
<td>15°</td>
</tr>
</tbody>
</table>

Operating weight LB 28-320

Total weight with 31.5 inch 3–web shoes 217,600 lbs
Total weight with 35.4 inch 3–web shoes 218,920 lbs

The operating weight includes the basic machine LB 28-320 (with rotary and Kelly bar MD 28/3/30) and 33,950 lbs counterweight, without equipment for casing oscillator.

Technical data LB 28-320 with optional equipment

<table>
<thead>
<tr>
<th>Total height</th>
<th>89 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous rig inclination adjustment</td>
<td>± 5°</td>
</tr>
<tr>
<td>Lateral inclination</td>
<td>± 5°</td>
</tr>
<tr>
<td>Forward inclination</td>
<td>5°</td>
</tr>
<tr>
<td>Backward inclination</td>
<td>15°</td>
</tr>
</tbody>
</table>

Operating weight LB 28-320 with optional equipment

Total weight with 31.5 inch 3–web shoes 233,910 lbs
Total weight with 35.4 inch 3–web shoes 235,235 lbs

The operating weight includes the basic machine LB 28-320 (with rotary and Kelly bar MD 28/4/54), extension of drilling axis (51.2 inch), leader extension (44.1 inch) and 37,920 lbs counterweight, without equipment for casing oscillator.
Technical data LB 28-320 Low Head

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total height</td>
<td>56 ft</td>
</tr>
<tr>
<td>Continuous rig inclination adjustment</td>
<td>± 5°</td>
</tr>
<tr>
<td>Lateral inclination</td>
<td>5°</td>
</tr>
<tr>
<td>Forward inclination</td>
<td>5°</td>
</tr>
<tr>
<td>Backward inclination</td>
<td>15°</td>
</tr>
</tbody>
</table>

Operating weight LB 28-320 Low Head

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total weight with 31.5 inch 3–web shoes</td>
<td>208,780 lbs</td>
</tr>
<tr>
<td>Total weight with 35.4 inch 3–web shoes</td>
<td>210,100 lbs</td>
</tr>
</tbody>
</table>

The operating weight includes the basic machine LB 28-320 (with rotary and Kelly bar MD 28/3/24) and 33,950 lbs 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
- Length: 81.9 ft
- Weight complete without counterweight: 156,750 lbs

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
- Length: 67.2 ft
- Weight complete without counterweight: 160,940 lbs

Transport with optional equipment
- 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: 86.3 ft
- Weight complete without counterweight: 159,835 lbs

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: 56.0 ft
- Weight complete without counterweight: 149,915 lbs

*) Dimensions for machines with optional equipment
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.
Rotary BAT 320 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
Kelly drilling

**Technical data**
- Rotary drive - torque: 0 – 236,020 lbf-ft
- Rotary drive - speed: 0 – 47 rpm

**Performance data**
- Max. drilling diameter*: 6.2 ft uncased
- Max. drilling diameter*: 4.9 ft 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 4.9 ft.
Kelly drilling
LB 28-320 with optional equipment

Technical data

- Rotary drive - torque 0 – 236,020 lbf-ft
- Rotary drive - speed 0 – 47 rpm

Performance data

- Max. drilling diameter* 7.5 ft uncased
- Max. drilling diameter* 6.6 ft 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 5.2 ft.

Kelly bars

| MD 28/3/24 | 32.4 | 41.0 | 72.2 | 11,025 | 16.5 |
| MD 28/3/27 | 35.7 | 37.7 | 82.0 | 12,125 | 16.5 |
| MD 28/3/30 | 39.0 | 34.4 | 91.9 | 13,010 | 16.5 |
| MD 28/3/33 | 42.3 | 31.2 | 101.7 | 14,110 | 16.5 |
| MD 28/3/36 | 45.5 | 27.9 | 111.5 | 14,905 | 16.5 |
| MD 28/4/36 | 37.6 | 36.1 | 111.5 | 16,095 | 16.5 |
| MD 28/4/42 | 52.5 | 31.2 | 131.2 | 17,860 | 16.5 |
| MD 28/4/48 | 47.4 | 26.2 | 150.9 | 19,845 | 16.5 |
| MD 28/4/54 | 52.3 | 21.3 | 170.6 | 21,605 | 16.5 |
| MD 28/4/60 | 57.3 | 16.4 | 190.3 | 23,590 | 16.5 |
| MD 28/4/66 | 62.2 | 11.5 | 210.0 | 25,575 | 16.5 |
| MD 28/4/72 | 67.1 | 6.6  | 229.7 | 27,340 | 16.5 |
**Kelly drilling**

**LB 28-320 Low Head**

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### Technical data

- **Rotary drive - torque**: 0 – 236,020 lbf-ft
- **Rotary drive - speed**: 0 – 47 rpm

### Performance data

- **Max. drilling diameter**: 6.2 ft uncased
- **Max. drilling diameter**: 4.9 ft cased

---

### Kelly bars

<table>
<thead>
<tr>
<th>A (ft)</th>
<th>X (ft)</th>
<th>Drilling depth (ft)</th>
<th>Weight (lbs)</th>
<th>Kelly Ø (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD 28/3/24</td>
<td>32.4</td>
<td>8.9</td>
<td>72.2</td>
<td>11,025</td>
</tr>
<tr>
<td>MD 28/3/27</td>
<td>35.7</td>
<td>5.6</td>
<td>82.0</td>
<td>12,125</td>
</tr>
</tbody>
</table>

* Other drilling diameters available on request
  Other Kelly bars available on request
  When using a casing oscillator, value X has to be reduced by 4.9 ft.
Continuous flight auger drilling

Technical data

Rotary drive - torque ......................................... 0 – 236,020 lbf-ft
Rotary drive - speed .......................................... 0 – 47 rpm

Performance data

Drilling depth with auger cleaner* ........................................ 66.8 ft
Drilling depth with 26.2 ft Kelly extension
without auger cleaner ........................................ 83.0 ft
Max. pull force (crowd winch and Kelly winch) ............. 202,330 lbf
Max. push force (weight of rotary and auger to be added) 44,965 lbf
Max. drilling diameter** .......................................... 39.4 inch

*) Without Kelly extension and without leader extension
**) Other drilling diameters available on request
**Full displacement drilling**

![Diagram of a drilling machine](image)

**Technical data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary drive - torque</td>
<td>0 – 236,020 lbf-ft</td>
</tr>
<tr>
<td>Rotary drive - speed</td>
<td>0 – 47 rpm</td>
</tr>
</tbody>
</table>

**Performance data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling depth*</td>
<td>58.4 ft</td>
</tr>
<tr>
<td>Drilling depth with 26.2 ft Kelly extension</td>
<td>84.6 ft</td>
</tr>
<tr>
<td>Max. pull force (crowd winch and Kelly winch)</td>
<td>202,330 lbf</td>
</tr>
<tr>
<td>Max. push force (weight of rotary and drilling tool to be added)</td>
<td>44,965 lbf</td>
</tr>
<tr>
<td>Max. drilling diameter**</td>
<td>23.6 inch</td>
</tr>
</tbody>
</table>

*) Without Kelly extension  
**) Other drilling diameters available on request
Double rotary drilling
Model DBA 200

Technical data

<table>
<thead>
<tr>
<th></th>
<th>0 – 154,888 lbf-ft</th>
<th>0 – 17 rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary drive I - torque</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotary drive I - speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotary drive II - torque</td>
<td>0 – 77,444 kNm</td>
<td></td>
</tr>
<tr>
<td>Rotary drive II - speed</td>
<td>0 – 37 rpm</td>
<td></td>
</tr>
</tbody>
</table>

Performance data

<table>
<thead>
<tr>
<th></th>
<th>29.5 inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. drilling diameter*</td>
<td></td>
</tr>
<tr>
<td>Max. drilling depth**</td>
<td>58.4 ft</td>
</tr>
<tr>
<td>Max. pull force</td>
<td>202,330 lbf</td>
</tr>
</tbody>
</table>

*) Other drilling diameters available on request
**) Other drilling depths available on request

Display for double rotary drilling
Technical description

Engine

Power rating according to ISO 9249, 390 kW (523 hp) at 1700 rpm
Engine type: Liebherr D 946 A7 - 04
Fuel tank: 185 gal capacity with continuous level indicator and reserve warning
Engine complies with 97/68 EC Stage IV and 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 92.5 gal/min
Separate pump for kinematics: 47.5 gal/min
Hydraulic oil tank: 211 gal
Max. working pressure: 5076 PSI
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 – 1.15 mph
Track force: 153,095 lbf
Width of 3-web grousers (option 31.5 inch): 35.4 inch

Swing

Consists of triple-row roller bearing with external teeth and two swing drives, fixed axial piston hydraulic motor, 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 – 2 rpm is continuously variable.

Noise emission

Noise emissions correspond with 2000/14/EC directive.
Guaranteed sound pressure level LpA in the cabin: 76.5 dB(A)
Guaranteed sound power level LwA: 112 dB(A)
Vibration transmitted to the hand-arm system of the machine operator: < 8.20 ft/s²
Vibration transmitted to the whole body of the machine operator: < 1.64 ft/s²

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

Line pull effective (1st layer): 56,200 lbf
Rope diameter: 34 mm
Line speed: 0-279 ft/min
Option:
Line pull effective (1st layer): 64,445 lbf
Rope diameter: 34 mm
Line speed: 0-249 ft/min

Auxiliary winch

Line pull effective (1st layer): 22,480 lbf
Rope diameter: 20 mm
Line speed: 0-292 ft/min

Rope crowd system

Crowd force push/pull: 89,925 lbf
Line pull (effective): 44,965 lbf
Rope diameter: 28 mm
Travel with standard leader between mechanical limit stops, without extension: 60.7 ft
Line speed: 0-230 ft/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

Guaranteed sound pressure level LpA in the cabin: 76.5 dB(A)
Guaranteed sound power level LwA: 112 dB(A)
Vibration transmitted to the hand-arm system of the machine operator: < 8.20 ft/s²
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Noise emission

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Vibration transmitted to the hand-arm system of the machine operator: < 8.20 ft/s²
Vibration transmitted to the whole body of the machine operator: < 1.64 ft/s²
Process data recording system - PDE® (additional equipment)

The Liebherr process data recording system PDE® constantly records the relevant process data during the working process.

![Image of PDE® colour monitor](image)

- PDE® colour monitor for visualization of the PDE® data in the operator's cab
- CompactFlash memory card
- External sensors
- Printer
- Process data report software PDR
- PC provided by the customer
- Standard
- Optional

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.

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