

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.

JACK-UP RIGS

HIGHLY AUTOMATED OFFSHORE DRILLING AND WORKOVER



Hydraulic cantilever rigs for automated offshore operations

- › Highly automated pipe handling and racking system (hands-off-technology)
- › Ultra sensitive hydraulic cylinder hoisting system with push and pull capability
- › Less personnel required due to minimized manual interference
- › Easy and safe tripping and casing operations even during heavy winds
- › Efficient tubular transport due to pipe rack box design
- › Offshore safety standards
- › Made in Germany



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**AUTOMATED
RIG TECHNOLOGY**

Jack-up cantilever rig packages for safe and efficient offshore operations

The **Herrenknecht Vertical jack-up rig**, a highly-automated cantilever rig package for offshore drilling and workover on jack-up platforms. The rig is equipped with a precise hydraulic cylinder hoisting system and incorporates a maximum level of automation for pipe handling and racking as well as rig floor processes. The jack-up rig is available with hook loads of 250 up to 450 metric tons (275 up to 500 short tons), with super singles range 3 or doubles range 2 mast. Customized designs with higher hook loads are available upon request.

Key features of the hydraulic offshore rig concept are the light and compact design with low center of gravity and the high flexibility in arranging required workover equipment, maximizing the operational envelope and utilization rate. The comprehensive automation concept allows for single-man operation from the driller's cabin and ensures highest safety and process efficiency. Time- and cost-consuming tasks, such as

tubulars preparation, are shifted to shore, reducing costly offshore work and logistical support. Therefore, the automated hydraulic offshore rig concept contributes significantly to operational cost savings, making a broad range of economically and technically challenging drilling and work-over operations viable.

The hydraulic rig design with its high accuracy in operation and positioning is the key for further drilling process automation, which has been implemented in the second-generation jack-up rig design:

- › A remote driller's cabin, at the accommodation unit or onshore, allows the driller to work door by door with the tool pusher and other drilling expert, enabling direct support for most efficient operations.
- › The horizontal pipe rack system with pipe boxes and gantry crane incorporates further functions: the doubles catwalk has an integrated make-up/break-out unit, maximizing tripping times by handling doubles.
- › A robotic rig floor provides automation also for non-standardized components handling, such as BHA components or crossovers.

The rig's standard configuration includes a hydraulic top drive. Upon request, an electric top drive design with soft torque is available.



Automated pipe racking system on cantilever deck with gantry crane and pipe boxes (man free no-go area)



Pipe handler gripper and pipe yokes on catwalk



Automated rig floor with man free no-go area

Technical specifications

HOOK LOAD	TI-250 CL	TI-450 CL
› Max. hook load:	250 mt (275 sht) at saver sub	450 mt (500 sht) at saver sub
MAST*	TI-250 CL	TI-450 CL
› Type:	twin profile	
› Height:	30 m (98.5 ft)	38.5 m (126 ft)

SUBSTRUCTURE*

The rig can be installed on a cantilever for jack-up platforms. The interface between rig and platform is engineered on customer order. Hydraulic installation (HPU) and rails for iron roughneck are integrated in the substructure.

HOISTING SYSTEM*	TI-250 CL	TI-450 CL
› Type:	cylinder system	
› Hoisting power:	1,200 kW (1,600 hp)	2,400 kW (3,200 hp)
› Stroke:	17.5 m (57 ft)	24 m (78.7 ft)
› Brake:	hydraulic lowering brake valves	

Ultra sensitive operation due to multi-valve hydraulic control.

RIG POWER SUPPLY*	TI-250 CL	TI-450 CL
› Hydraulic power unit:	4x 500 kW (4x 670 hp) drives all components including hoisting system, top drive, rotary table and pipe handling system	6x 500 kW (6x 670 hp)

DRILLER'S CABIN*

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

TOP DRIVE*	HV TD H 500-1000	HV TD E 500-1600
› Max. static load:	450 mt (500 sht)	
› Max. push load:	160 mt (175 sht)	
› Max. rotary speed:	220 rpm	
› Max. continuous rotary torque:	62,000 Nm (45,730 ft-lbs)	81,000 Nm (59,740 ft-lbs)
› Max. brake torque (intermittent):	100,000 Nm (73,750 ft-lbs)	137,500 Nm (101,410 ft-lbs)
› Link tilt capacity:	4 mt at 1.5 m (8,820 lbs at 4.92 ft)	
› Rated power:	800 kW (1,000 hp)	1,200 kW (1,600 hp)
› Drive:	hydraulic	electric

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

ROTARY TABLE*	TI-250 CL	TI-450 CL
› Table opening:	1,257 mm (49 1/2")	
› Load rating:	250 mt (275 sht)	450 mt (500 sht)
› Max. torque (intermittent):	50,000 Nm (36,880 ft-lbs)	
› Braking torque:	120,000 Nm (88,500 ft-lbs)	
› Drive:	hydraulic	

Specifically designed rotary table suited for conductor pipe hammering and high-pressure riser installation.

PIPE HANDLING SYSTEM*	TI-250 CL	TI-450 CL
› Type:	automated horizontal racking system with pipe boxes and pipe feeder (gantry crane)	
› Operating range:	73 mm - 620 mm (2 7/8" - 24 1/2")	
› Max. load:	3 mt (3.3 sht)	4.5 mt (5 sht)
› Max. length:	super singles range 3	doubles range 2
› Max. tripping speed:	380 m/h (1,245 ft/h)	700 m/h (2,300 ft/h)
› Drive:	hydraulic	

The complete pipe handling and racking system is designed to handle drill pipes in super singles range 3 (TI-250 CL) / doubles range 2 (TI-450 CL), 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.

IRON ROUGHNECK

- › Make/type: Weatherford TorkWrench 10-100
- › Tubular TJ range: 57 mm - 254 mm (2 1/8" - 10") DP and DC
- › Make-up/break-out torque: 135,500 Nm (100,000 ft-lbs)
- › Drive: hydraulic

The iron roughneck is installed in a specifically designed frame on rails, adapted to the 49 1/2" rotary table.

OPTIONAL EQUIPMENT

- › Manual rotary tongs
- › Power slips/slip lifter/manual slips
- › Elevators
- › Generators
- › Mud tank system/mud pump units

* Components manufactured by Herrenknecht Vertical

