

3. Offshore Drilling Rig Module

3.1 7000 And 5000 Meters DC Electric Drilling Rig Module

Technical Features

Adopting optimization design bottleneck derrick or bootstrap derrick, bottleneck derrick with high carrying capacity and good overall stability; bootstrap derrick with small room, and easy to disassembly and maintenance.

Drilling rig movable system adopts frictional pawl proportional spacing mechanism to complete drilling rig four-way move in the same plane to meet onshore complex working condition operation.

AC motor drives mud pump to complete stepless speed regulation and have optimum flexible characteristic. Mud pumps are driven by chain with features of compact structure and convenient operation and maintenance.

Two sets of DC motor are used to drive big power drawworks, which is of good performance of speed adjustment, high power factor and timesaving features, and improves operation efficiency. Big torque, flexible main brake of hydraulic disk brake combines with electromagnetic eddy current brake or pusher tray auxiliary brake, so the drawworks works reliably, adjusts drilling pressure accurately, and feed the drilling tools smoothly and steadily.

Wind stopping and sun-shading shed are supplied in the system, rest platform and ladder booster device, anti-fall device and monkey board escape device are in accordance with HSE standard expressing design idea of humanization. It improves drilling operation condition effectively and ensures the safe operation.

After anti-corrosive treatment, all the surface of structure and fastening pieces have high corrosion resistance and good locking capacity.

Drilling rig electric control and power supply system are designed by American standard. Three circuit-Nominal power, emergency power and UPS power interlock each other. It is with remote control and all electrical equipment meets the requirement of anti-crash.

Electric control system adopts SCR DC speed adjustment, "One-to-One" individually drives DC motors of drawworks, rotary table and mud pumps. Bus controlled PROFIBUS-DP network can be used to communicate, real-time upper section monitor, data storage and fault diagnosis among the following devices such as SCR, intelligent remote driller monitor, electrical and pneumatic integrated control, man-machine interface, auto-driller, integrated instrument system, and electronic anti-crash control system.





Technical Parameter

Nominal drilling depth (ϕ 114mm drill pipe) ,m	7000	5000
Max. hook load, kN(t)	4500 (500)	3150 (350)
Drawworks max input power, kW(hp)	1470(2000)	1100(1500)
Drawworks gear number	4+4reverse(stepless speed regulation)	4+4reverse (stepless speed regulation)
Hoisting system rope series	6 \times 7	6 \times 7
Traveling system max. line number	12	12
Wire rope diameter, mm(in)	ϕ 38 (1 1/2)	ϕ 35 (1 3/4)
Rotary table span dimension, mm(in)	ϕ 952.5 (37 1/2)	ϕ 952.5 (37 1/2)
Rotary table gear number	2+2 reverse(stepless speed regulation)	2+2reverse (stepless speed regulation)
Pump number and type	2 \times F-1600	2 \times F-1600
Mast type and clear height	Derrick , 47m; Boot Strap, 46.33m	Boot Strap, 45m
Control mode	One-to-One control	One-to-One control

3.2 Offshore Variable-Frequency Drive(VFD) Drilling Rig

Technical Features

The drilling rig control system adopts high-performance PLC as its control center, and composes digital equipment to PROFIBUS-DP network by bus at field technology. It can be used to communicate quickly among the following devices such as VFD, intelligent remote driller monitor, electrical, hydraulic and pneumatic integrated control, man-machine interface, integrated instrument system,etc.



Technical Parameter

Nominal drilling depth, m	4000 (ϕ 114mm drill pipe)	5000 (ϕ 114mm drill pipe)	7000 (ϕ 114mm drill pipe)
Max hook load, kN	2250	3150	4500
Drawworks rated power, kW	800	1100	1600
Drawworks gear number	2+2R AC variable frequency drive, stepless speed regulation	2+2R AC variable frequency drive, stepless speed regulation	1+1R AC variable frequency drive, stepless speed regulation
wire rope diameter, mm	32	35	38
Hoisting system rope series	5 \times 6	6 \times 7	6 \times 7
AC variable frequency drive unit(VFD)	One-to-One control, 4+1 units	One to one control for drawworks rotary table,, One to two control for mud pump, 5+1 units	ne-to-One control, 6+1 units
Variable frequency drive unit	0 ~ 600V, 0 ~ 150Hz (adjustable)	0 ~ 600V, 0 ~ 150Hz (adjustable)	0 ~ 400V, 0 ~ 100Hz (adjustable)
Mast type and clear height	43 (bootstrap derrick)	45 (bootstrap derrick)	47 (bottleneck derrick)
Mud pump number and type	2 \times F-1300	2 \times F-1600	3 \times F-1600
rotary table open nominal diameter, mm(in)	ϕ 952.5 (37 1/2)	ϕ 952.5 (37 1/2)	ϕ 952.5 (37 1/2)
Rotary table gear number	1+1R AC variable frequency drive, stepless speed regulation	1+1R AC variable frequency drive, stepless speed regulation	1+1R AC variable frequency drive, stepless speed regulation
Feed speed, m/h	0.1 ~ 36	0.1 ~ 36	0.1 ~ 36
MCC system	600V/400V/230V 50Hz 3相	600V/400V/230V 50Hz 3相	600V/400V/230V 50Hz
independent auto driller system	Variable-frequency motor 400V 37kW(continuous)	Variable-frequency motor 400V 45kW(continuous)	Variable-frequency motor 400V 37kW(continuous)
Swivel center tube inner diameter, mm	75	75	75

3.3 Artificial Island 7000m Movable Drilling Rig Module

The artificial island 7000m movable drilling rig module is our new designed land use offshore platform drilling module system. It consists mainly of main module, circulating module, power module, control module, ground common module, cementing equipment module, and bulk material module, etc.

Technical Features

Main module and circulating module are two deck structure and are consolidation connected. After main module and circulating module are connected in the moving track, it can move along the track in longitudinal and transverse direction and turn moving, meeting requirement for two row cluster well rig location shifting.



Technical Parameter

Nominal drilling depth, m	7000 (ϕ 114mm drill pipe)
Max. hook load, kN	4500
Drawworks max input power, kW	1600
Drawworks gear number	2+2R AC variable frequency drive, stepless speed regulation
Wire rope diameter, mm	38
Hoisting system rope series	6 \times 7
AC variable frequency drive unit (VFD)	One-to-One vector control, 6+1 unit
Variable frequency drive unit	0 ~ 400V, 0 ~ 100Hz (adjustable)
Mast type and clear height, m	45 (bootstrap derrick)
Mud pump number and type	3 \times F-1600
rotary table open nominal diameter, mm(in)	ϕ 952.5 (37 1/2)
Rotary table gear number	1+1R AC variable frequency motor single speed drive, stepless speed regulation
Feed speed, m/h	0.1 ~ 36
MCC system	600V/400V/230V 50Hz
independent auto-feed system	Variable-frequency motor 400V 45kW(continuous)
Swivel center tube inner diameter, mm	75