

Drilling Rig

**LB 44-510**

Litronic®

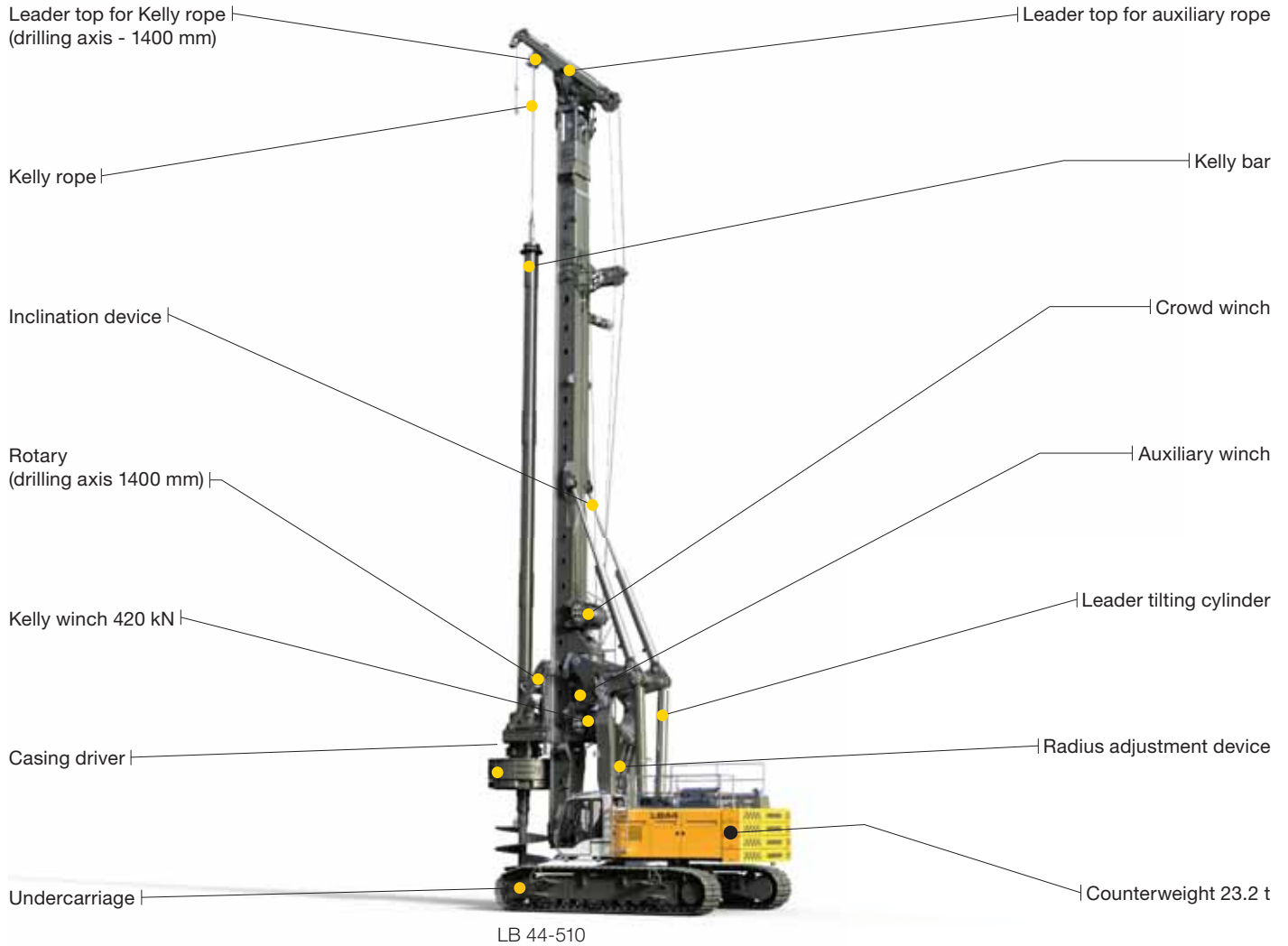
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LB 2006.05



**LIEBHERR**

# Concept and characteristics



## 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.

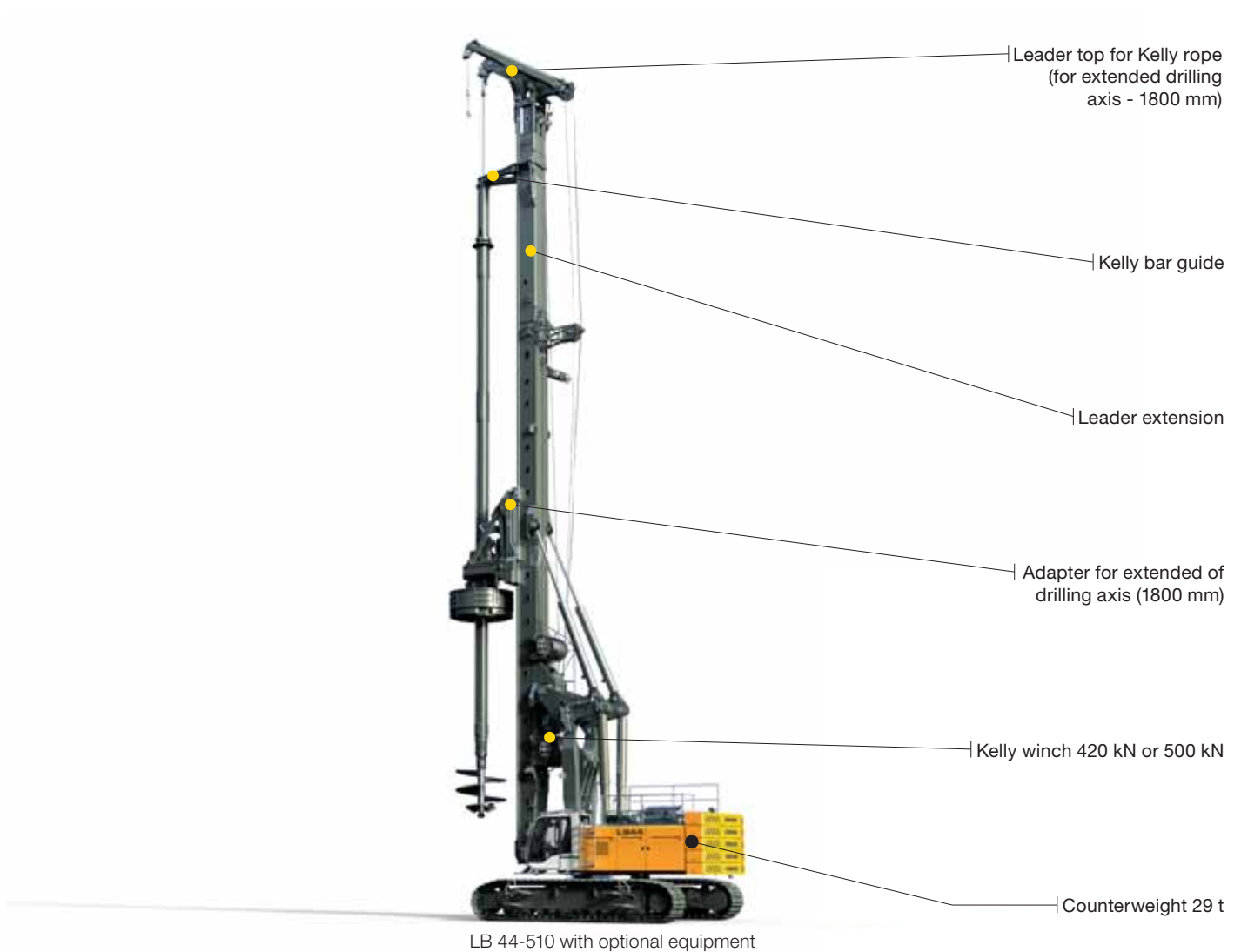
Parallel kinematics with a large working area allow to fold the leader back and, as an option, forward.

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 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.

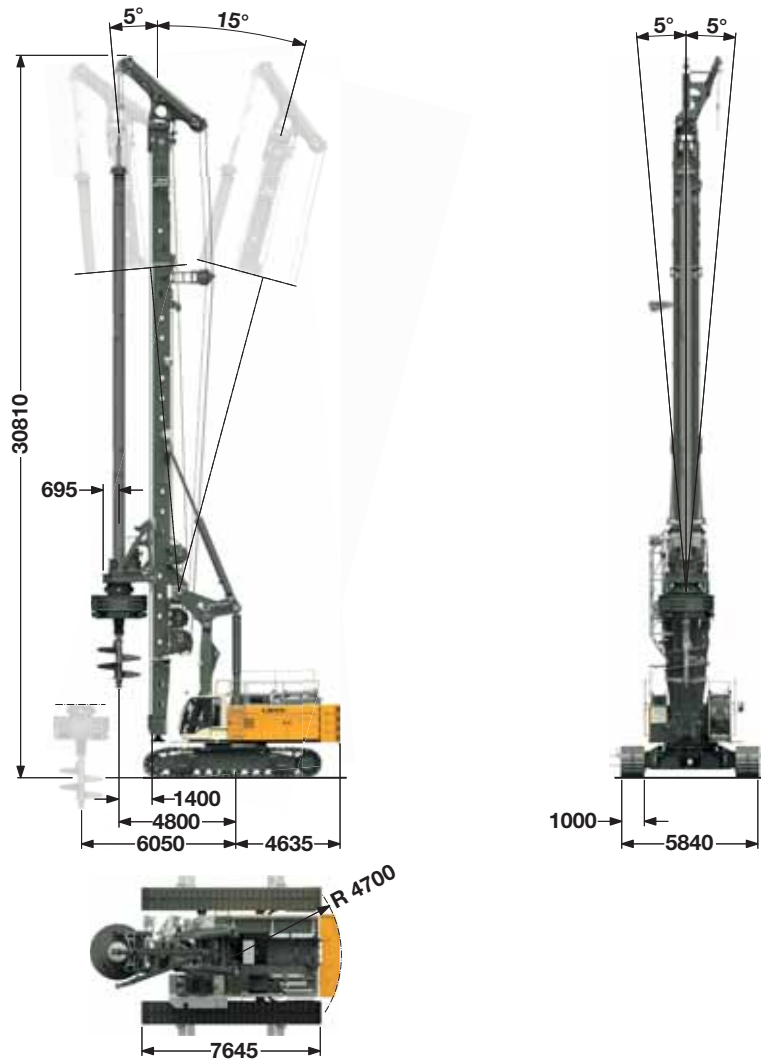
Sophisticated solutions provide safe operation and maintenance of the machine.

- 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

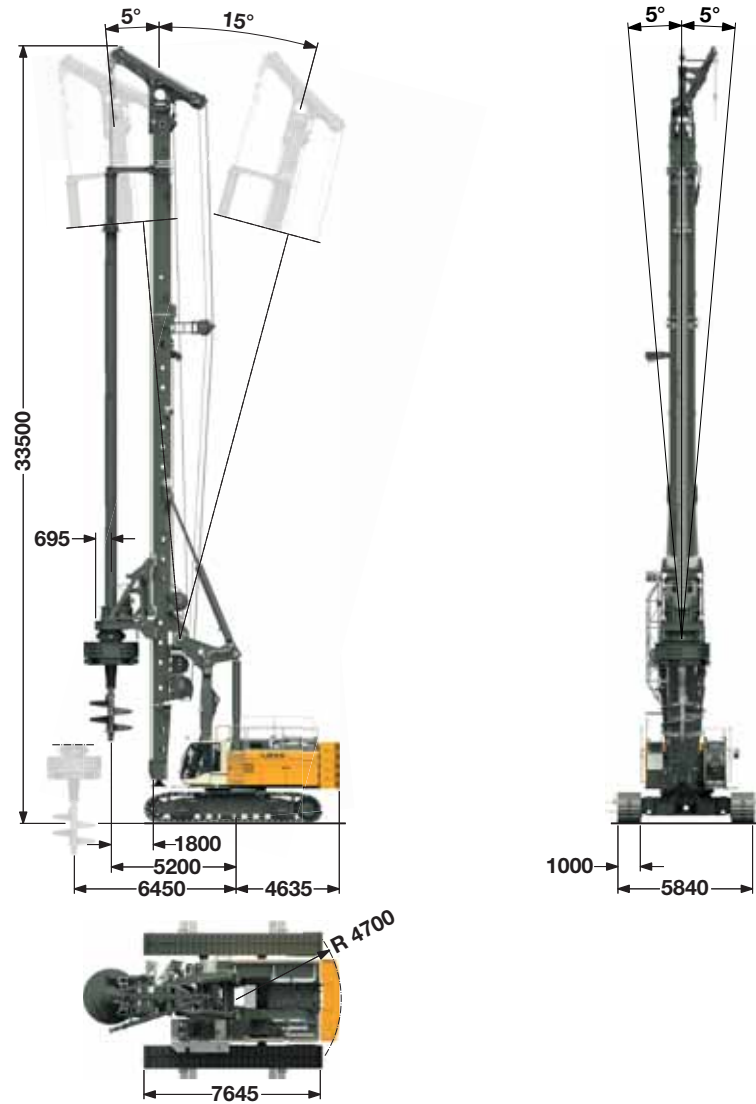


## Technical data LB 44-510

Total height	30.81 m
Rotary drilling axis	1400 mm
Continuous rig inclination adjustment	
Lateral inclination	± 5°
Forward inclination	5°
Backward inclination	15°

## Operating weight LB 44-510

Total weight with 1000 mm 2-web shoes	155 t
The operating weight includes the basic machine LB 44-510 (with rotary and Kelly bar MD 36/3/30) and 23.2 t counterweight, without equipment for casing oscillator.	



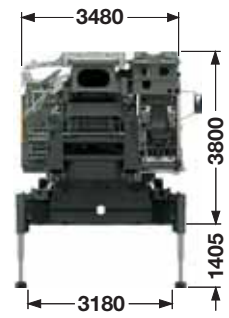
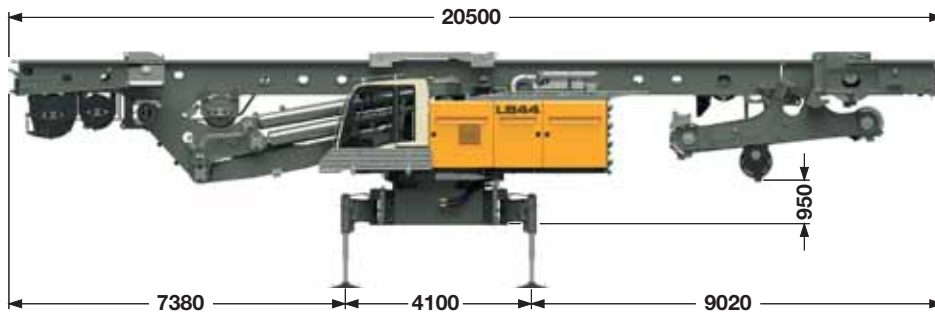
#### Technical data LB 44-510 with optional equipment

Total height	33.5 m
Rotary drilling axis	1800 mm
Continuous rig inclination adjustment	
Lateral inclination	± 5°
Forward inclination	5°
Backward inclination	15°

#### Operating weight LB 44-510 with optional equipment

Total weight with 1000 mm 2-web shoes	173 t
The operating weight includes the basic machine LB 44-510 (with rotary and Kelly bar MD 36/4/72) and 29 t counterweight, without equipment for casing oscillator.	

# Transport dimensions and weights

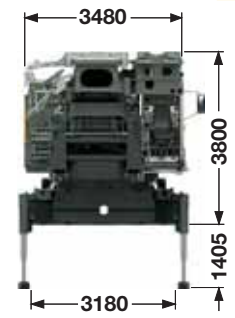
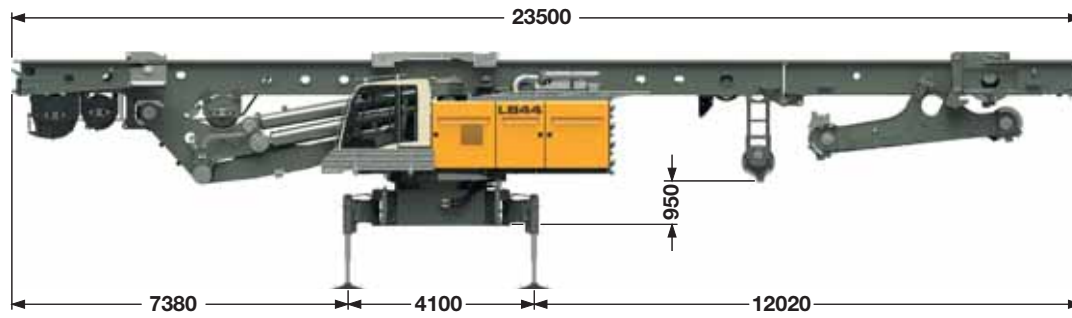


## Transport standard

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

## Dimensions and weights

Length	20.5 m
Weight	82.5 t

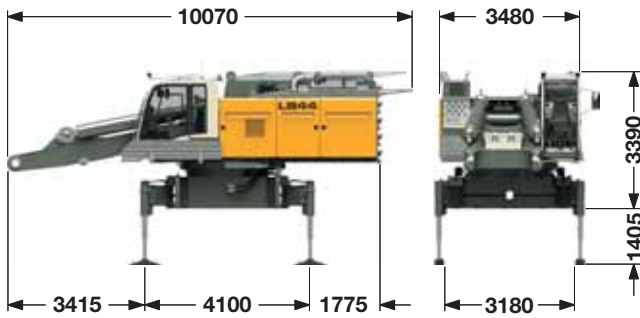


## Transport with optional equipment

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

## Dimensions and weights

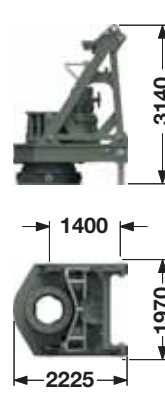
Length	23.5 m
Weight	83.5 t



### Transport basic machine

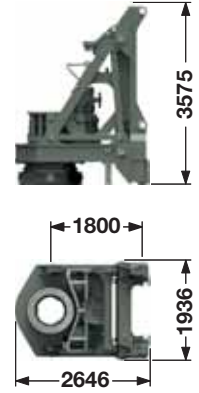
without crawlers and without counterweight.

Transport weight ————— 41 t



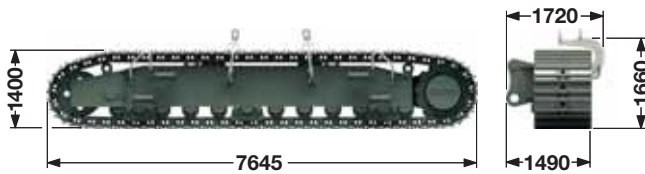
### Rotary standard

Transport weight  
BAT 510 ————— 10.5 t



### Rotary with optional equipment

Transport weight  
BAT 510 ————— 12.5 t



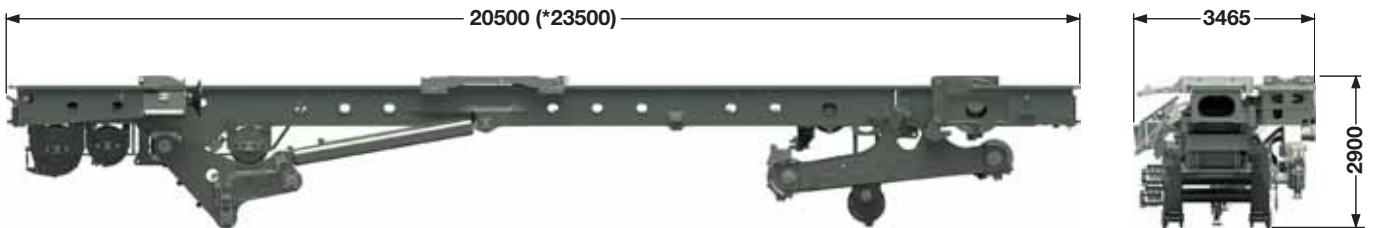
### Crawlers

Crawler left ————— 16.4 t  
Crawler right ————— 16.4 t



### Counterweight

Counterweight LB 44 standard ————— 4x 5.8 t = 23.2 t  
Counterweight LB 44 with optional equipment — 5x 5.8 t = 29.0 t



### Transport leader

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

### Dimensions and weights

Length ————— (\*23.5) 20.5 m  
Weight complete ————— 42 t  
Weight complete with optional equipment ————— 43 t

\*) Dimensions for rigs 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 510 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

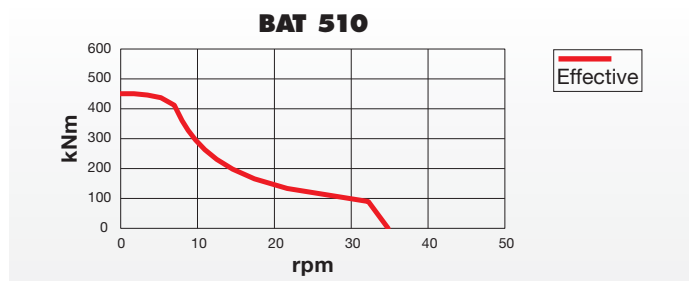
## Highest availability through easy set-up

- 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

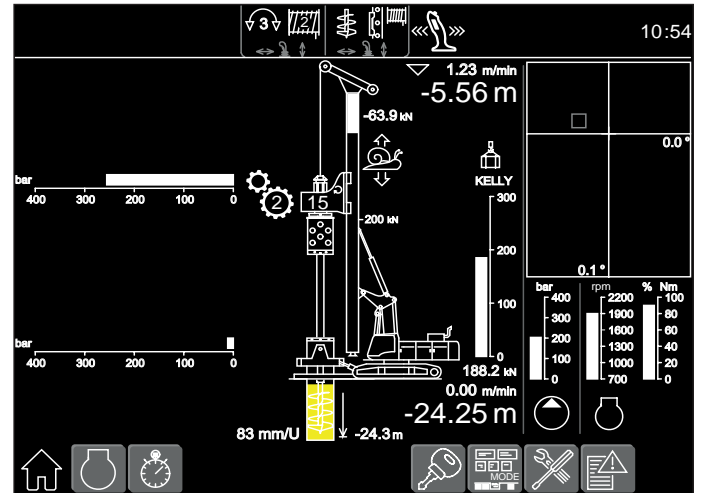
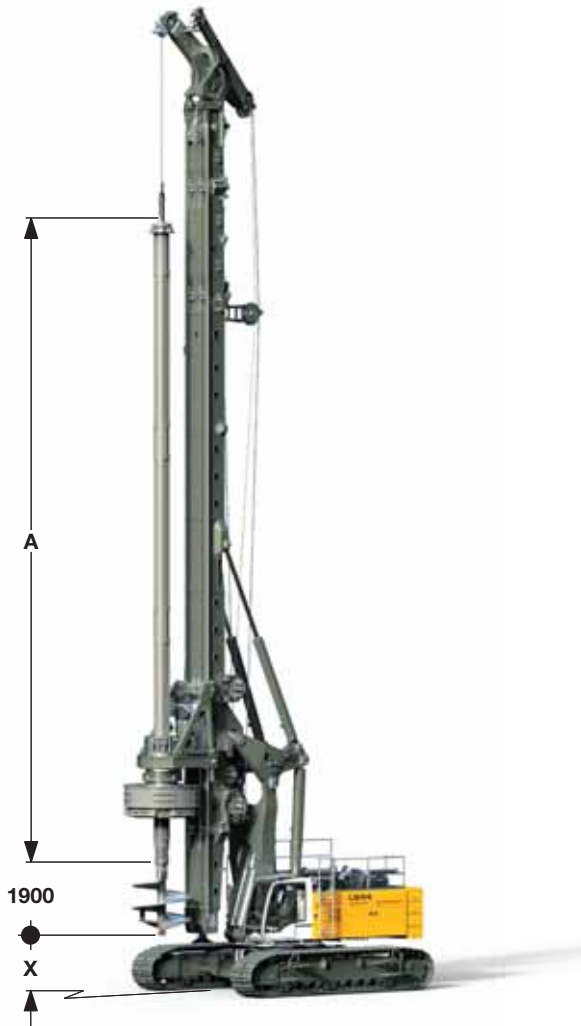
- Exchangeable drive adapters for use of other Kelly bars
- Exchangeable cardan joint for other casing drivers
- Quickly exchangeable equipment for other methods of operation





# Kelly drilling

LB 44-510



Display for Kelly drilling

## Kelly bars MD 36

	A	X <sup>1)</sup>	Drilling depth	Weight	Kelly Ø
	(mm)	(mm)	(m)	(t)	(mm)
MD 36/3/30	11900	13300	27.9	7.6	470
MD 36/3/36	13900	11300	33.9	8.8	470
MD 36/4/42	12950	12300	40.0	10.3	470
MD 36/4/48	14450	10800	46.0	11.5	470
MD 36/4/54	15950	9300	52.0	12.7	470
MD 36/4/60	17450	7800	58.0	13.9	470
MD 36/4/66	18950	6300	64.0	15.1	470
MD 36/4/72	20450	4800	70.0	16.3	470
MD 36/4/78	21950	3300	76.0	17.5	470
MD 36/4/84	23450	1800	82.0	18.7	470
MD 36/4/90	24950	300	88.0	20.1	470

## Kelly bars MD 45

	A	X <sup>1)</sup>	Drilling depth	Weight	Kelly Ø
	(mm)	(mm)	(m)	(t)	(mm)
MD 45/3/30	12200	12900	27.6	10.1	559
MD 45/3/36	14200	10900	33.6	11.5	559
MD 45/4/42	13020	12000	39.6	12.6	559
MD 45/4/48	14520	10500	45.6	13.9	559
MD 45/4/54	16020	9000	51.6	15.4	559
MD 45/4/60	17520	7500	57.6	16.7	559
MD 45/4/66	19020	6000	63.6	18.0	559
MD 45/4/72	20520	4500	69.6	19.4	559
MD 45/4/78	22020	3000	75.6	20.4	559
MD 45/4/84	23520	1500	81.6	22.1	559
MD 45/4/90	25020	0	87.6	23.5	559

### Technical data

Rotary drive - torque	0 – 510 kNm
Rotary drive - speed	0 – 36 rpm
Rotary drilling axis	1400 mm

### Performance data

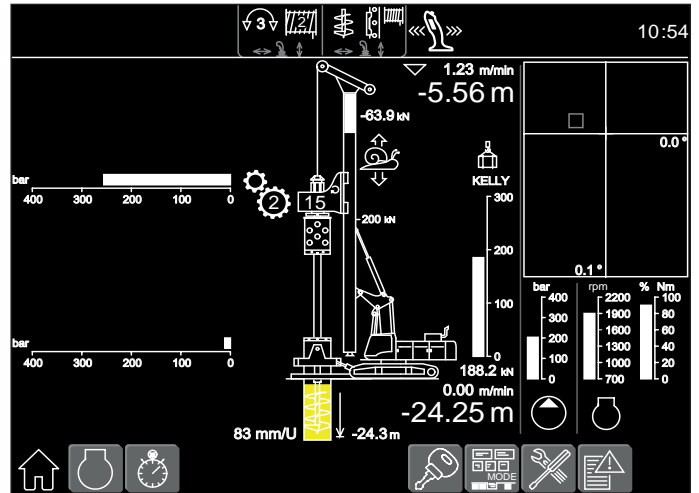
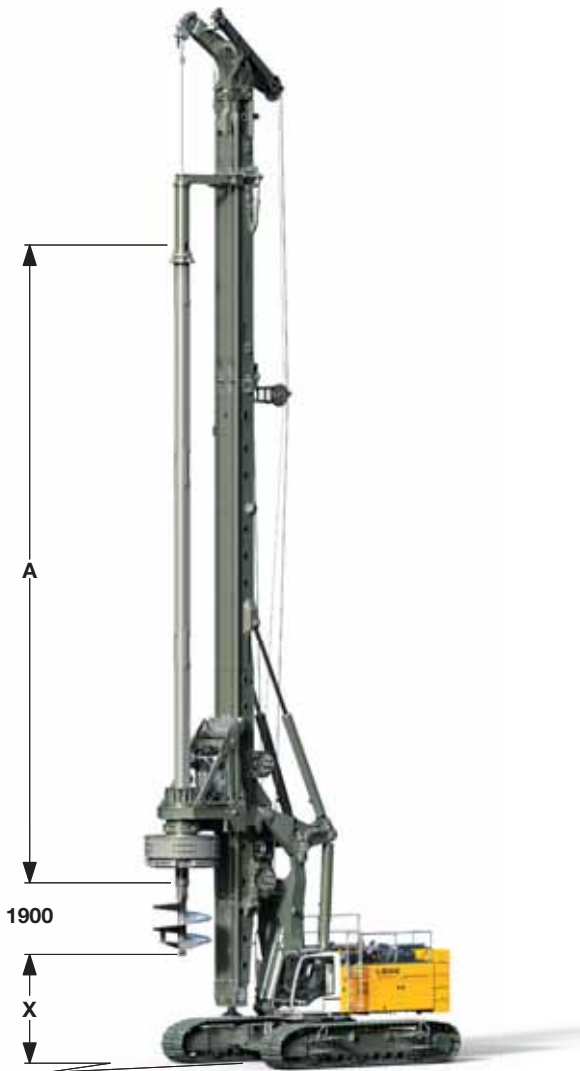
Max. drilling diameter*	2500 mm uncased
Max. drilling diameter*	2000 mm cased

\*) 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.

1) Without kelly guide.  
 When using a kelly guide, value X has to be reduced by  
 2450 mm for kelly bars MD 36 or  
 1850 mm for kelly bars MD 45.

# Kelly drilling

LB 44-510 with optional equipment



Display for Kelly drilling

## Kelly bars MD 36

	A	X <sup>1</sup>	Drilling depth	Weight	Kelly Ø
	(mm)	(mm)	(m)	(t)	(m)
MD 36/3/30	11900	16600	28.5	7.6	470
MD 36/3/36	13900	14600	34.5	8.8	470
MD 36/4/42	12950	15600	40.6	10.3	470
MD 36/4/48	14450	14100	46.6	11.5	470
MD 36/4/54	15950	12600	52.6	12.7	470
MD 36/4/60	17450	11100	58.6	13.9	470
MD 36/4/66	18950	9600	64.6	15.1	470
MD 36/4/72	20450	8100	70.6	16.3	470
MD 36/4/78	21950	6600	76.6	17.5	470
MD 36/4/84	23450	5100	82.6	18.7	470
MD 36/4/90	24950	3600	88.6	19.9	470
MD 36/4/96	26450	2100	94.6	21.1	470

## Kelly bars MD 45

	A	X <sup>1</sup>	Drilling depth	Weight	Kelly Ø
	(mm)	(mm)	(m)	(t)	(mm)
MD 45/3/30	12200	16200	28.2	10.1	559
MD 45/3/36	14200	14200	34.2	11.5	559
MD 45/4/42	13020	15300	40.2	12.6	559
MD 45/4/48	14520	13800	46.2	13.9	559
MD 45/4/54	16020	12300	52.2	15.4	559
MD 45/4/60	17520	10800	58.2	16.7	559
MD 45/4/66	19020	9300	64.2	18.0	559
MD 45/4/72	20520	7800	70.2	19.4	559
MD 45/4/78	22020	6300	76.2	20.4	559
MD 45/4/84	23520	4800	82.2	22.1	559
MD 45/4/90	25020	3300	88.2	23.5	559
MD 45/4/96	26520	1800	94.2	25.0	559

## Technical data

Rotary drive - torque	0 – 510 kNm
Rotary drive - speed	0 – 36 rpm
Rotary drilling axis	1800 mm

## Performance data

Max. drilling diameter*	3000 mm uncased
Max. drilling diameter*	2500 mm cased

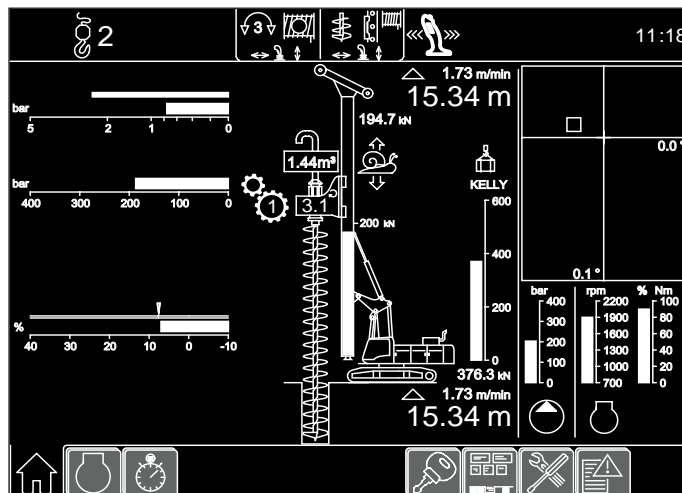
\*) Other drilling diameters available on request  
 Other Kelly bars available on request  
 When using a casing oscillator, value X has to be reduced by 1850 mm.

1) Without kelly guide.  
 When using a kelly guide, value X has to be reduced by  
 3050 mm for kelly bars MD 36 or  
 2450 mm for kelly bars MD 45.

# Continuous flight auger drilling



Auger with auger guide



Display for continuous flight auger drilling

## Technical data

Rotary drive - torque	0 – 510 kNm
Rotary drive - speed	0 – 36 rpm

## Performance data

Drilling depth with auger cleaner*	19.5 m
Drilling depth with 10 m Kelly extension with auger cleaner	29.5 m
Max. pull force (crowd winch and Kelly winch)	1240 kN
Max. drilling diameter**	1400 mm

\*) Without Kelly extension and without leader extension

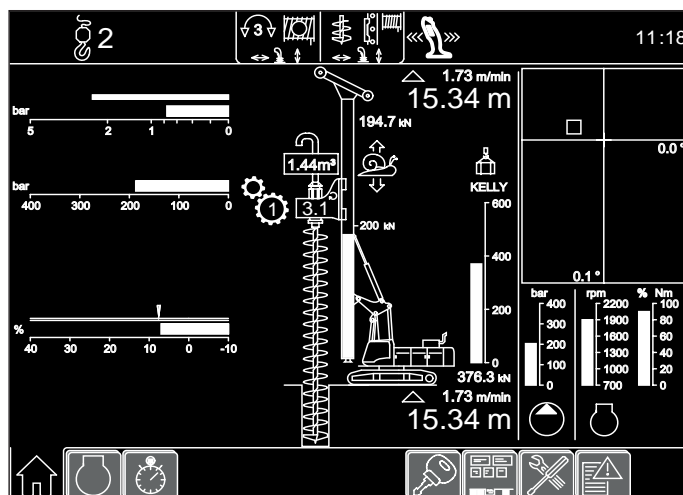
\*\*) Other drilling diameters available on request

For machines with optional equipment (longer leader) the drilling depth increases by 3 m.

# Full displacement drilling



Full displacement tool with auger guide



Display for full displacement drilling

## Technical data

Rotary drive - torque	0 – 510 kNm
Rotary drive - speed	0 – 36 rpm

\*) Without Kelly extension

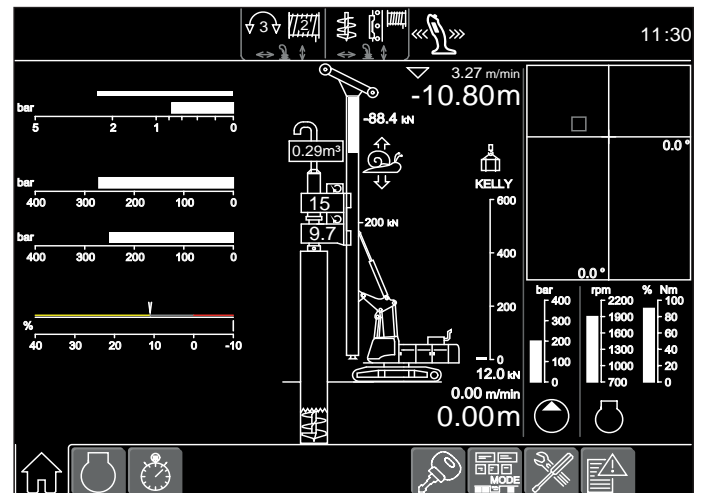
\*\*) Other drilling diameters available on request

## Performance data

Drilling depth*	20 m
Drilling depth with optional equipment	23 m
Drilling depth with 10 m Kelly extension	30 m
Drilling depth with 10 m Kelly extension and optional equipment	33 m
Max. pull force (crowd winch and Kelly winch)	1240 kN
Max. drilling diameter**	600 mm

# Double rotary drilling

Model DBA 300



Display for double rotary drilling

## Technical data

Rotary drive I - torque	0 – 300 kNm
Rotary drive I - speed	0 – 26 rpm
Rotary drive II - torque	0 – 150 kNm
Rotary drive II - speed	0 – 30 rpm

## Performance data

Max. drilling diameter*	900 mm
Max. drilling depth**	20 m
Max. drilling depth with optional equipment	23 m
Max. pull force	900 kN

\*) Other drilling diameters available on request

\*\*) Other drilling depths available on request

# Technical description



## Engine

Power rating according to ISO 9249, 505 kW (677 hp) at 1700 rpm  
Engine type ————— Liebherr D 9508 A7-04  
Fuel tank ————— 1000 l 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 485 l/min  
Separate pump for kinematics ————— 215 l/min  
Hydraulic oil tank ————— 1400 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 – 1.45 km/h  
Track force ————— 1165 kN  
Width of 2-web grousers ————— 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 rpm is continuously variable.



## Noise emission

Noise emissions correspond with 2000/14/EC directive.  
Guaranteed sound pressure level  $L_{PA}$  in the cabin ————— 76.8 dB(A)  
Guaranteed sound power level  $L_{WA}$  ————— 112 dB(A)  
Vibration transmitted to the hand-arm system of the machine operator ————— < 2.5 m/s<sup>2</sup>  
Vibration transmitted to the whole body of the machine operator ————— < 0.5 m/s<sup>2</sup>



## 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 (1<sup>st</sup> layer) ————— 420 kN  
Rope diameter ————— 38 mm  
Line speed ————— 0-65 m/min

Option:

Line pull effective (2<sup>nd</sup> layer) ————— 500 kN  
Rope diameter ————— 42 mm  
Line speed ————— 0-79 m/min



## Auxiliary winch

Line pull effective (1<sup>st</sup> layer) ————— 140 kN  
Rope diameter ————— 22 mm  
Line speed ————— 0-71 m/min



## Rope crowd system

Crowd force push/pull ————— 560/560 kN  
Line pull (effective) ————— 280 kN  
Rope diameter ————— 30 mm  
Travel ————— 20 m  
Travel with optional equipment ————— 23 m  
Line speed ————— 0-68 m/min

The winches are noted for compact, easily mounted design.

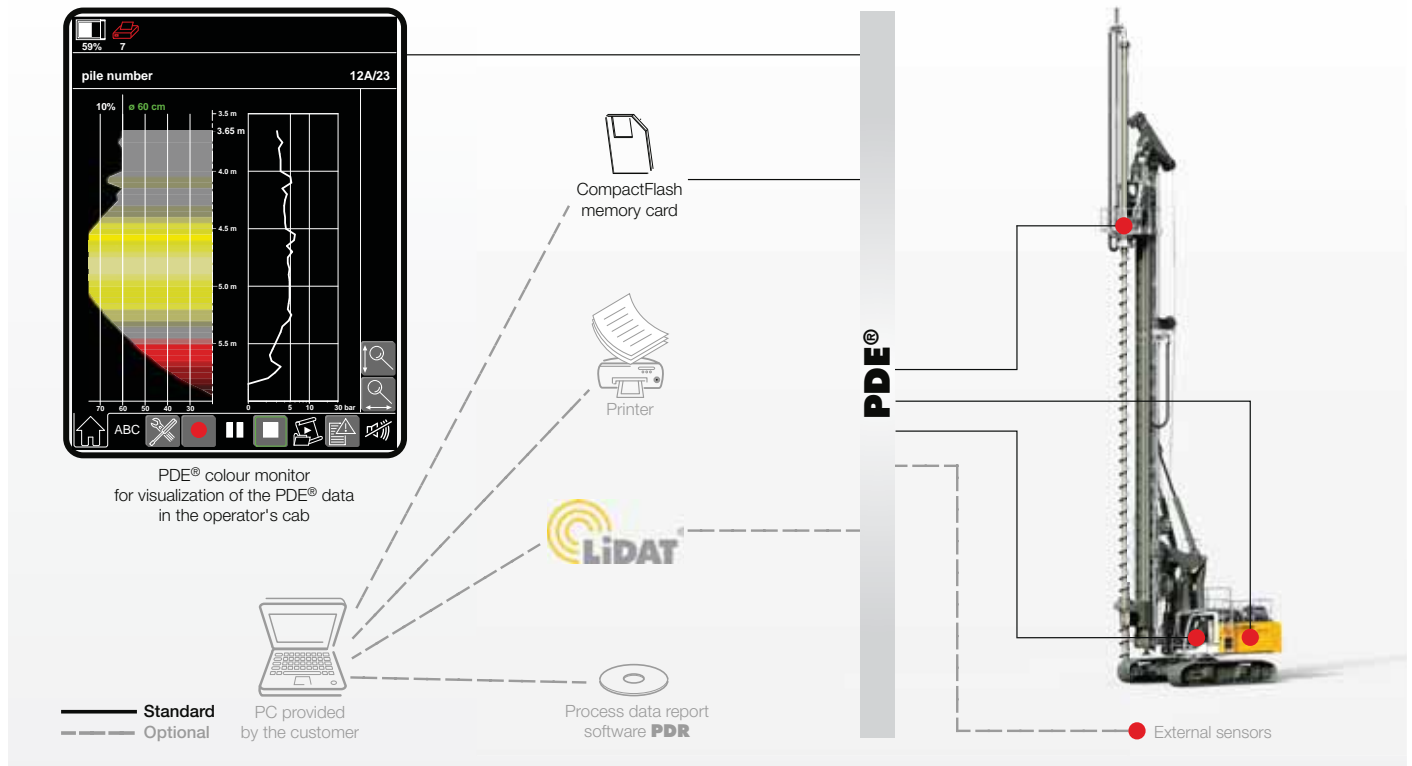
Propulsion is via a maintenance-free planetary gearbox in oil bath.

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.



# 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.

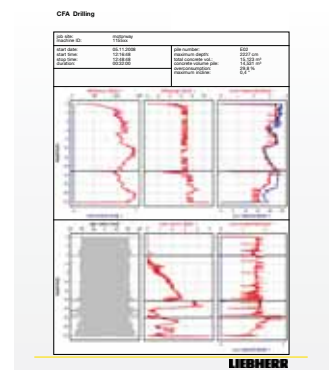
# Process data reporting - PDR (additional equipment)

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.



# Leader kinematics



Standard: Leader can be folded back.



Option: Leader can be folded forward (and back).

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