

Drilling Rig

LB 16-180

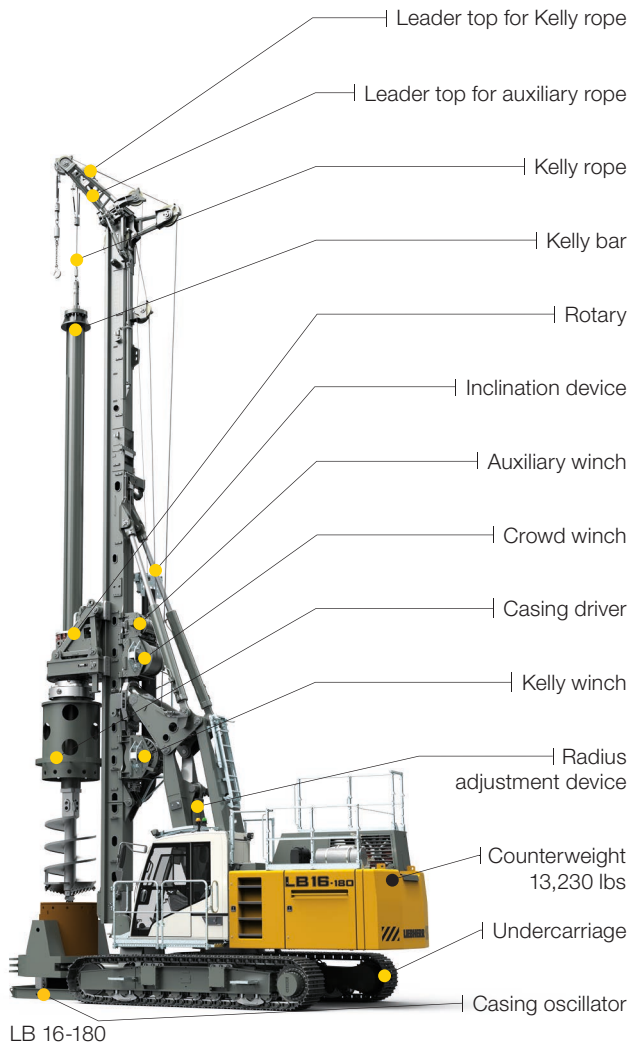
Litronic®

enUS

LB 2001.06



LIEBHERR



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.

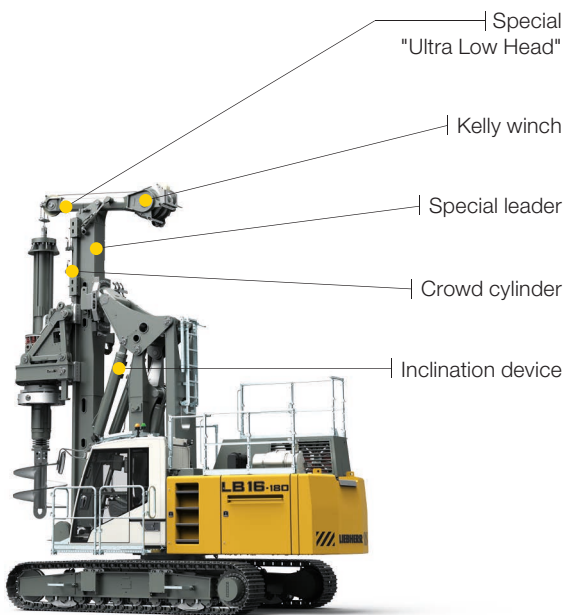
Parallel kinematics with a large working area allow to fold back the leader.

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

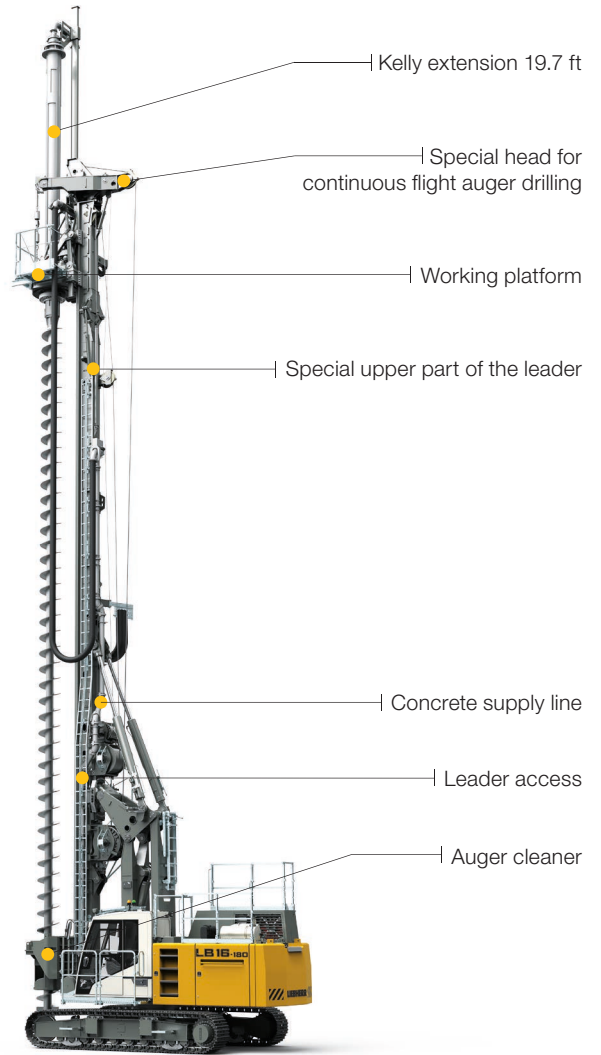
All winches are mounted on the leader, which provides a direct view of the main winch from the operator's cab.

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.



LB 16-180 Ultra Low Head



LB 16-180 CFA Drilling

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.

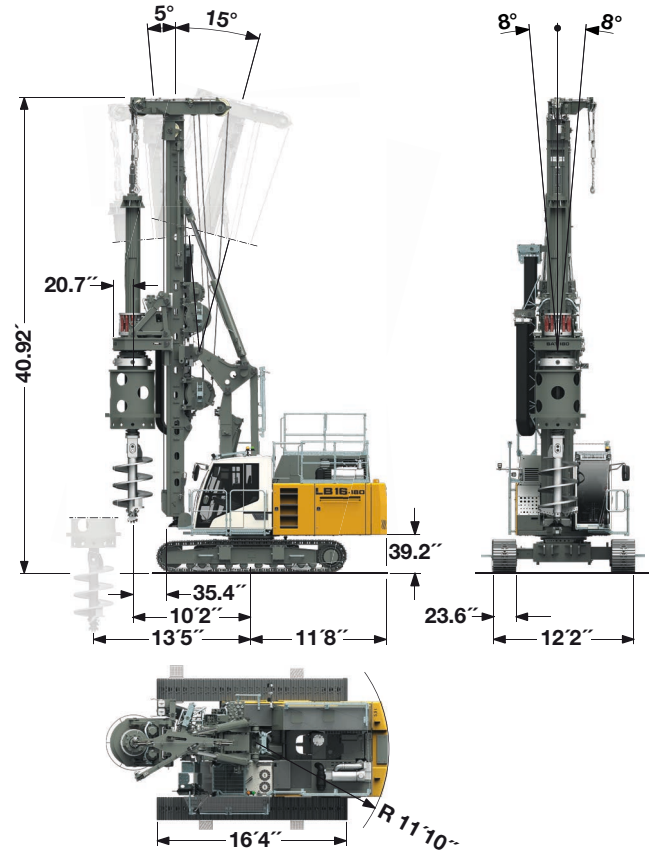
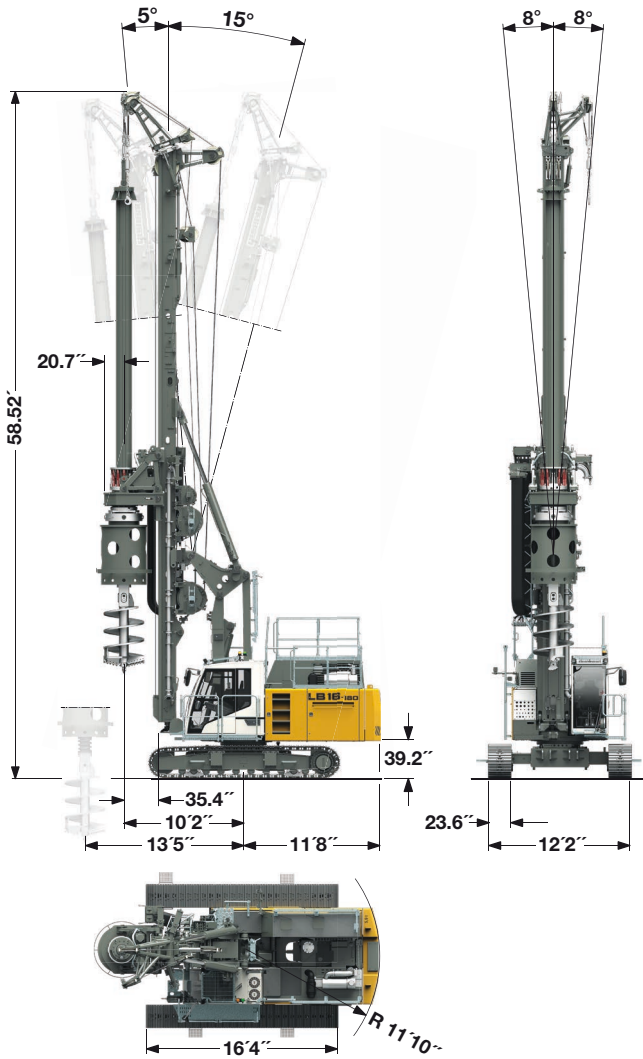
Sophisticated solutions provide safe operation and maintenance of the machine.

- 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	58.83 ft
Max. pull, leader on ground	44,965 lbf
Continuous rig inclination adjustment	
Lateral inclination	± 8°
Forward inclination	5°
Backward inclination	15°

Operating weight LB 16-180

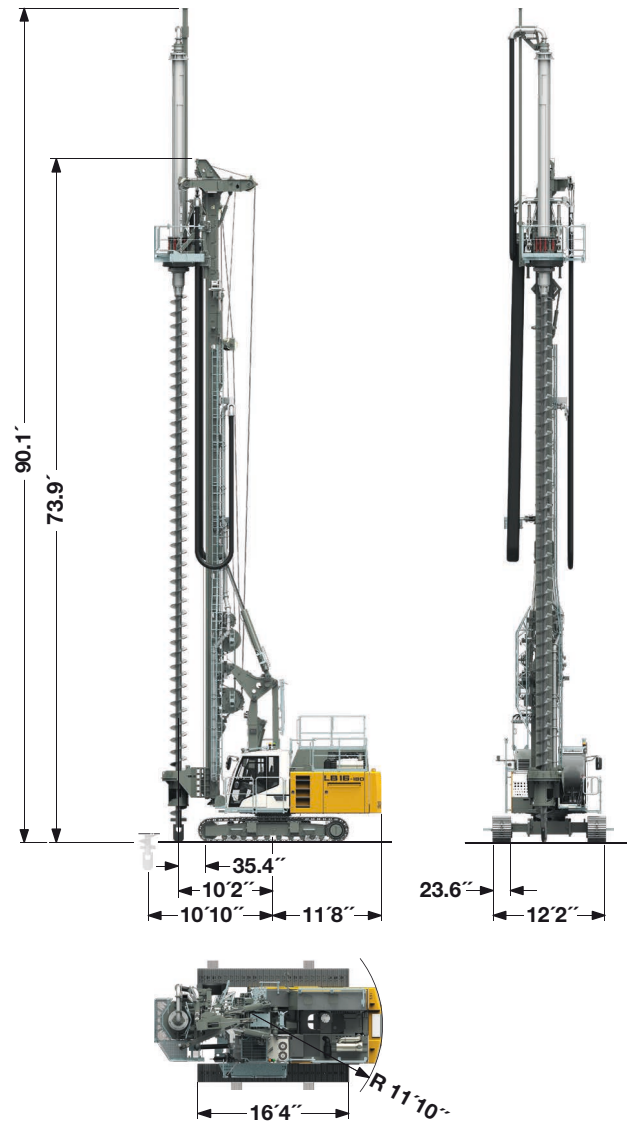
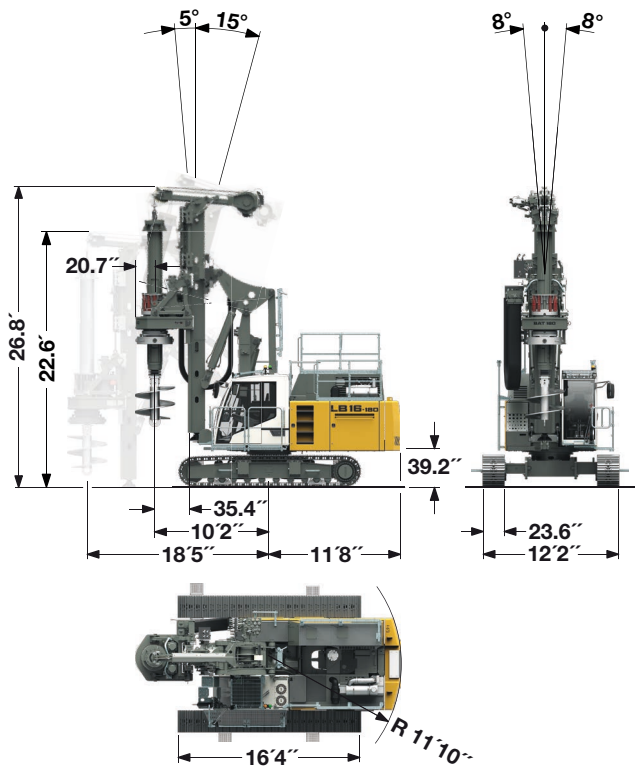
Total weight with 23.6 inch 3-web shoes	116,400 lbs
The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 20/3/24) and 13,230 lbs counterweight, without equipment for casing oscillator.	

Technical data LB 16-180 Low Head

Total height	40.91 ft
Max. pull, leader on ground	44,965 lbf
Continuous rig inclination adjustment	
Lateral inclination	± 8°
Forward inclination	5°
Backward inclination	15°

Operating weight LB 16-180 Low Head

Total weight with 23.6 inch 3-web shoes	111,995 lbs
The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 20/3/15) and 13,230 lbs counterweight, without equipment for casing oscillator.	



Technical data LB 16-180 Ultra Low Head

Total height	22.64 ft — 26.8 ft
Max. pull, leader on ground	44,965 lbs
Continuous rig inclination adjustment	
Lateral inclination	± 8°
Forward inclination	5°
Backward inclination	15°

Operating weight LB 16-180 Ultra Low Head

Total weight with 23.6 inch 3–web shoes	106,263 lbs
The operating weight includes the basic machine LB 16-180 (with rotary and Kelly bar MD 16/3/10) and 13,230 lbs counterweight, without equipment for casing oscillator.	

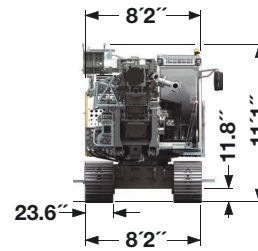
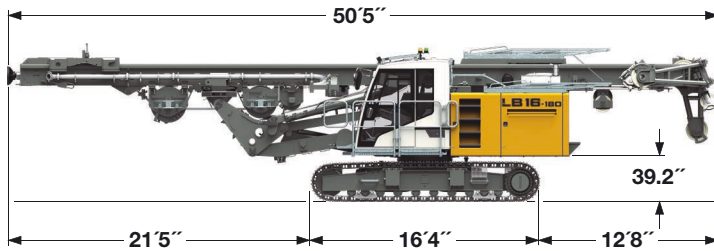
Technical data LB 16-180 CFA Drilling

Total height	90.1 ft
Max. pull, leader on ground	116,900 lbf
Continuous rig inclination adjustment	
Lateral inclination	± 3°
Forward inclination	3°
Backward inclination	3°

Operating weight LB 16-180 CFA Drilling

Total weight with 23.6 inch 3–web shoes	133,600 lbs
The operating weight includes the basic machine LB 16-180 (with rotary, auger of 23.6 inch diameter, auger cleaner) and 13,230 lbs counterweight, without equipment for casing oscillator.	

Transport dimensions and weights



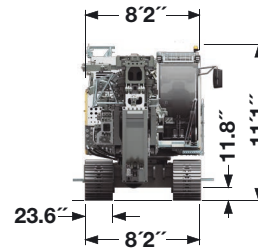
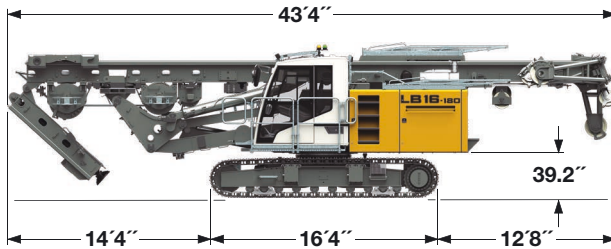
Transport standard

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 ————— 50.4 ft

Weight complete without counterweight ————— 83,335 lbs



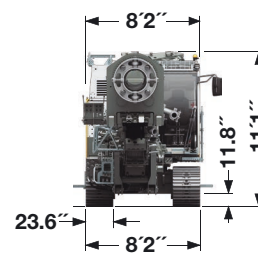
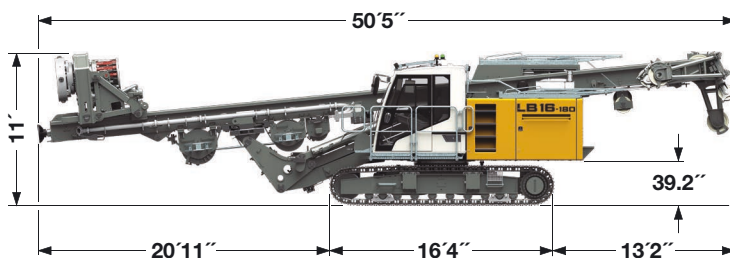
Transport option leader folded

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 ————— 43.3 ft

Weight complete without counterweight ————— 17,145 lbs



Transport with equipment

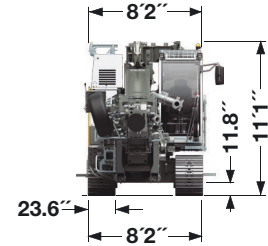
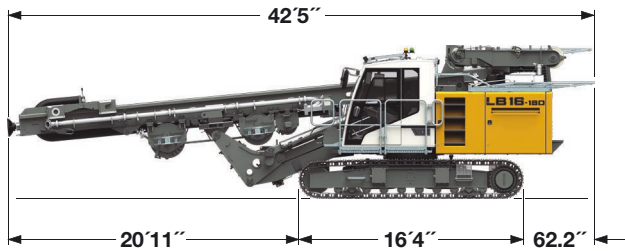
includes the basic machine (ready for operation) with leader and rotary, without other working tools (such as Kelly bar etc.) and without counterweight.

Dimensions and weights

Length ————— 50.4 ft

Weight complete without counterweight ————— 94,360 lbs

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.

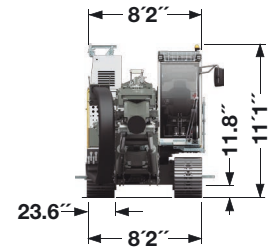
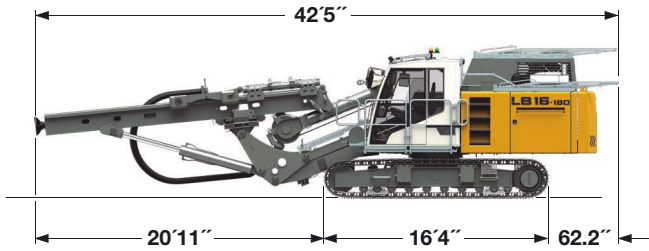


Transport Low Head

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	42.42 ft
Weight complete without counterweight	81,355 lbs

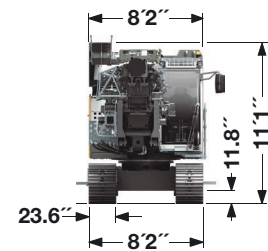
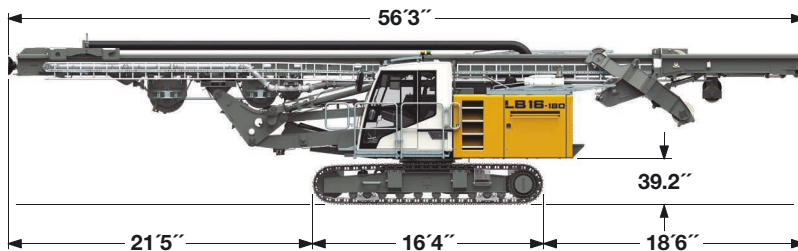


Transport Ultra Low Head

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	42.42 ft
Weight complete with counterweight	90,390 lbs



Transport CFA drilling

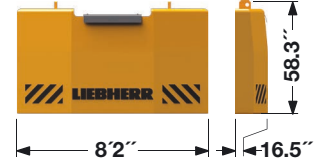
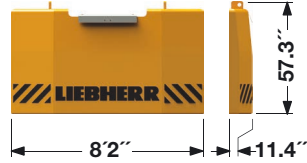
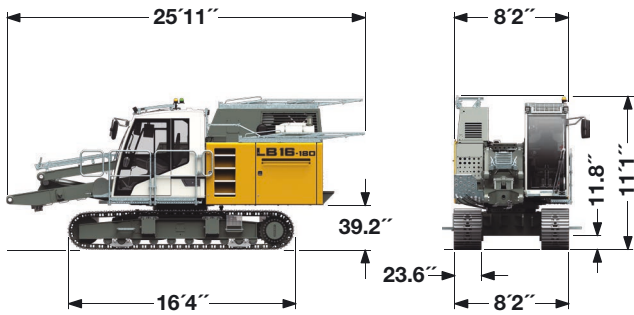
includes the basic machine (ready for operation) with leader, without working tools (such as rotary, Kelly bar etc.) and without counterweight.

Dimensions and weights

Length	56.27 ft
Weight complete without counterweight	91,275 lbs

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.

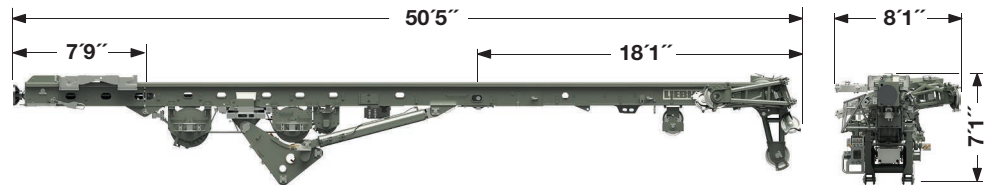
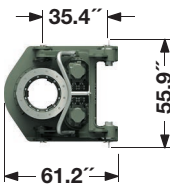
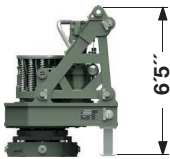
Transport weight ————— 54,675 lbs

Counterweight (optional equipment)

Counterweight — 8,820 lbs

Counterweight (standard)

Counterweight — 13,480 lbs



Rotary

Transport weight

BAT 180 ————— 11,245 lbs

Transport leader

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

Dimensions and weights

Length ————— 50.4 ft

Weight complete ————— 283,660 lbs

Lower part of the leader ————— 2,425 lbs

Upper part of the leader

with leader top ————— 5,070 lbs

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 _____ 124 gal 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 72 gal/min
Separate pump for kinematics _____ 34 gal/min
Hydraulic oil tank _____ 132 gal
Max. working pressure _____ 5,076 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 – 1.1 mph
Track force _____ 98,470 lbf
Width of 3-web grousers (option 31.5 inch) _____ 23.6 inch



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.



Noise emission

Noise emissions correspond with 2000/14/EC directive.
Guaranteed sound pressure level L_{PA} in the cabin _____ 76.3 dB(A)
Guaranteed sound power level L_{WA} _____ 110 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 for Ultra Low Head

Line pull effective (3rd layer) _____ 24,730 lbf
Rope diameter _____ 20 mm
Line speed _____ 0-299 ft/min



Kelly winch with freewheeling

Line pull effective (1st layer) _____ 35,970 lbf
Rope diameter _____ 24 mm
Line speed _____ 0-246 ft/min



Auxiliary winch

Line pull effective (1st layer) _____ 11,240 lbf
Rope diameter _____ 14 mm
Line speed _____ 0-279 ft/min



Rope crowd system

Crowd force push/pull _____ 44,962/44,962 lbf
Line pull (effective) _____ 22,481 lbf
Travel _____ 39.4 ft
Line speed _____ 0-295 ft/min

Crowd cylinder system for Ultra Low Head:

Crowd force push/pull _____ 46,535/46,535 lbf
Travel _____ 9.2 ft
Crowd speed up/down _____ 54/43 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.

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

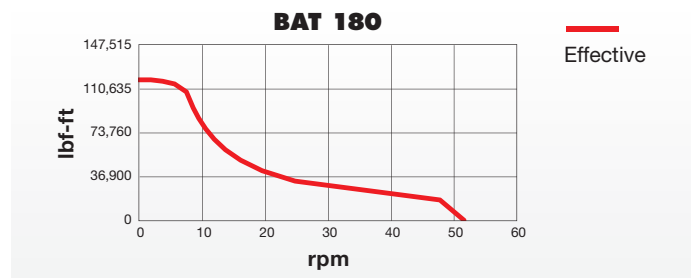
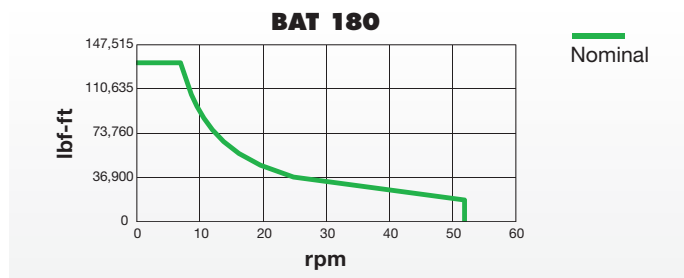
Highest availability through easy set-up

- 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

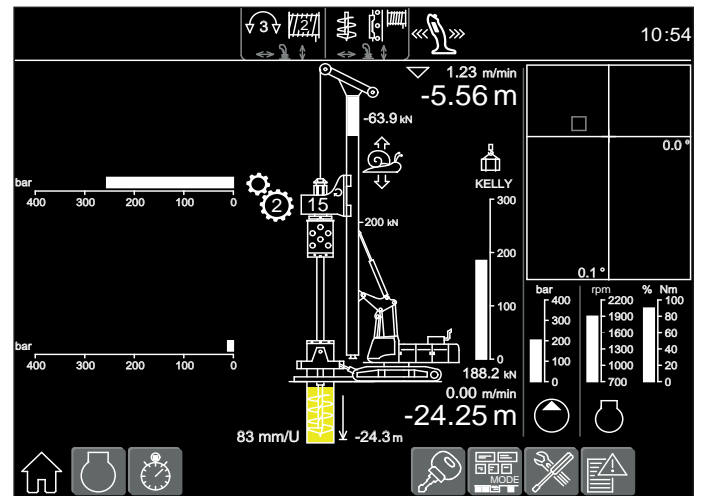
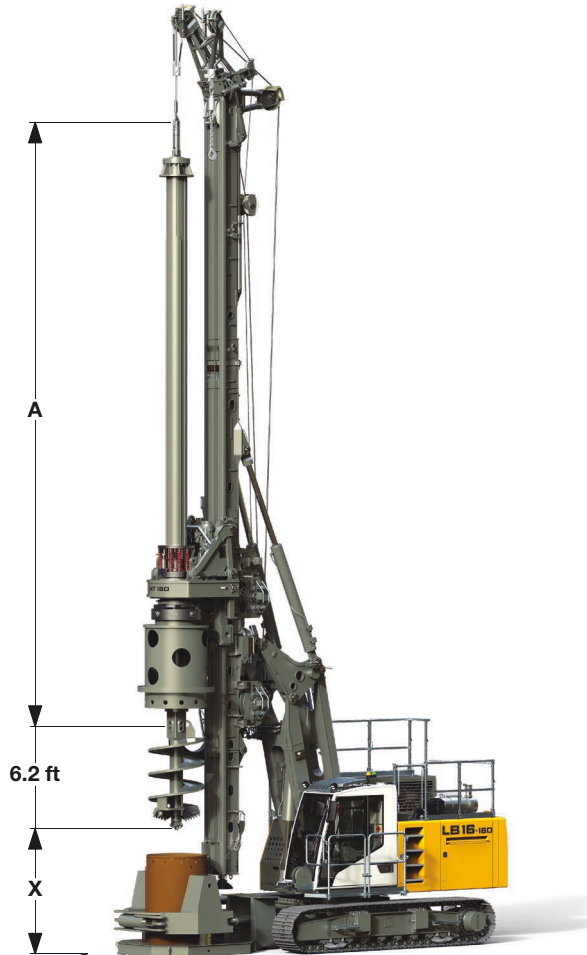
Flexibility through modular design

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



Kelly drilling

LB 16-180



Display for Kelly drilling

Technical data

Rotary drive - torque	0 – 132,765 lbf-ft
Rotary drive - speed	0 – 52 rpm

Performance data

Max. drilling diameter*	4.9 ft uncased
Max. drilling diameter*	3.9 ft cased

*) Other drilling diameters available on request

Other Kelly bars available on request

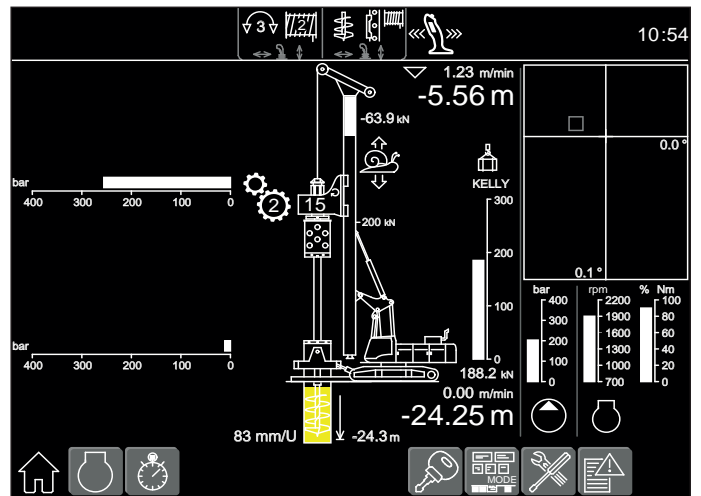
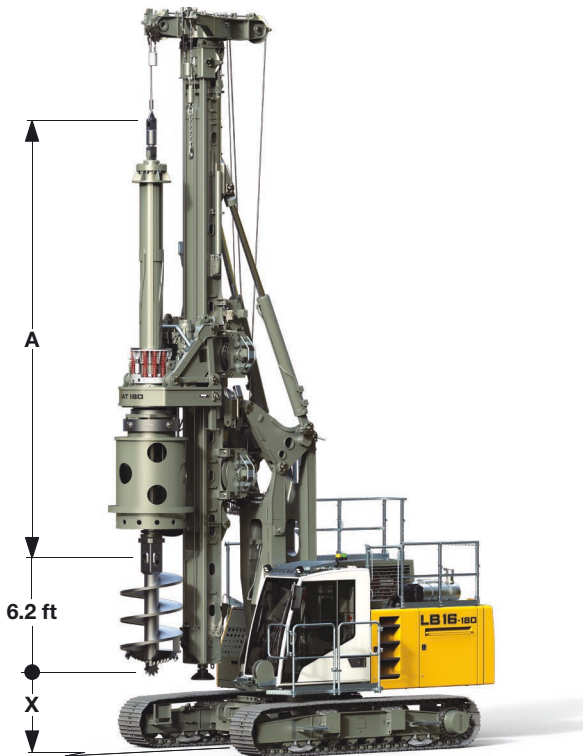
When using a casing oscillator, value X has to be reduced by 3.9 ft.

Kelly bars

	A	X	Drilling depth	Weight	Kelly Ø
	(ft)	(ft)	(ft)	(lbs)	(inch)
MD 20/2/18	35.1	8.9	54.1	7,500	14.5
MD 20/3/18	25.9	18.4	54.1	7,500	14.5
MD 20/3/21	28.9	15.1	64.0	8,160	14.5
MD 20/3/24	32.2	11.8	73.8	9,040	14.5
MD 20/3/27	35.4	8.5	83.7	9,920	14.5
MD 20/3/30	38.7	5.2	93.5	10,585	14.5
MD 20/4/36	37.3	6.9	113.2	13,900	14.5

Kelly drilling

LB 16-180 Low Head



Display for Kelly drilling

Technical data

Rotary drive - torque	0 – 132,765 lbf-ft
Rotary drive - speed	0 – 52 rpm

Performance data

Max. drilling diameter*	4.9 ft uncased
Max. drilling diameter*	3.9 ft cased

*) Other drilling diameters available on request

**) Assist crane required for mounting/dismounting

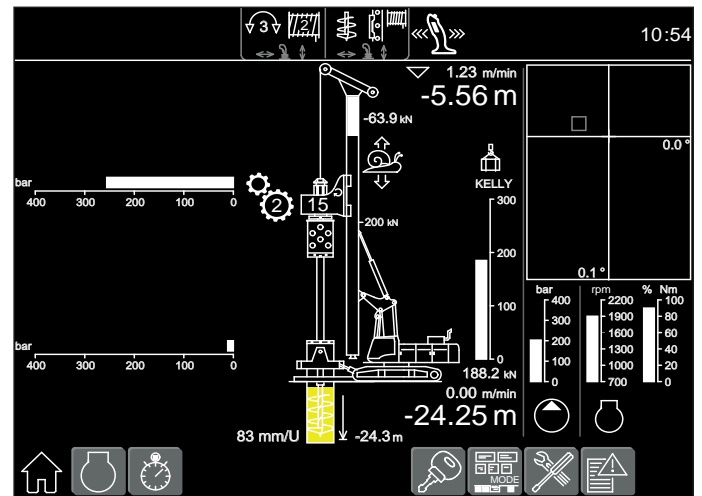
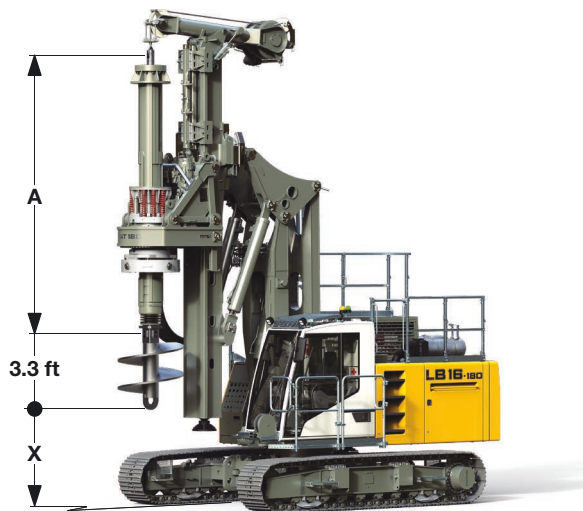
Kelly bars

	A	X	Drilling depth	Weight	Kelly Ø
	(ft)	(inch)	(ft)	(lbs)	(inch)
MD 20/3/15	22.3	47.2	44.3	6,615	14.5
MD 20/3/18**	25.6	7.9	54.1	7,500	14.5

Other Kelly bars available on request

Kelly drilling

LB 16-180 Ultra Low Head



Display for Kelly drilling

Technical data

Rotary drive - torque	0 – 132,765 lbf-ft
Rotary drive - speed	0 – 52 rpm
Kelly winch (Ultra Low Head)	24,730 lbf
Rope diameter	20 mm
Line speed	0 – 298 ft/min
Crowd cylinder push/pull	0 – 44,965 lbf
Crowd speed	0 – 75 ft/min

Performance data

Max. drilling diameter*	4.9 ft uncased
Max. drilling diameter*	3.9 ft cased

*) Other drilling diameters available on request

Kelly bars

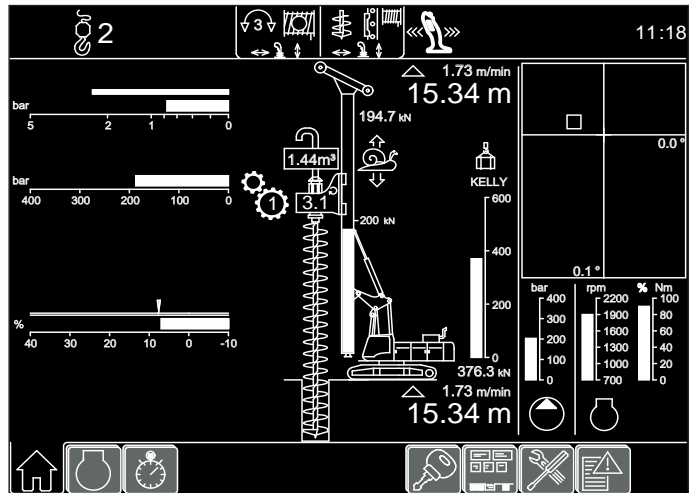
	A	X	Drilling depth	Weight	Kelly Ø
	(ft)	(ft)	(ft)	(lbs)	(ibch)
MD 16/3/10	15.1	5.6	28.5	4,960	14.5
MD 16/4/13	15.1	5.6	37.7	5,560	14.5

When working at max. radius X will be reduced by 3.9 ft, drilling depth will be increased by 3.9 ft. Other Kelly bars available on request

Continuous flight auger drilling



Auger with auger cleaner



Display for continuous flight auger drilling

Technical data

Rotary drive - torque	0 – 132,765 lbf-ft
Rotary drive - speed	0 – 52 rpm

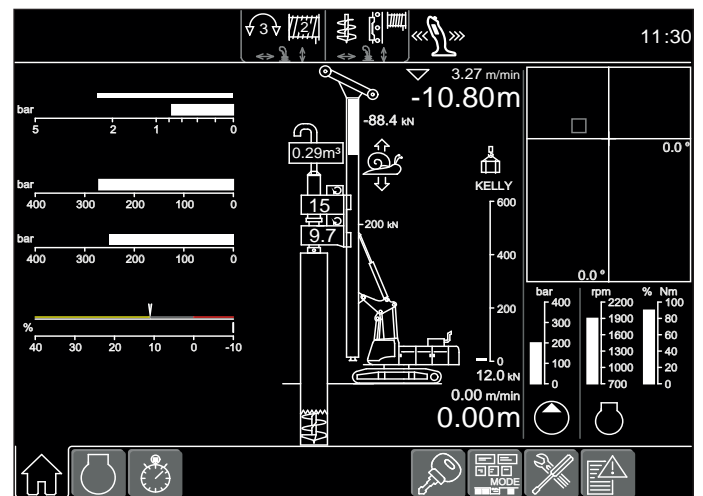
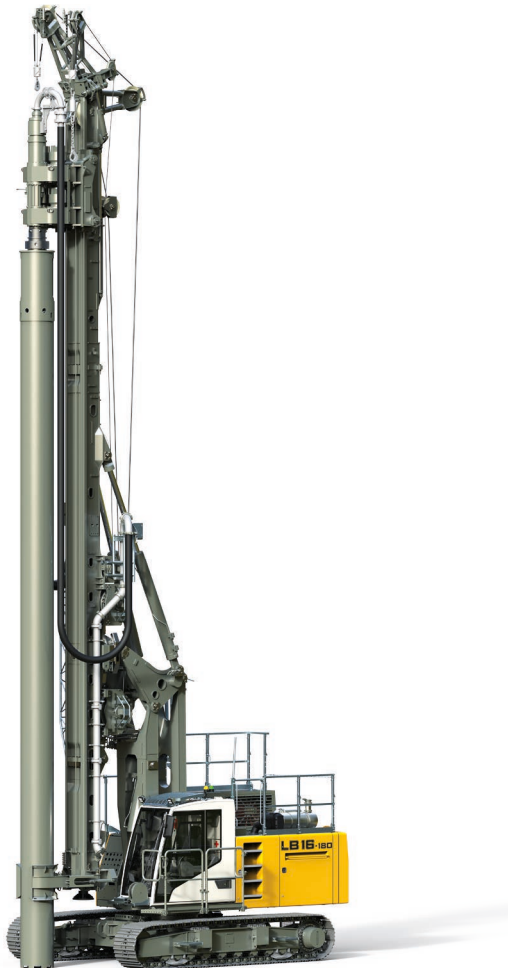
Performance data

Drilling depth with 19.7 ft Kelly extension, with auger cleaner	70.2 ft
Max. pull force (crowd winch and Kelly winch)	116,900 lbf
Max. drilling diameter*	31.5 inch

*) Other drilling diameters available on request

Double rotary drilling

Model DBA 90



Display for double rotary drilling

Technical data

Rotary drive I - torque	1 st gear	66,380 lbf-ft
Rotary drive I - speed	1 st gear	16 rpm
Rotary drive I - torque	2 nd gear	33,190 lbf-ft
Rotary drive I - speed	2 nd gear	32 rpm
Rotary drive II - torque	1 st gear	50,154 lbf-ft
Rotary drive II - speed	1 st gear	22 rpm
Rotary drive II - torque	2 nd gear	25,077 lbf-ft
Rotary drive II - speed	2 nd gear	44 rpm

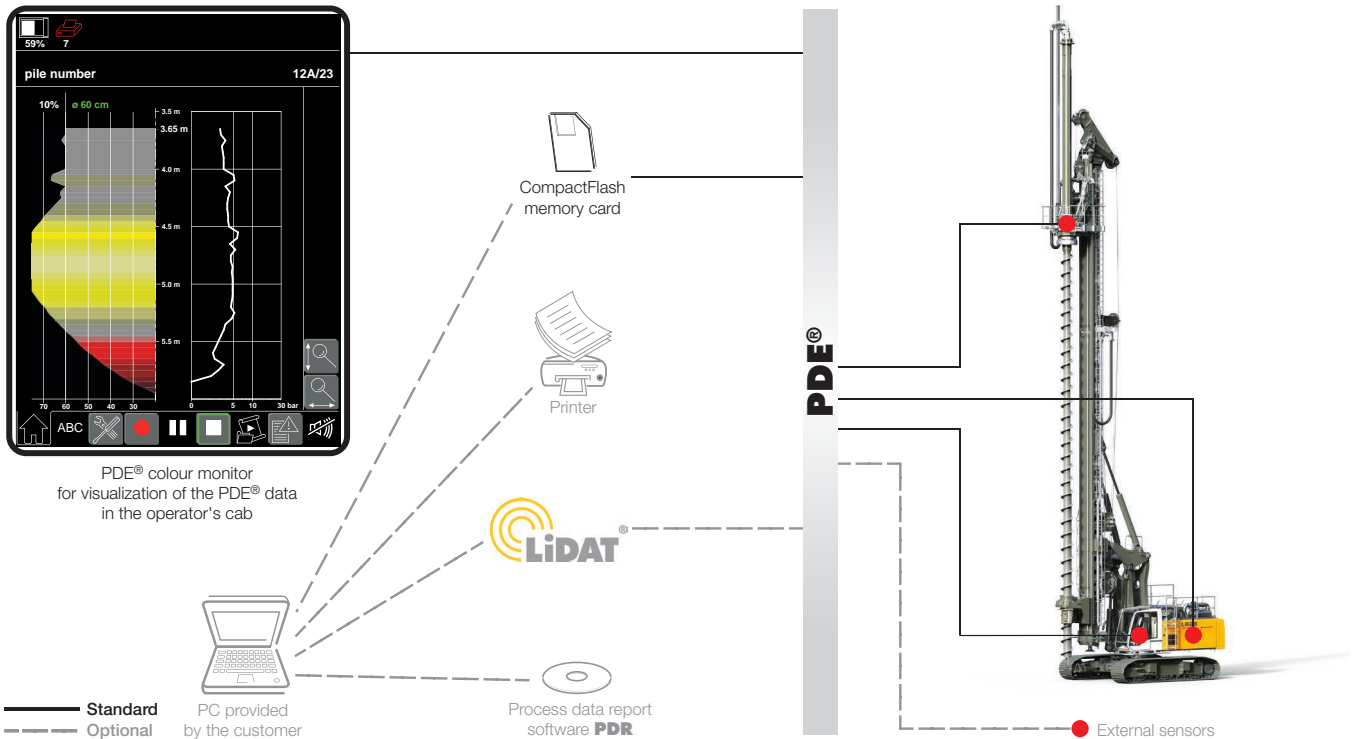
Performance data

Max. drilling diameter*	20 inch
Max. drilling depth	37.7 ft
Max. pull force	80,935 lbf

*) 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.

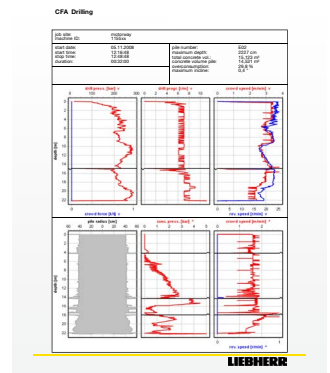
Process data reporting - PDR (additional equipment)

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.



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