

Herrenknecht Vertical

Automated Rig Technology

The exploration of new energy deposits is one of the global challenges for future energy supply. Whether the development of onshore and offshore oil and gas or deep geothermal energy is economically reasonable also depends on the drilling equipment used. Herrenknecht Vertical, a subsidiary of Herrenknecht AG, the market leader in mechanized tunnelling systems, designs and manufactures customized high-quality rigs for drilling, workover and decommissioning, meeting the needs of our customers and their projects. The hydraulic rig concepts for drilling to 8,000 meters incorporate comprehensive, safety-based automation, setting new standards of safety, efficiency and environmental protection. **Automated Rig Technology. Engineered and built for your performance.**



Headquarters in Germany, active worldwide. With more than 40 years of engineering and manufacturing experience, around 5,000 employees and 76 locations within the Herrenknecht Group, we support our customers globally.

RACK & PINION RIGS

TRAILERIZED RIGS FOR CRANELESS RIG-UP



Fast-moving rack & pinion rigs

- › Completely self-erecting rig for craneless rig-up
- › Fully trailerized for fastest rig moves
- › Push and pull capability
- › Semi-automatic pipe handling system (hands-off-technology)
- › Automated vertical pipe rack system for small footprint (optional)
- › Effective pad drilling through XY stepping system (optional)
- › Made in Germany



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**AUTOMATED
RIG TECHNOLOGY**



**HERRENKNECHT
VERTICAL**

Trailer-mounted rack & pinion rigs for fast rig moves

The **Herrenknecht Vertical rack & pinion rig**, a newly designed fast-moving rig type for oil and gas as well as geothermal drilling. The rig concept combines the expertise of Herrenknecht Vertical in automated, hydraulic drilling rigs with the parent company's experience in rack and pinion hoisting system, gained from over 100 HDD rigs built with hook loads up to 500 metric tons (550 short tons).

The rig integrates all benefits of the automated, hydraulic rig concept with a robust, modular rack and pinion hoisting system. It has been developed for projects, where the rig move is a critical part of operation, but infrastructure is poor in terms of site access and availability of rig move equipment such as cranes. With a hook load up to 250 metric tons (275 short tons) and a super singles mast, the rig is capable of drilling down to about 4,000 meters (13,200 feet).



Hydraulic power catwalk for hands-off pipe handling

2-stage pipe handling between vertical pipe rack and well center



The rig with lighter and smaller components is fully self-erecting; it can be assembled craneless, only with a 7.5 metric tons (8.3 short tons) forklift. The mast can be divided into three segments to suit restricted transport dimensions; this modularity is where the rack and pinion system has its advantages. The mast base section has an integrated trailer and the rig floor with driller's cabin is self-erecting by slingshot mechanism. Main components, like rotary table, iron roughneck and top drive, are fixed to the mast and stay 'on board' for transportation. The mast is assembled in lowered position and erected by a hydraulic cylinder that is integrated in the trailer. Backyard components such as the central HPU, MCC, mud pumps and mud tanks are trailerized and can be easily moved by standard oilfield trucks.

The rack & pinion rig offers different levels of pipe handling and racking automation, adaptable to individual project requirements:

- › Tubulars are handled hands-off with the **hydraulic power catwalk** between ground and well center.
- › Optionally, an automated, space-saving **vertical pipe rack with two-stage pipe handling system** provides enhanced automation.

The cassette-type racking system is placed on the ground next to the rig, reducing rig surface pressure and load in height, allowing for lighter mast and substructure compared to conventional racking in the mast.



Trailerized backyard components (mud pumps)

Technical specifications

HOOK LOAD

- › Max. hook load: 170 mt - 250 mt (190 sht - 275 sht) at saver sub

MAST*

- › Type: single mast structure, trailer-mounted
- › Height: 33.3 m (109 ft)

SUBSTRUCTURE*

- › Type: slingshot
- › Rig floor height: 7 m (21.5 ft)
- › Clear height below RT: 6 m (14 ft)
- › Rig floor dimensions: 6 m x 5 m (20 ft x 16 ft)
- › BOP handling: 2x 15 mt (2x 16.5 sht)

HOISTING SYSTEM*

- › Type: rack and pinion
- › Hoisting power: 1,000 kW (1,340 hp)
- › Stroke: 17.5 m (57 ft)
- › Brake: hydraulic lowering brake valves

Ultra sensitive operation due to multi-valve hydraulic control.

RIG POWER SUPPLY*

- › Hydraulic power unit: 2x 600 kW (2x 800 hp) drives all components including hoisting system, top drive, rotary table and pipe handling system

The rig can be operated with:

- a. power from the generator sets
- b. power from the grid
- c. generator supported grid power

b. and c. require an additional medium voltage switchgear unit.

TOP DRIVE*

- › Type: HV TD H 300-670
- › Max. static load: 272 mt (300 sht)
- › Max. push load: 30 mt (33 sht)
- › Max. rotary speed: 180 rpm at 21,000 Nm (15,500 ft-lbs)

- › Max. continuous rotary torque: 42,500 Nm (31,350 ft-lbs) up to 88 rpm

- › Max. brake torque (intermittent): 100,000 Nm (73,750 ft-lbs)

- › Link tilt capacity: 4 mt at 1.5 m (8,820 lbs at 4.92 ft)

- › Rated power: 500 kW (670 hp)
- › Drive: hydraulic

Including IBOP, pipe handler and dolly with torque pick-up.

ROTARY TABLE*

- › Table opening: 698.5 mm (27 1/2")
- › Load rating: 250 mt (275 sht)
- › Drive: hydraulic

DRILLER'S CABIN*

- › Controls: joystick, trackball and touch screen with camera control



POWER CATWALK*

- › Pipe range: 73 mm - 508 mm (2 7/8" - 20")
- › Max. load: 4.5 mt (5 sht)
- › Max. length: range 3
- › Drive: hydraulic

PIPE HANDLING SYSTEM (OPTIONAL)*

- › Type: vertical cassette-type pipe rack system with automated pipe handler
- › Range pipe handler: 73 mm - 203 mm (2 7/8" - 8")
- › Max. load: 3.5 mt (3.9 sht)
- › Max. tripping speed: 380 m/h (1,250 ft/h)
- › Drive: hydraulic

The complete pipe handling system is designed to handle drill pipe range 3 in super singles, drill collars and casing. The controls are semi-automated and the system is operated by the pipe handling operator or the driller. An integrated anti-collision system ensures a safe pipe handling process during all operations.

OPTIONAL EQUIPMENT

- › Iron roughneck/manual rotary tongs
- › Power slips/slip lifter/manual slips
- › Elevators
- › Medium voltage switchgear unit/generators
- › Mud tank system/mud pump units
- › BOP/BOP closing unit

* Components manufactured by Herrenknecht Vertical