Piling and drilling rig

LRB 355

Litronic

LIEBHERR
The robust universal machine for a wide variety of applications:

- Full displacement drilling
- Continuous flight auger drilling
- Double rotary drilling
- Kelly drilling
- Soil mixing
- Vibrator slim design
- Ring vibrator
- Hydraulic hammer
- Cutter Soil Mixing (CSM)

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 allows to fold the leader back.

All winches are mounted on the leader for low centre of gravity and easy operation.

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

The quick change system allows for rapid mounting or changing of attachment.
The powerful Liebherr diesel engine is low in emission and economical through SCR technology.

The optional Eco-Silent-Mode reduces fuel consumption and noise emission.

The Litronic control with assistance systems supports the operator:

- Joystick control for all machine functions
- Leader inclination memory
- Centrifugal governor for vibrator
- Cruise Control for the drilling process etc.

The PDE process data recording system creates the basis for a complete documentation of the working processes carried out. Using the PDR evaluation software this documentation is given the desired form.

Sophisticated solutions provide safe operation and maintenance of the machine:

- Cab design for optimum visibility
- Acoustic and optic warnings
- Rear and side view cameras etc.
**Dimensions and weights**

**LRB 355 with standard undercarriage**

**Operating weight LRB 355**
- Total weight with 900 mm 3–web shoes: 94 t
- The operating weight includes the basic machine LRB 355 (ready for operation*) and 3x 6 t counterweight, without attachment.

**Additional weights LRB 355**
- Main winch 25 t with leader top: 4.8 t
- Elevating working platform: 0.9 t
- Adapter for casing oscillator: 1.2 t
- Hydraulic leader foot: 0.8 t
- Concrete supply line: 0.8 t

*) Including 20% filling of diesel tank

**LRB 355 with standard undercarriage and optional equipment**

**Operating weight LRB 355 with optional equipment**
- Total weight with 900 mm 3–web shoes: 95.3 t
- The operating weight includes the basic machine LRB 355 (ready for operation*) and 3x 6 t counterweight, without attachment.

**Additional weights LRB 355 with optional equipment**
- Main winch 25 t with leader top: 4.8 t
- Elevating working platform: 1.0 t
- Adapter for casing oscillator: 1.2 t
- Hydraulic leader foot: 0.8 t
- Concrete supply line: 0.8 t
LRB 355, undercarriage with detachable crawlers and optional equipment

**Operating weight LRB 355 with optional equipment**

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total weight with 1000 mm 3–web shoes</td>
<td>104.5 t</td>
</tr>
<tr>
<td>The operating weight includes the basic machine LRB 355 (ready for operation*), the undercarriage with detachable crawlers and 3x 6 t counterweight, without attachment.</td>
<td></td>
</tr>
</tbody>
</table>

**Additional weights LRB 355 with optional equipment**

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main winch 25 t with leader top</td>
<td>4.8 t</td>
</tr>
<tr>
<td>Elevating working platform</td>
<td>1.0 t</td>
</tr>
<tr>
<td>Adapter for casing oscillator</td>
<td>1.3 t</td>
</tr>
<tr>
<td>Hydraulic leader foot</td>
<td>0.8 t</td>
</tr>
<tr>
<td>Concrete supply line</td>
<td>0.8 t</td>
</tr>
<tr>
<td>Jack-up system</td>
<td>1.3 t</td>
</tr>
</tbody>
</table>
Transport dimensions and weights
LRB 355 with undercarriage

**Transport standard – LRB 355 with 22.2 m leader**
includes the basic machine (ready for operation*) with leader, without attachment (such as rotary, vibrator, hammer etc.) and without counterweight.

**Dimensions and weights**

<table>
<thead>
<tr>
<th></th>
<th>Length (m)</th>
<th>Weight complete without counterweight (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transport standard – LRB 355 with 27.2 m leader</strong> includes the basic machine (ready for operation*) with leader, without attachment (such as rotary, vibrator, hammer etc.) and without counterweight.</td>
<td>22.68</td>
<td>77.3</td>
</tr>
<tr>
<td><strong>Dimensions and weights</strong></td>
<td>Length (m)</td>
<td>Weight complete without counterweight (t)</td>
</tr>
<tr>
<td><strong>Transport standard – LRB 355 with 22.2 m leader</strong> includes the basic machine (ready for operation*) with leader, without attachment (such as rotary, vibrator, hammer etc.) and without counterweight.</td>
<td>20.18</td>
<td>76.0</td>
</tr>
</tbody>
</table>

**Transport basic machine (ready for operation*, without counterweight)**
Transport weight 48.0 t

**Additional weights LRB 355**
- Main winch 25 t with leader top 4.8 t
- Elevating working platform (leader length 22.2 m) 0.9 t
- Elevating working platform (leader length 27.2 m) 1.0 t
- Adapter for casing oscillator 1.2 t
- Hydraulic leader foot 0.8 t
- Concrete supply line 0.8 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.

*) Including 20% filling of diesel tank
LRB 355 with undercarriage and detachable crawlers

Transport standard – LRB 355 with 27.2 m leader
includes the basic machine (ready for operation*) with leader, without attachment (such as rotary, vibrator, hammer etc.) and without counterweight.

Dimensions and weights
Length: 22.68 m
Weight complete without counterweight: 67.4 t

Transport basic machine
ready for operation*, without crawlers and without counterweight
Transport weight: 57.2 t

Transport crawlers
Crawler left: 10.2 t
Crawler right: 10.2 t

*) Including 20% filling of diesel tank

Additional weights LRB 355
Main winch 25 t with leader top: 4.8 t
Elevating working platform: 1.0 t
Adapter for casing oscillator: 1.3 t
Hydraulic leader foot: 0.8 t
Concrete supply line: 0.8 t
Jack up: 1.3 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

Equipment

**Double rotary drive DBA 300**
- Transport weight DBA 300: 11.8 t

**Vibrator slim design 1500 H**
- Transport weight 1500 H: 8.9 t

**Rotary (standard)**
- Transport weight BAT 450: 9.1 t

**Counterweight (standard)**
- Counterweight: 3x 6 t

**Counterweight (option)**
- Counterweight: 1x 6 t

**Additional counterweight** (option only for double rotary drilling)
- Counterweight: 2x 3 t

**Transport leader**
- Includes the leader without attachment (such as rotary, Kelly bar etc.).

**Additional weights**
- Weight for 22.2 m leader: 28.0 t
- Weight for 27.2 m leader: 29.3 t
- Main winch 25 t with leader top: 4.8 t
- Elevating working platform (leader length 22.2 m): 0.9 t
- Elevating working platform (leader length 27.2 m): 1.0 t
- Hydraulic leader foot: 0.8 t
- Concrete supply line: 0.8 t
Technical description

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

Hydraulic system

The main pumps are operated by a distributor gearbox. Axial piston variable displacement pumps work in open and closed circuits, supplying oil only on demand. Hydraulic pressure peaks are absorbed by the integrated automatic pressure compensation, which relieves the pumps and saves fuel.

Main pump capacities

- 3x 396 l/min
- 2x 430 l/min
- 1x 215 l/min

Hydraulic oil tank

- 1100 l
Max. working pressure

- 400 bar

Largely dimensioned hydraulic components guarantee a high efficiency rate and fuel economy. A system of electronically monitored pressure and return filters cleans the hydraulic oil. Any clogging is displayed in the cabin. 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 – 2.1 km/h
Track force

- 681 kN
Width of 3-web grousers (option 800 mm)

- 900 mm

Option:
Undercarriage with detachable crawlers

Drive speed

- 0 – 1.85 km/h
Track force

- 814 kN
Width of 3-web grousers (option 900 mm)

- 1000 mm

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 – 2.4 rpm is continuously variable.

Main winch

- Line pull effective (1st layer) 250 kN
- Rope diameter 34 mm
- Line speed 0-79 m/min
- Free-fall function

Auxiliary winch

- Line pull effective (3rd layer) 80 kN
- Rope diameter 20 mm
- Line speed 0-46 m/min

Rope crowd system

- Crowd force push/pull 400/400 kN
- Line pull (effective) 200 kN
- Line speed 0-70 m/min
- Free-fall function

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.

Engine

- Engine type Liebherr D 9512 A7-04
- Power rating according to ISO 9249 – 600 kW (805 hp) at 1700 rpm or 750 kW (1006 hp) at 1700 rpm
- Fuel tank 1300 l capacity with continuous level indicator and reserve warning

Engine complies with 97/68 EC or NRMM exhaust certification EPA/CARB Tier 4f.

The reduced engine speed results in increased fuel efficiency, less noise emission and longer service life of the engine.

The optional Eco-Silent Mode can be used when the working process does not require the full engine power. This function further reduces the engine speed so allowing the machine to operate even more silently and with enhanced fuel efficiency. The optional Engine Auto-Stop prevents long idle times after the operator has left the cabin and thus avoids unnecessary fuel consumption and emissions. As an option a diesel particulate filter is available (for 97/68 EC engines only).

Noise emission

Noise emissions correspond with 2000/14/EC directive.

Guaranteed sound pressure level $L_{pa}$ in the cabin

- 71.8 dB(A)

Guaranteed sound power level $L_{wa}$

- 112 dB(A)

Option: Eco-Silent Mode

Guaranteed sound power level $L_{wa}$

- 108 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
Full displacement drilling
BAT 450

Technical data
- Rotary drive - torque: 0 – 450 kNm
- Rotary drive - speed: 0 – 40 rpm

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

Display for full displacement drilling

Performance data for 22.2 m leader
- Drilling depth: 21 m
- Drilling depth with 10 m Kelly extension: 31 m
- Max. pull force (crowd winch and Kelly winch): 900 kN
- Max. drilling diameter*: 600 mm

Performance data for 27.2 m leader
- Drilling depth: 26 m
- Drilling depth with 10 m Kelly extension: 36 m
- Max. pull force (crowd winch and Kelly winch): 900 kN
- Max. drilling diameter*: 600 mm

*) Other drilling diameters available on request
Continuous flight auger drilling
BAT 450

**Technical data**
- Rotary drive - torque: 0 – 450 kNm
- Rotary drive - speed: 0 – 40 rpm

*) Other drilling diameters available on request

**Performance data for 22.2 m leader and auger cleaner**
- Drilling depth: 19.6 m
- Drilling depth with 10 m Kelly extension: 29.6 m
- Max. pull force (crowd winch and Kelly winch): 900 kN
- Max. drilling diameter*: 1200 mm

**Performance data for 27.2 m leader and auger cleaner**
- Drilling depth: 24.6 m
- Drilling depth with 10 m Kelly extension: 34.6 m
- Max. pull force (crowd winch and Kelly winch): 900 kN
- Max. drilling diameter*: 1200 mm
Double rotary drilling
DBA 300

Option: additional counterweight 2x 3 tonnes
(only for double rotary drilling)

Display for double rotary drilling

Technical data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rotary drive I - torque</td>
<td>0 – 300 kNm</td>
</tr>
<tr>
<td>Rotary drive I - speed</td>
<td>0 – 26 rpm</td>
</tr>
<tr>
<td>Rotary drive II - torque</td>
<td>0 – 150 kNm</td>
</tr>
<tr>
<td>Rotary drive II - speed</td>
<td>0 – 30 rpm</td>
</tr>
</tbody>
</table>

*) Other drilling diameters available on request

Performance data for 22.2 m leader

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling depth</td>
<td>21 m</td>
</tr>
<tr>
<td>Max. pull force (crowd winch and Kelly winch)</td>
<td>900 kN</td>
</tr>
<tr>
<td>Max. drilling diameter*</td>
<td>900 mm</td>
</tr>
</tbody>
</table>

Performance data for 27.2 m leader

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling depth</td>
<td>26 m</td>
</tr>
<tr>
<td>Max. pull force (crowd winch and Kelly winch)</td>
<td>900 kN</td>
</tr>
<tr>
<td>Max. drilling diameter limited to 23 m drilling depth*</td>
<td>900 mm</td>
</tr>
</tbody>
</table>

*) Other drilling diameters available on request
Kelly drilling
BAT 450

Technical data
Rotary drive - torque 0 – 450 kNm
Rotary drive - speed 0 – 40 rpm

Performance data
Max. drilling diameter* 2000 mm uncased
Max. drilling diameter* 1500 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 1600 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 36/3/30</td>
<td>11900</td>
<td>29.9</td>
<td>7.6</td>
<td>470</td>
</tr>
<tr>
<td>MD 36/3/36</td>
<td>13900</td>
<td>35.9</td>
<td>8.8</td>
<td>470</td>
</tr>
<tr>
<td>MD 36/4/42</td>
<td>12950</td>
<td>41.9</td>
<td>10.3</td>
<td>470</td>
</tr>
<tr>
<td>MD 36/4/48</td>
<td>14450</td>
<td>47.9</td>
<td>11.5</td>
<td>470</td>
</tr>
<tr>
<td>MD 36/4/54</td>
<td>15950</td>
<td>53.9</td>
<td>12.7</td>
<td>470</td>
</tr>
<tr>
<td>MD 36/4/60</td>
<td>17450</td>
<td>59.9</td>
<td>13.9</td>
<td>470</td>
</tr>
</tbody>
</table>

**) Values valid for 22.2 m leader.
For machines with 27.2 m leader X + 5000 mm can be applied.
Soil mixing equipment
3MA 35*

Technical data
Drilling drive – torque 1st gear 35 kNm
Drilling drive – speed 1st gear 62 rpm
Drilling drive – torque 2nd gear 17.5 kNm
Drilling drive – speed 2nd gear 124 rpm

*) Single, double and triple mixing equipment available.
Double and triple mixing equipment available for longitudinal or transverse mounting.

Performance data for 22.2 m leader
Drilling depth 20.5 m

Performance data for 27.2 m leader
Drilling depth 25.5 m
Vibrator slim design
1500 H

Technical data
- Static moment: 0 – 30 kgm
- Max. frequency: 2160 rpm
- Max. centrifugal force: 1535 kN
- Max. amplitude with clamp: 14.5 mm
- Total weight without clamp: 7200 kg
- Total weight with single clamp: 8300 kg
- Dynamic weight with clamp: 4150 kg

Performance data for 22.2 m leader
- Max. pile length: 21 m

Performance data for 27.2 m leader
- Max. pile length: 26 m
**Ring vibrator**
32 VMR

**Technical data**
- Static moment: 0 – 32 kgm
- Max. frequency: 2300 rpm
- Max. centrifugal force: 1860 kN
- Diameter: 356 – 610 mm
- Total weight: 13900 kg

**Performance data for 22.2 m leader**
- Max. pipe length: 35 m

**Performance data for 27.2 m leader**
- Max. pipe length: 40 m
Hydraulic hammer

H 110

Technical data
Drop weight 7000 or 9000 kg
Max. rated energy 83 or 106 kNm
Blow rate max. energy 36 blows/min
Max. blow rate 100 blows/min
Total weight 12000 or 14000 kg

Performance data for 27.2 m leader
Max. pile length 24 m

Performance data for 22.2 m leader
Max. pile length 19 m

Display for impact driving
**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.
Transport option
LRB 355