MADE IN GERMANY

Prime Vertical

Multi Directional Drilling

Prime Vertical
MDD-Rigs
Multi **D**irectional **D**rilling
PV 40-500 MDD
0°- 45°-90°
vertical & horizontal

MDD-Rigs
up to 5,000 kN pull force (500 t)
up to 120 kNm torque

Prime-Vertical operates worldwide and is specialised in the manufacture of Multi Directional Drilling Rigs.

Quality and Reliability „Made in Germany"
Product quality is the highest priority at Prime Vertical.
That is why we keep development, manufacture and assembly entirely under one roof at our German facility in Wenden. This approach enables short development phases and optimised manufacturing processes under compliance with the highest quality standards.

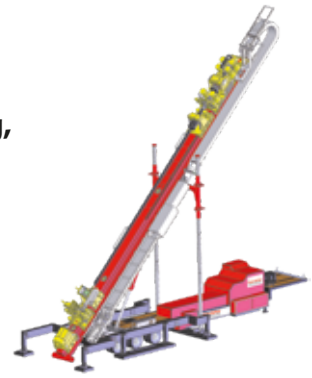
Our qualified and highly motivated employees ensure utmost quality, safety and delivery reliability. The proven modular construction system guarantees the customer high flexibility in the selection of both pull force and torque for his rig. These are the benchmark for Prime Vertical's entrepreneurial activities.

The first-class quality of design, manufacture and assembly is a guarantee for high technology products with maximum reliability and extra long service life.

Patented technology, robust construction, high torque and experience are only a few of the many powerful features that make Prime Vertical the global market leader for MDD-technology.

Multidirectional Drilling Rig, Frame Version
the low cost version

Multidirectional Drilling Rig, Trailer Version
easy transportation to job-site



Multidirectional Drilling Rig, Crawler Version
mobile and flexible at job-site

Standard equipment

All our Multidirectional Drilling Rigs are equipped with „Load-Sensing Hydraulic Systems“. The rigs are available as crawler version, trailer version or frame version.

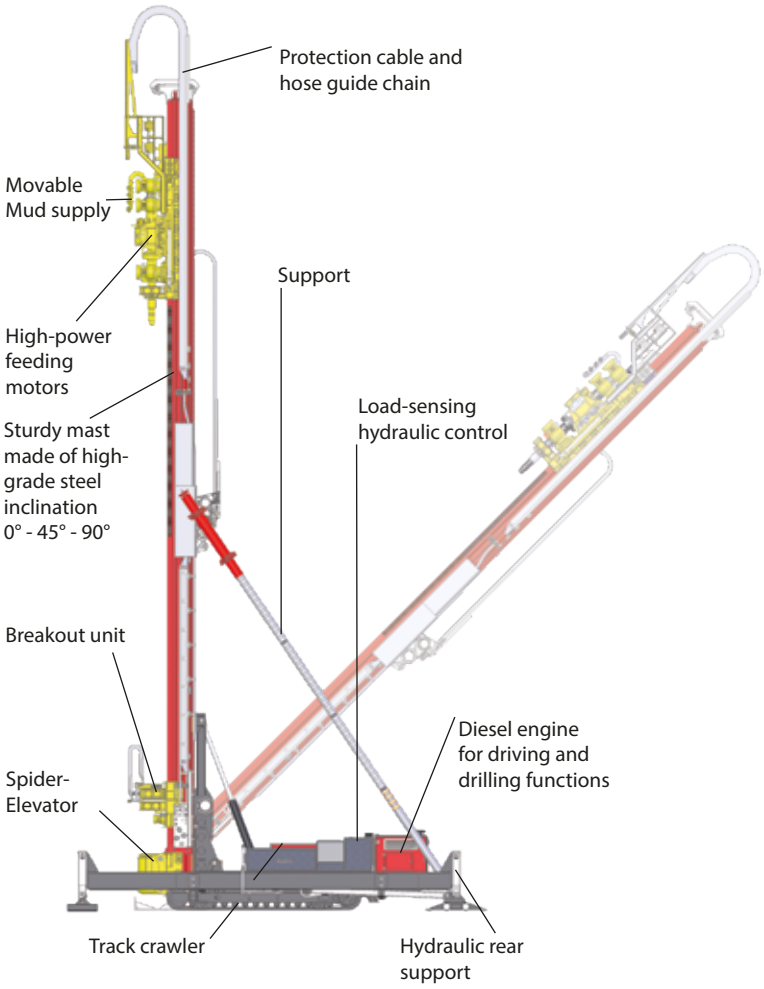
The Diesel engine including the hydraulic system can be mounted „on board“ with the crawler version or can be provided as a separate power pack (20 ft container) with all three versions. With the separate power pack the customer can choose between **330 kW, 470 kW, 570 kW and 940 kW** engine capacities.

The power rotary head which is driven by hydraulic motors develops a torque rating up to **120 kNm** and can be selected in two or three different gear steps.

Furthermore, the drilling rig is available with drill pipe supply system, hydraulic manipulator, drill pipe crane, camera system, a drill data log system as well as further options.

The MDD-rigs are equipped with a separate operating container, which provides the operator an optimum view.

The sturdy mast can be equipped with two hydraulic cylinders with a sliding movement between 0° and 90°. The telescopic station is mounted on two large plates which safely support the mast in any drilling position.



Options, compatibility and versions

✔ Standard equipment
● Optional non standard equipment

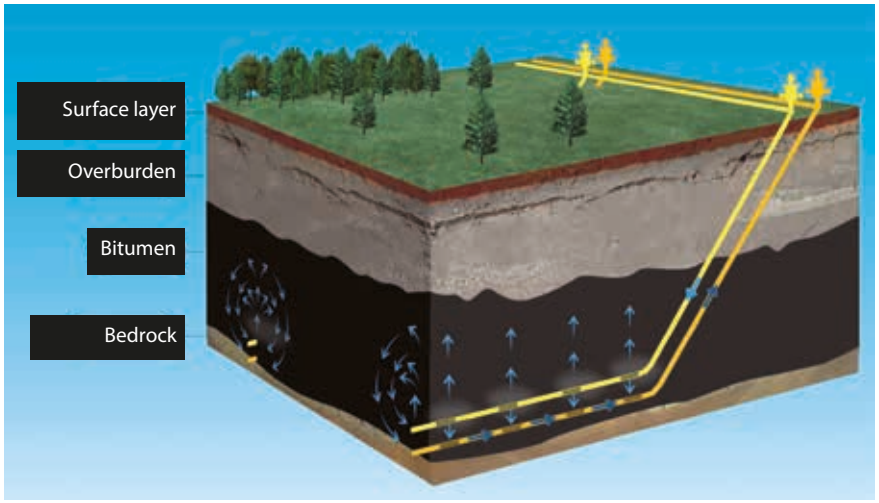
	PV 40	PV 60	PV 80	PV 100	PV 150	PV 200	PV 250	PV 300	PV 400	PV 500
on frame	●	●	●	✔	✔	✔	✔	✔	✔	✔
on crawler	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
on trailer	●	●	●	✔	✔	✔	✔	✔	✔	✔
external hydraulic aggregate	●	●	●	●	✔	✔	✔	✔	✔	✔
external control cabin	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
drill pipes range 2	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
drill pipes range 3	●	●	●	✔	✔	✔	✔	✔	✔	✔
Power rating 181 kW	✔	✔	●	●	●	●	●	●	●	●
Power rating 330 kW	●	●	✔	✔	✔	✔	●	●	●	●
Power rating 470 kW	●	●	●	●	✔	✔	✔	✔	✔	✔
Power rating 570 kW	●	●	●	●	●	●	✔	✔	✔	✔
Power rating 940 kW	●	●	●	●	●	●	●	●	✔	✔
Torque 30 kNm	✔	✔	✔	●	●	●	●	●	●	●
Torque 50 kNm	●	●	✔	✔	✔	●	●	●	●	●
Torque 70 kNm	●	●	●	✔	✔	✔	✔	●	●	●
Torque 90 kNm	●	●	●	●	●	✔	✔	✔	✔	✔
Torque 120 kNm	●	●	●	●	●	●	●	✔	✔	✔

Advantages of a MDD-rig over the traditional vertical drilling technique

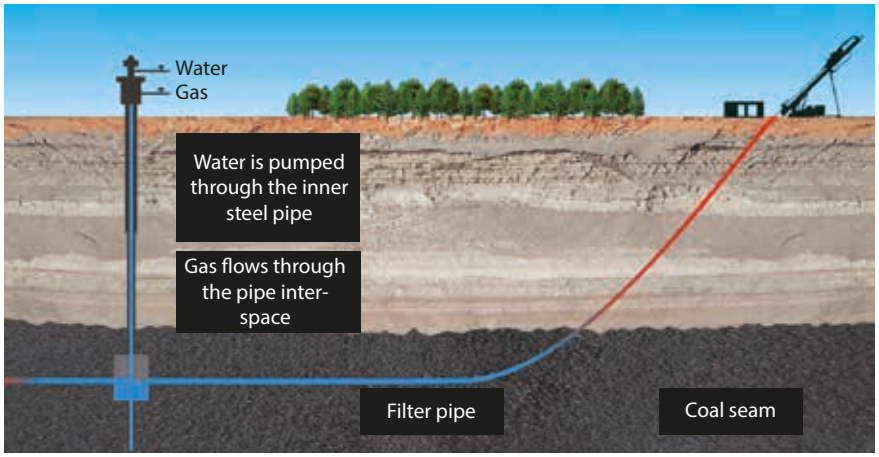
Traditional vertical drill rigs	MDD-rigs
Push or pull force with pipe installation is derived from the weight of the lower drill string and winch	Push or pull force with pipe installation is derived from the thrust power of the rack & pinion feed system
No change of angle possible for the pipe centering guidance	Inclination of mast enables angles of 8°- 45°- 90° for pipe centering guidance
Axial load is provided by pulley system, winch, rotor and weight of the drill string	Axial load is provided by driving the power rotary head via the rack & pinion system
To break the drill pipes, tongs or wrenches are used: Chain pliers, universal or automatic key, hydraulic torque wrench	To break the drill pipes, the automatic breakout unit is used
High material and time expenditure for set-up as well as for preparation and follow-up works	Low material and time expenditure for set-up as well as for preparation and follow-up works, thus: • Reduced transport costs • Fast assembly on the jobsite • Reduced space requirements on site
High labour costs: usually 4-6 workers and a technician required	Reduced labour costs: 2-3 workers and an operator required

Range of application of MDD-rigs

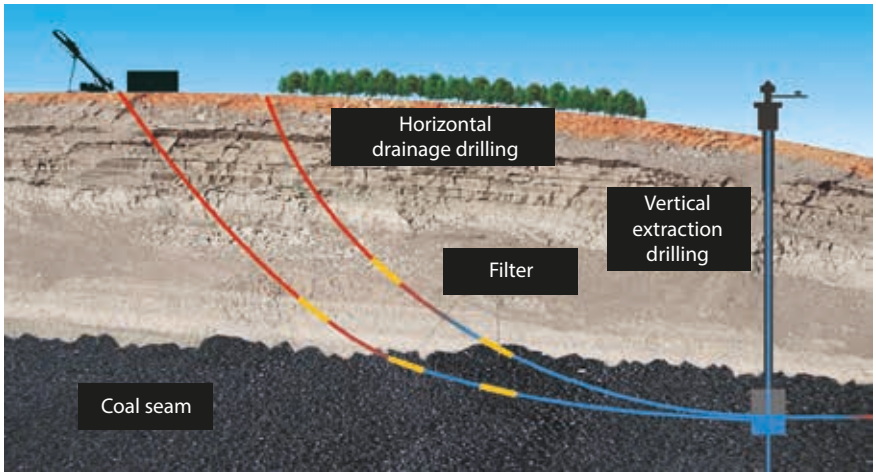
- Extraction of heavy oil and bitumen via SAGD and TAGD method
- Extraction of mineral resources e.g. difficult to recover resources, shale gas, bitumen sand or old deposits
- Preliminary degassing of coal beds and extraction of methane gas from excavation voidsm
- Extraction of coal bed methane
- Development of mineral oil (heavy oil and bitumen) and gas (shale gas and coal bed methane)
- Exploration and extraction of hydrocarbons within coastal platforms
- Accident prevention with oil and gas driillings
- Installation of underwater pipelines with major level differences
- Construction of drainage systems to protect objects and built-up areas
- Installation of conveying pipelines
- Reconstruction of abandoned oil and gas drilling sites
- Installation of product pipelines for offshore oil rigs
- General overhaul of existing oil and gas drilling sites



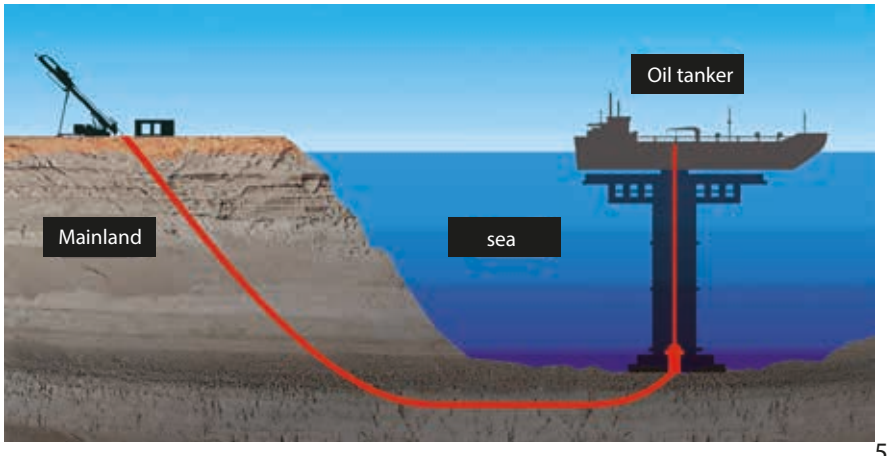
Extraction of difficult-to-recover oil and bitumen resources, via SAGD method



Extraction of coal bed methane



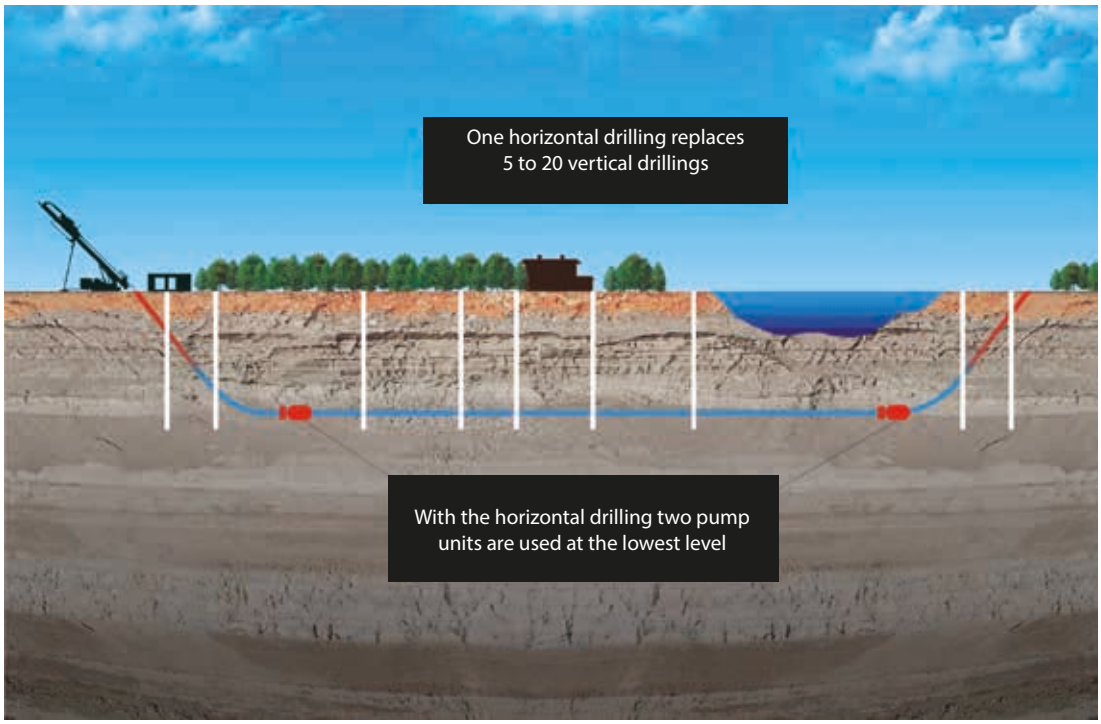
Construction of drainage systems

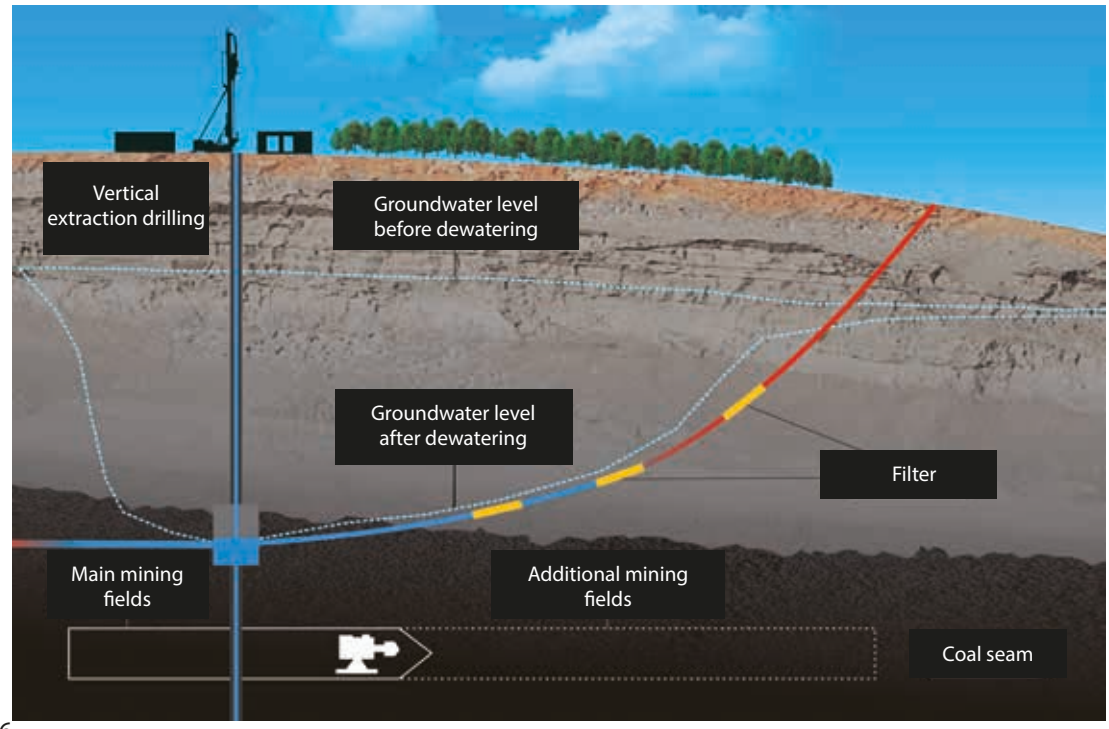


Installation of pipelines for offshore oil rigs

Construction of drainage systems

MDD-rigs are ideally suited for hydrogeological projects such as the construction of drainage systems to protect objects and built-up areas against flooding by groundwater - via water level lowering, dewatering, sewage disposal etc. - as well as against contamination by industrial wastewater

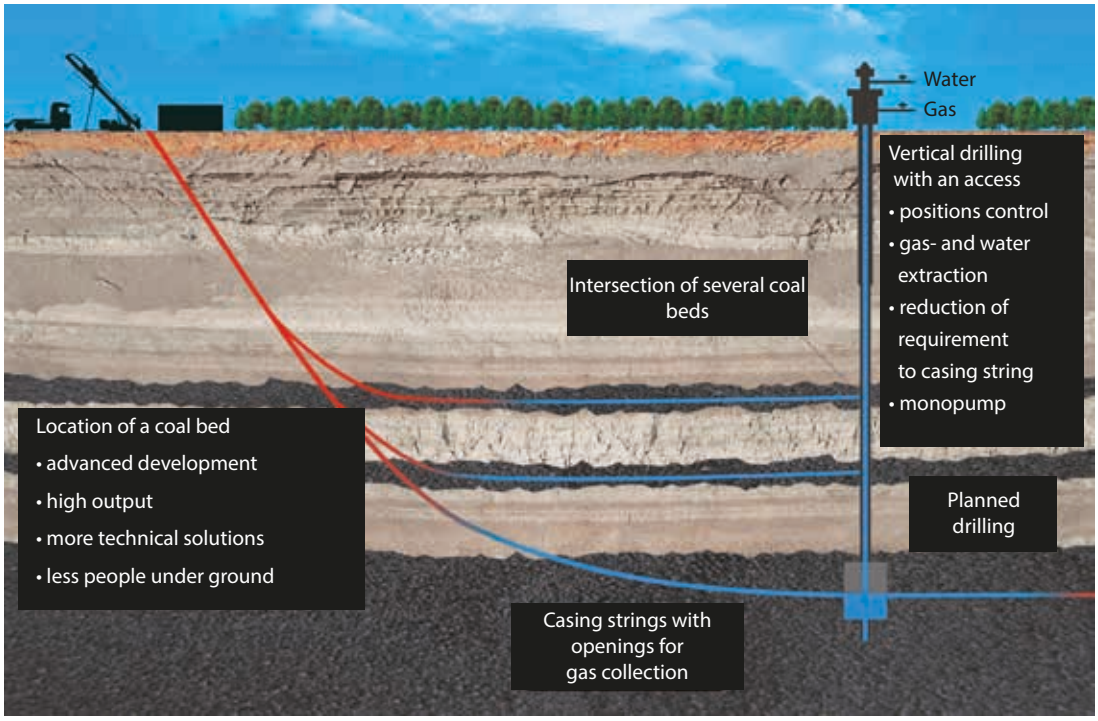


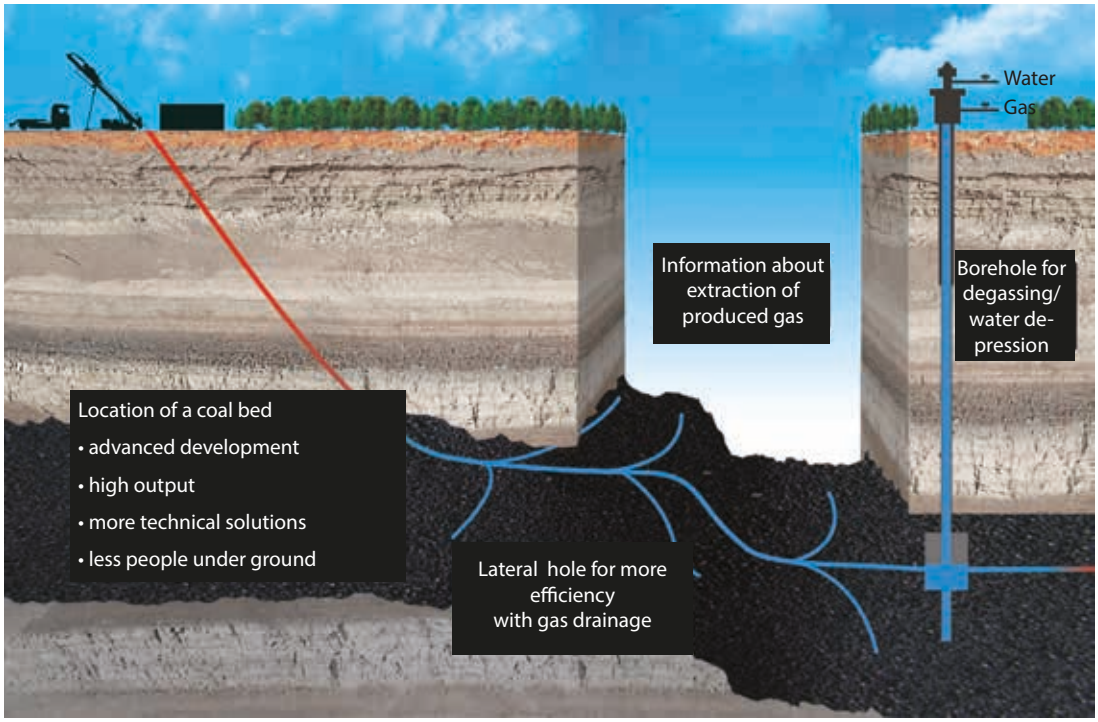


Extraction of coal bed methane

As a first step, a preliminary degassing of the coal deposit is executed to guarantee the safety of the mining personnel. This means degassing of the coal bed gas prior to start mining and support of the return flow process of the gas during the mining works.

The second step is to extract the coal bed methane for practical purposes (fuel gas, gas power plants). This application field of our rigs is of high ecological significance.

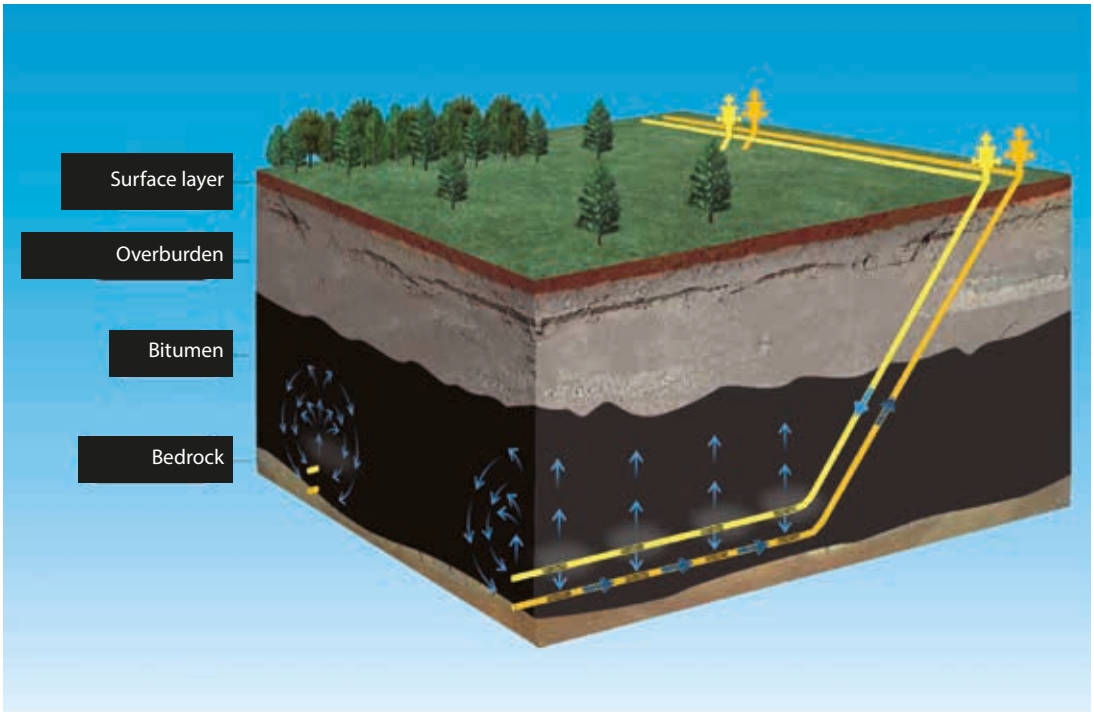




Extraction of difficult-to-recover oil and bitumen resources via SAGD method

Using a MDD-rig with the SAGD method facilitates the extraction of difficult-to-recover resources such as the flat deposits of heavy oil and bitumen.

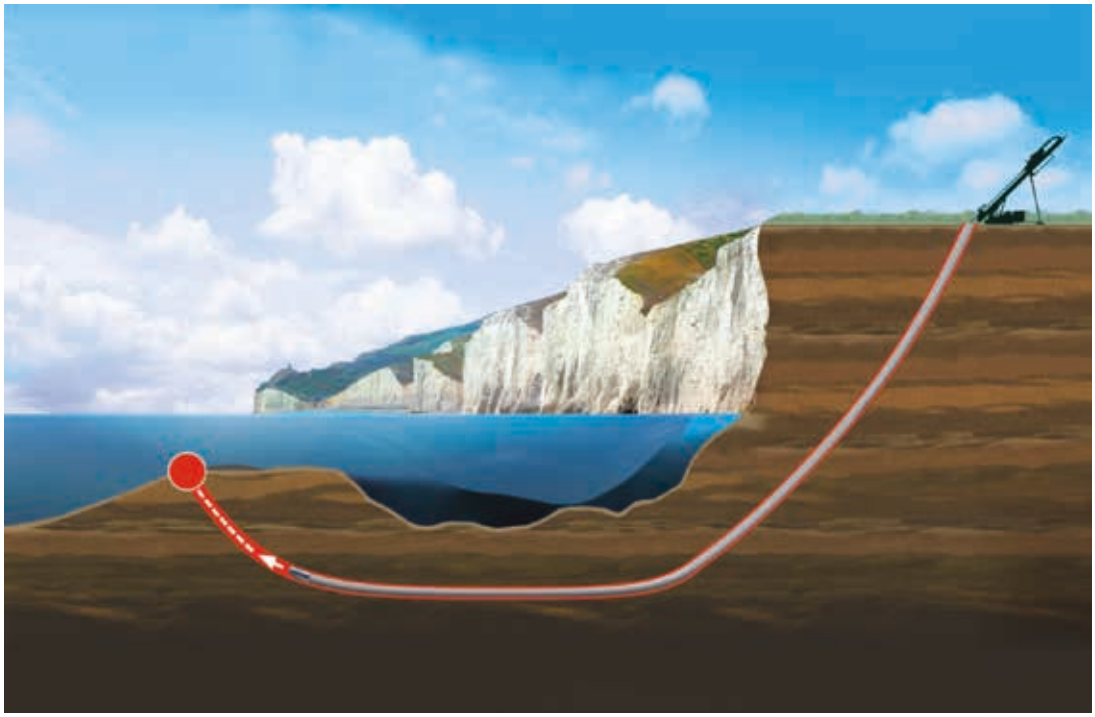
Our MDD-rigs are drilling rigs equipped with a rack & pinion feed system and a power rotary head. These features enable near-surface drillings (up to 100 m) with horizontal completion.



Performance of drillings with access to the sea

MDD-rigs are also suitable for drillings into the seabed and for drillings with major differences in coastline height.

Our rigs have already been successfully operated with drillings at sites of limited space and in mountainous terrain with large height differences. Even with hard and rocky ground the MDD-rigs perform their task effectively



Optional quality equipment

Mud-swivel Western type with manifold

Drill and measuring data transmission system

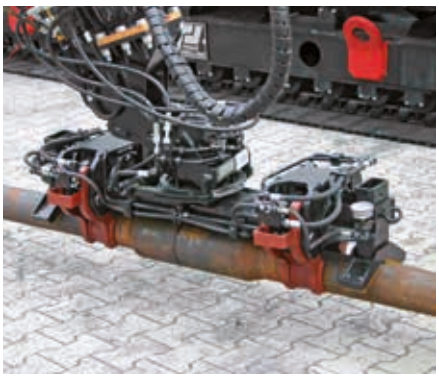
Optimal noise reduction

Remote control for drive modes

Drill pipe supply for 5 drill rods

Breakout system at the power rotary head

Drill pipe magazine



3D drill pipe gripper, rotatable and swivelling

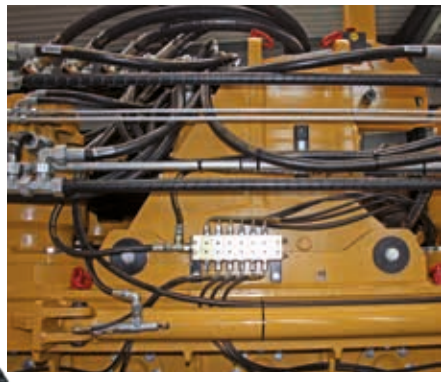
Drill data log system for recording of drilling parameter

Automatic drill pipe lubrication

Camera and lights for power rotary head and breakout unit

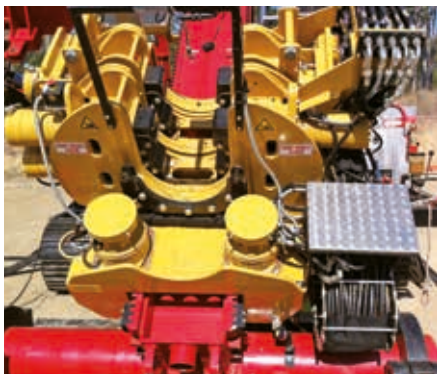
Drill pipe crane with drill pipe gripper and remote control

Large operating container with heating, air conditioning and panoramic windows

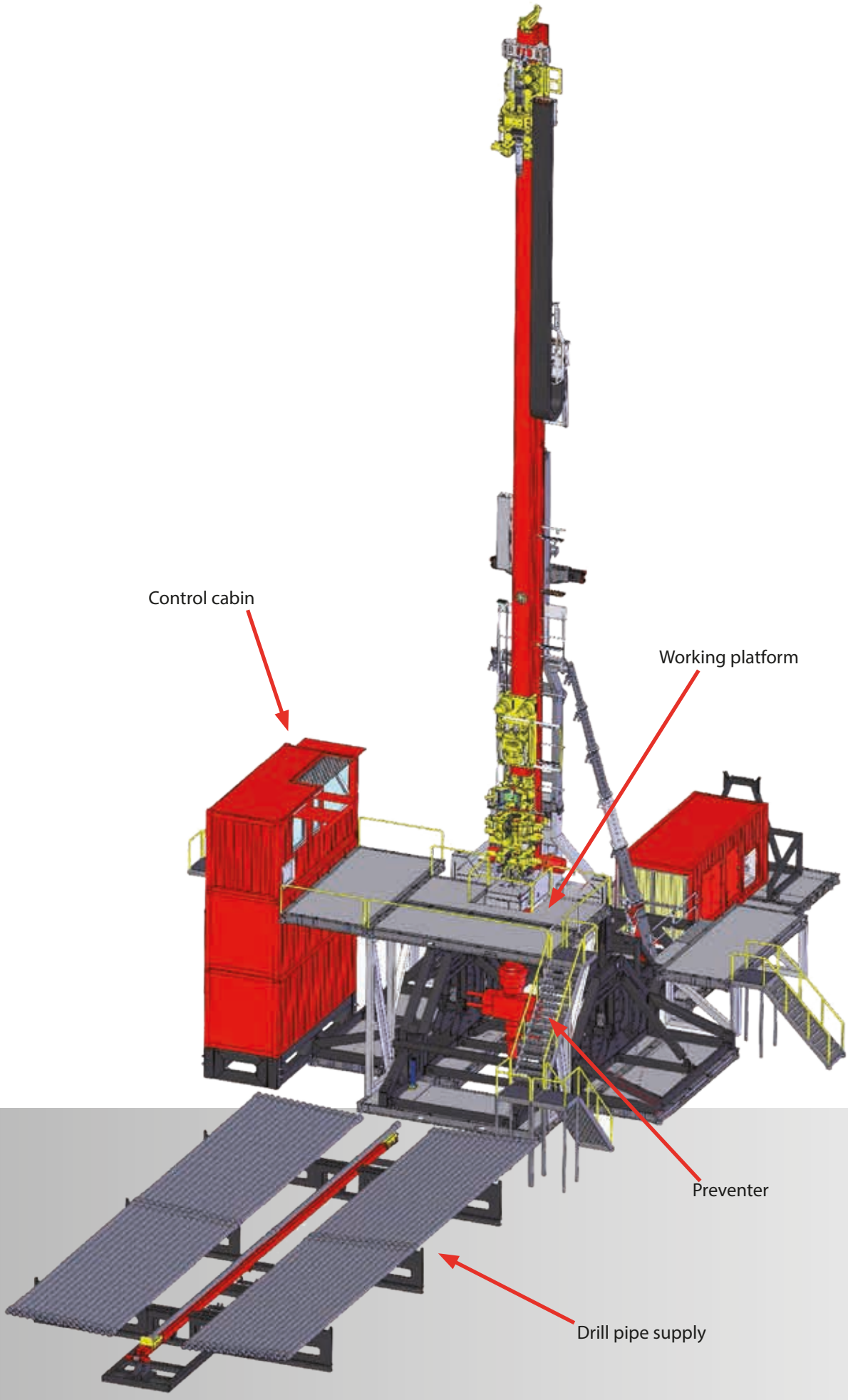


Automatic central lubrication unit

Mud supply, hydraulically lockable with by-pass



Breakout system with easily replaceable and self-centering clamping jaws


Control cabin
Working platform
Preventer
Drill pipe supply

PV 40 - 100 MDD on crawler for drill pipes range 2

	PV 40	PV 60	PV 80	PV 100
Pull force	40 t	60 t	80 t	100 t
Torque	33 kNm	33 kNm	33 / 50 kNm	50 / 70 kNm
Inclination angle	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°
Power rating	181 kW	181 kW	330 kW	330 kW
Noise volume max.	78 dB(A)	78 dB(A)	78 dB(A)	78 dB(A)
Transport length	18 m	18 m	18 m	18 m
Transport width	2.5 m	2.5 m	2.5 m	2.5 m
Transportation height	3.2 m	3.2 m	3.2 m	3.2 m
Weight	36,000 kg	36,000 kg	38,000 kg	38,000 kg

PV 150 - 500 MDD on crawler for drill pipes range 3

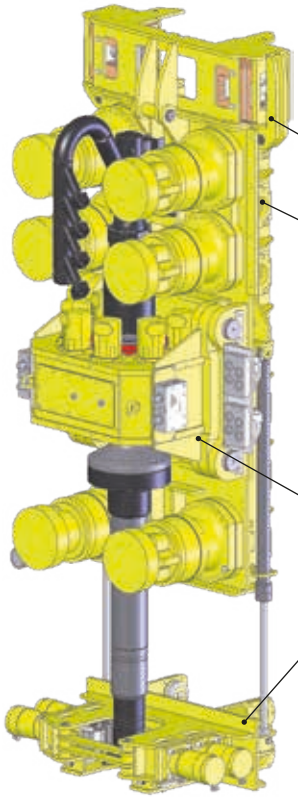
	PV 100	PV 150	PV 200	PV 250	PV 300	PV 400	PV 500
Pull force	100 t	150 t	200 t	250 t	300 t	400 t	500 t
Torque	50 / 70 kNm	50 / 70 kNm	70 / 90 kNm	70 / 120 kNm	90 / 120 kNm	90 / 120 kNm	90 / 120 kNm
Inclination angle	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°
Power rating	330 kW	330 / 470 kW	330 / 470 kW	330 / 570 kW	470 / 570 kW	470 / 940 kW	470 / 940 kW
Noise volume max.	78 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)
Transport length	20.9 m	20.9 m	21.8 m	21.8 m	22.7 m	22.7 m	22.7 m
Transport width	3.3 m	2.5 m	2.5 m	3.0 m	3.0 m	3.2 m	3.2 m
Transport height	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m	3.0 m
Weight	43,000 kg	43,000 kg	55,000 kg	55,000 kg	60,000 kg	60,000 kg	63,000 kg

PV 100 - 500 MDD on steel frame for drill pipes range 3

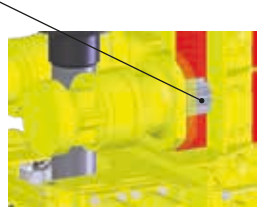
	PV 100	PV 150	PV 200	PV 250	PV 300	PV 400	PV 500
Pull force	100 t	150 t	200 t	250 t	300 t	400 t	500 t
Torque	50 / 70 kNm	50 / 70 kNm	70 / 90 kNm	70 / 90 kNm	90 / 120 kNm	90 / 120 kNm	90 / 120 kNm
Inclination angle	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°
Power rating	330 / 470 kW	330 / 470 kW	330 / 470 kW	330 / 470 kW	470 / 570 kW	470 / 940 kW	470 / 940 kW
Noise volume max.	78 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)
Transport length max.	20.9 m	20.9 m	21.8 m	21.8 m	22.7 m	22.7 m	22.7 m
Transport width max.	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m
Transport height max.	3 m	3 m	3 m	3 m	3 m	3 m	3 m
Total weight	59,600 kg	61,600 kg	64,200 kg	66,200 kg	69,900 kg	71,900 kg	77,900 kg

PD 100 - 500 MDD on trailer for drill pipes range 3

	PD 100	PD 150	PD 200	PD 250	PD 300	PD 400	PD 500
Pull force	100 t	150 t	200 t	250 t	300 t	400 t	500 t
Torque	50 / 70 kNm	50 / 70 kNm	70 / 90 kNm	70 / 120 kNm	90 / 150 kNm	120 / 150 kNm	120 / 180 kNm
Inclination angle	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°	0°- 45°- 90°
Power rating	330 / 470 kW	330 / 470 kW	330 / 470 kW	330 / 470 kW	470 / 570 kW	470 / 940 kW	470 / 940 kW
Noise volume max.	78 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)	86 dB(A)
Transport length	20.9 m	20.9 m	21.8 m	21.8 m	22.7 m	22.7 m	22.7 m
Transport width	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m
Transport height	2.8 m	2.8 m	2.8 m	2.8 m	2.8 m	2.8 m	2.8 m
Weight	28,000 kg	28,000 kg	32,000 kg	32,000 kg	39,000 kg	39,000 kg	39,000 kg



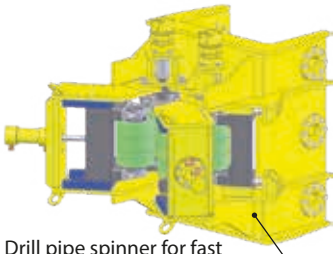
Safety feeding brake



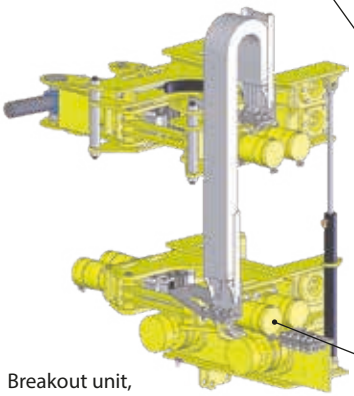
Feed via rack & pinion drive

Separate third clamp

Drill head with high-pressure swivel
and feeding motors



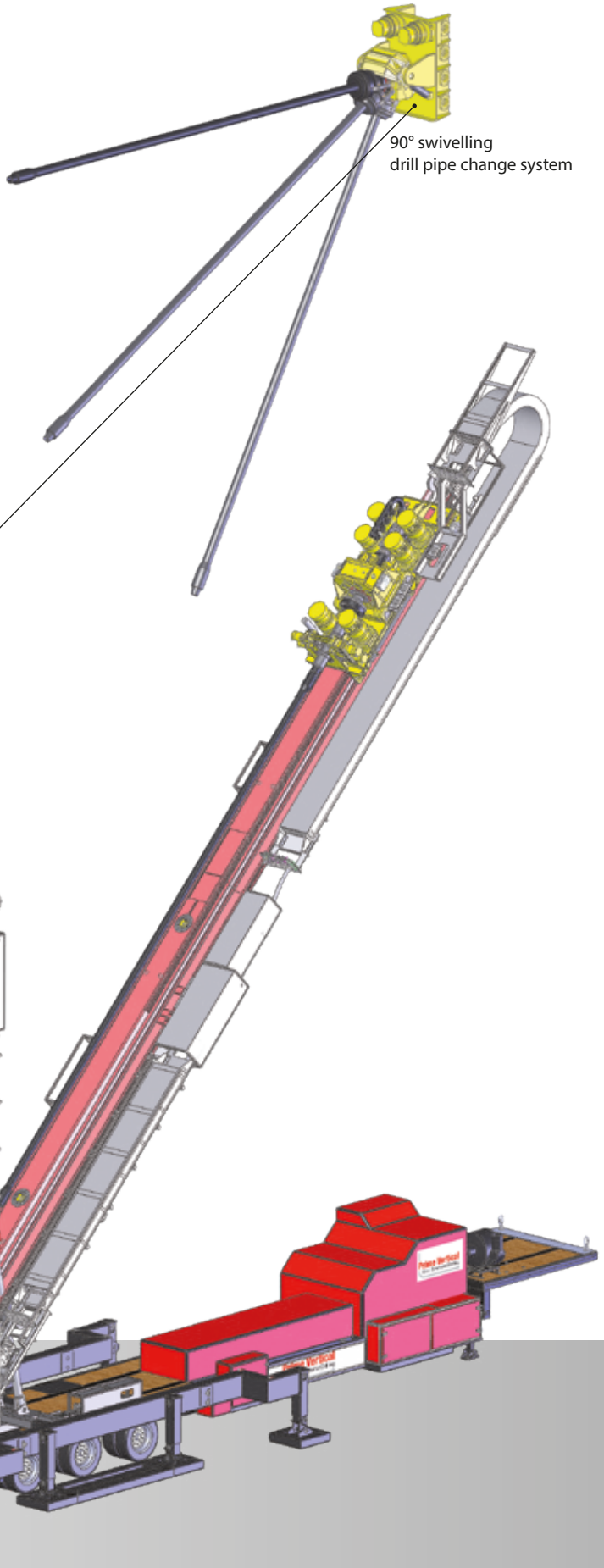
Drill pipe spinner for fast
unscrewing of the drill pipes



Breakout unit,
moveable and slidable

Hydraulic spider elevator

90° swivelling
drill pipe change system



Modular construction

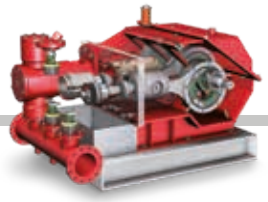
Thanks to their modular construction our rigs are easy to transport.

At customer´s request the drill mast has the option to be detached from the undercarriage. This eliminates the requirement for special transport permits.

None of the components weights more than 20 t., which allows for transport of all parts by standard truck with semi-trailer.


DANGER
HIGH
PRESSURE
LINES

Mud components



Mud pumps high pressure

	X - 3.003 MDD	$P_{max.}$ = 270 bar / 3,920 psi		470 kW / 639 HP			
Ø	110 rpm	130 rpm	150 rpm	170 rpm	190 rpm	210 rpm	230 rpm
7,0 in	1,457 lpm	1,722 lpm	1,987 lpm	2,251 lpm	2,516 lpm	2,781 lpm	3,046 lpm
	90 bar 1,310 psi	90 bar 1,310 psi	90 bar 1,310 psi	88 bar 1,270 psi	78 bar 1,140 psi	71 bar 1,030 psi	65 bar 940 psi
6,0 in	1,070 lpm	1,265 lpm	1,460 lpm	1,654 lpm	1,849 lpm	2,043 lpm	2,238 lpm
	120 bar 1,740 psi	120 bar 1,740 psi	120 bar 1,740 psi	119 bar 1,730 psi	107 bar 1,550 psi	97 bar 1,400 psi	88 bar 1,280 psi
5,0 in	743 lpm	878 lpm	1,014 lpm	1,149 lpm	1,284 lpm	1,419 lpm	1,554 lpm
	170 bar 2,470 psi	170 bar 2,470 psi	170 bar 2,470 psi	170 bar 2,470 psi	154 bar 2,230 psi	139 bar 2,020 psi	127 bar 1,840 psi
4,5 in	602 lpm	712 lpm	821 lpm	930 lpm	1,040 lpm	1,149 lpm	1,259 lpm
	210 bar 3,050 psi	210 bar 3,050 psi	210 bar 3,050 psi	210 bar 3,050 psi	190 bar 2,750 psi	172 bar 2,490 psi	157 bar 2,270 psi
4,0 in	476 lpm	562 lpm	649 lpm	735 lpm	822 lpm	908 lpm	995 lpm
	270 bar 3,920 psi	270 bar 3,920 psi	270 bar 3,920 psi	269 bar 3,890 psi	240 bar 3,480 psi	217 bar 3,150 psi	198 bar 2,880 psi

	X - 3.005 MDD	$P_{max.}$ = 400 bar / 5,800 psi		700 kW / 952 HP			
Ø	110 rpm	130 rpm	150 rpm	170 rpm	190 rpm	210 rpm	230 rpm
7,0 in	1,457 lpm	1,722 lpm	1,987 lpm	2,251 lpm	2,516 lpm	2,781 lpm	3,046 lpm
	130 bar 1,890 psi	130 bar 1,890 psi	130 bar 1,890 psi	130 bar 1,890 psi	117 bar 1,690 psi	106 bar 1,530 psi	97 bar 1,400 psi
6,0 in	1,070 lpm	1,265 lpm	1,460 lpm	1,654 lpm	1,849 lpm	2,043 lpm	2,238 lpm
	180 bar 2,610 psi	180 bar 2,610 psi	180 bar 2,610 psi	178 bar 2,580 psi	159 bar 2,310 psi	144 bar 2,090 psi	131 bar 1,910 psi
5,0 in	743 lpm	878 lpm	1,014 lpm	1,149 lpm	1,284 lpm	1,419 lpm	1,554 lpm
	260 bar 3,770 psi	260 bar 3,770 psi	260 bar 3,770 psi	256 bar 3,710 psi	229 bar 3,320 psi	207 bar 3,010 psi	189 bar 2,740 psi
4,5 in	602 lpm	712 lpm	821 lpm	930 lpm	1,040 lpm	1,149 lpm	1,259 lpm
	320 bar 4,640 psi	320 bar 4,640 psi	320 bar 4,640 psi	316 bar 4,580 psi	283 bar 4,100 psi	256 bar 3,710 psi	234 bar 3,390 psi
4,0 in	476 lpm	562 lpm	649 lpm	735 lpm	822 lpm	908 lpm	995 lpm
	400 bar 5,800 psi	400 bar 5,800 psi	400 bar 5,800 psi	400 bar 5,800 psi	358 bar 5,190 psi	324 bar 4,700 psi	296 bar 4,290 psi

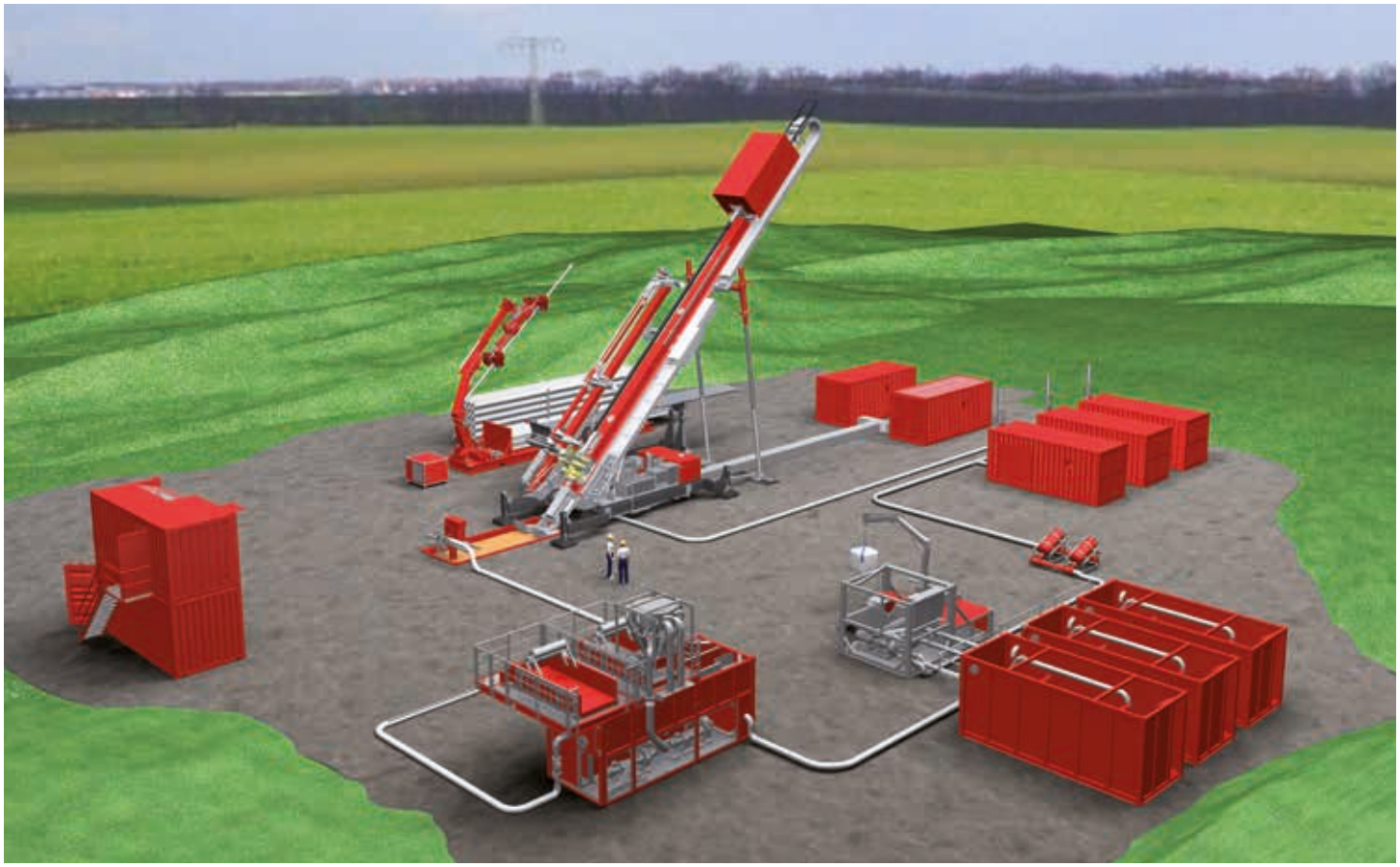
	X - 3.007 MDD	$P_{max.}$ = 500 bar / 7,250 psi		940 kW / 1,278 HP			
Ø	110 rpm	130 rpm	150 rpm	170 rpm	190 rpm	210 rpm	230 rpm
7,0 in	1,457 lpm	1,722 lpm	1,987 lpm	2,251 lpm	2,516 lpm	2,781 lpm	3,046 lpm
	175 bar 2,540 psi	175 bar 2,540 psi	175 bar 2,540 psi	175 bar 2,540 psi	157 bar 2,280 psi	142 bar 2,060 psi	130 bar 1,880 psi
6,0 in	1,070 lpm	1,265 lpm	1,460 lpm	1,654 lpm	1,849 lpm	2,043 lpm	2,238 lpm
	240 bar 3,480 psi	240 bar 3,480 psi	240 bar 3,480 psi	239 bar 3,460 psi	214 bar 3,100 psi	193 bar 2,800 psi	176 bar 2,560 psi
5,0 in	743 lpm	878 lpm	1,014 lpm	1,149 lpm	1,284 lpm	1,419 lpm	1,554 lpm
	350 bar 5,080 psi	350 bar 5,080 psi	350 bar 5,080 psi	344 bar 4,980 psi	308 bar 4,460 psi	278 bar 4,040 psi	254 bar 3,680 psi
4,5 in	602 lpm	712 lpm	821 lpm	930 lpm	1,040 lpm	1,149 lpm	1,259 lpm
	430 bar 6,240 psi	430 bar 6,240 psi	430 bar 6,240 psi	424 bar 6,150 psi	380 bar 5,510 psi	343 bar 4,980 psi	314 bar 4,550 psi
4,0 in	476 lpm	562 lpm	649 lpm	735 lpm	822 lpm	908 lpm	995 lpm
	500 bar 7,250 psi	500 bar 7,250 psi	500 bar 7,250 psi	500 bar 7,250 psi	480 bar 6,970 psi	435 bar 6,310 psi	397 bar 5,760 psi

Mud mixing units

	PM-3.000 2,7 E	PM-3.000 3,0 E	PM-3.000 3,5 E	PM-4.000 4,0 E
Mixing pump	45 kW	75 kW	75 kW	75 kW
Transfer pump	45 kW	45 kW	45kW	45kW
Mixing capacity	2,700 l/min	3,000 l/min	3,500 l/min	4,000 l/min
Container size, platform	10 ft	10 ft	10 ft	10 ft
Container size, per tank	40 ft	40 ft	40 ft	40 ft

Mud recycling systems

	PR-3.000 2,7 R	PR-3.000 3,0 R	PR-3.000 3,5 R	PR-4.000 4,0 R
Loading pump	75 kW	75 kW	75 kW	75 kW
Transfer pump	45 kW	45 kW	45 kW	45 kW
Recycling capacity	2,700 l/min	3,000 l/min	3,500 l/min	4,000 l/min
Container size, platform	2 x 15 ft	3 x 15 ft	3 x 15 ft	3 x 15 ft
Container size, tank	20 ft	20 ft	20 ft	20 ft



Welding of a frame

Electronic assembly

Assembly work on the power rotary head

Hydraulic assembly

Final inspection

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Multi Directional Drilling

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