

Smart Rig

Honghua smart rig 1.0, relying on ground automation technology, high-speed underground data transmission technology, and digital drilling technology, we will build an integrated operation platform for ground, underground and remote center linkage in stages. Through the joint collaboration of oil companies, engineering companies, and equipment manufacturers, we continuously promote the process of intelligent drilling!



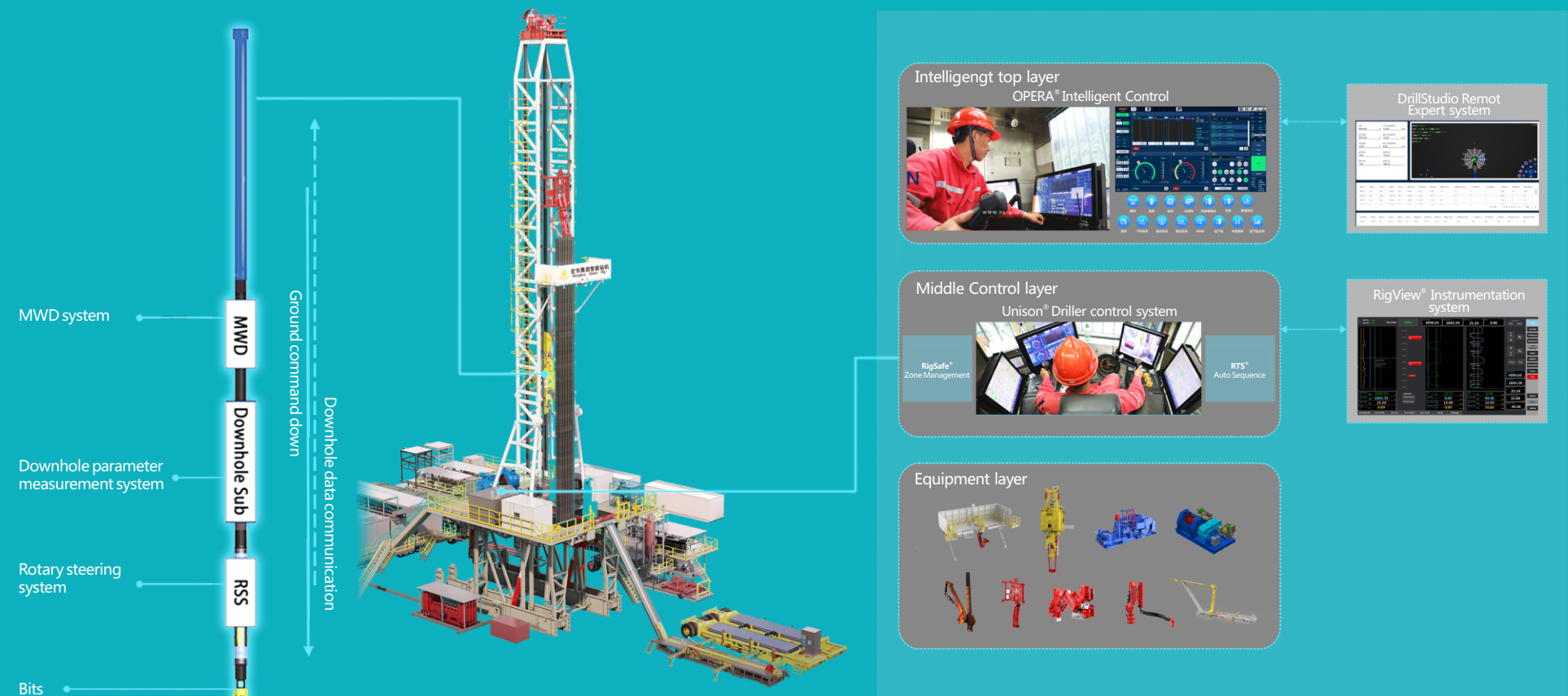
Six Technologies

Parid tripping system(RTS™)
Intellisense technology
Direct drive technology
Green and low-carbon technology
Digital drilling
Remote intelligent maintenance technology



Six Values

Money saving: Consistency of well construction and standardization of operations.
Efficiency improving: Increase tripping. Increase mechanical drilling speed by 10%
Labor saving: Reduce the workload of people
Safe: Implement consistency of work experience and dual human-machine safety
Low emission: Reduce emission of CO₂ 10-20%
Less worry: whole rig health monitoring. reducing abnormal shutdowns and reducing recovery time



Arctic Rig

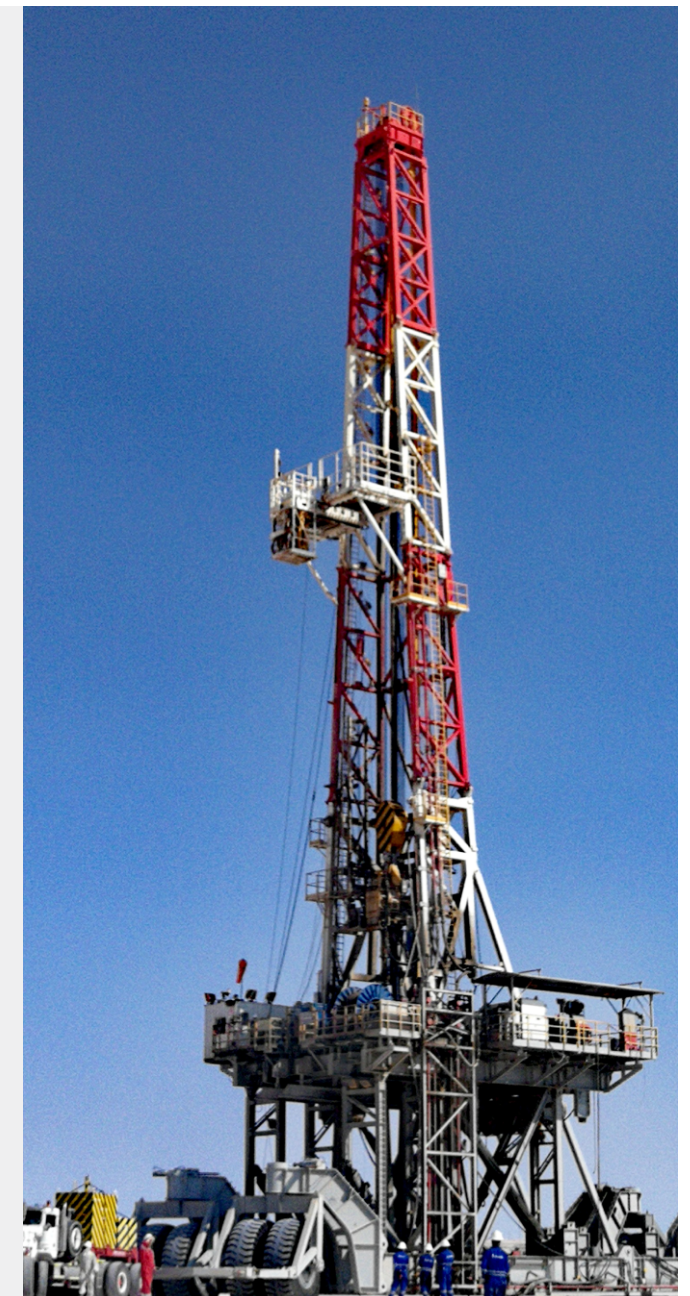
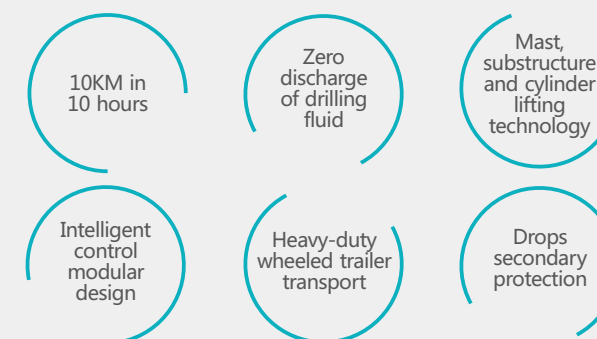


The arctic rig is a fully enclosed rig independently developed by Honghua Group for the ultra-low temperature Alpine region below -60°C . The rig is domestic initiative and world-leading. The arctic rig of Honghua Group innovatively adopts the overall spatial layout technology, key technologies for modular design composite solid control system with short distance, high body-surface ratio feature, key technologies of fully enclosed and high efficient heating and insulation and technology of intelligent control system for Ultra-low temperature transnational automatic drilling rig. The ultra-low temperature drilling rig has the ability to lift heavy loads, control posture leveling, and meet the requirements of cluster well operations. The compact layout of the arctic rig effectively saves the well site area, greatly reduces the thermal insulation energy consumption, and reduces the user's construction cost.



Desert Fast Moving Rig

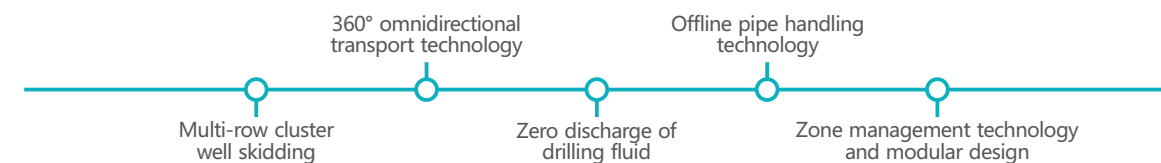
Desert fast moving rig is a wheeled truck-mounted fast moving rig specially designed by Honghua Group for high temperature desert areas. The desert fast moving rig covers various series of 750HP~3000HP rigs, and fully realizes the efficient operations of quick disassembly, quick moving and quick assembly of drills by means of key technologies such as heavy wheeled truck-mounted moving, mast swing up transportation technology, drilling fluid zero discharge technology, intelligent control technology and modular design. Since 2007, Honghua Group has entered into the market in the Middle East with its desert fast moving rig, sold dozens of sets of fast moving rigs and won the praise of users and the high recognition of the market with advanced technology and excellent quality.



Artificial Island Drilling Rig



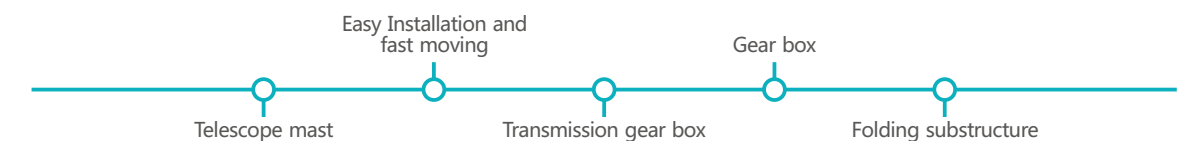
The 3000HP artificial island drilling rig is a multi-row cluster well skidding rig developed by Honghua Group for artificial island. The artificial island drilling rig achieves the multi-row cluster well operations on the artificial island by means of key technologies such as 360° omnidirectional transport technology, zero drilling fluid discharge technology, offline pipe handling technology, zone management technology and modular design. On October 21, 2022, ABU Dhabi National Oil Company (ADNOC) announced that the 3000 HP artificial island fast moving rig manufactured by Honghua Group set a new world record for the longest oil and gas well at Umm Al Anbar, one of the four artificial islands in the Upper Zakum region. The horizontal well is 50,000 feet (15,240 meters) long, about 800 feet (244 meters) longer than the previous world record set by Rosneft, Russia's largest oil exporter, in 2017.



Truck-Mounted/Semi-trailer Rig



The main power system transmission system, control system, hoisting system and mast C/W crown block have all been installed in one exclusive trailer to realize fast installation and rig move. Adopt telescope mast and swing up substructure. Equipped with one or two Caterpillar engine, it can realize one engine or parallel running through transmission gear box and transfer gear box.



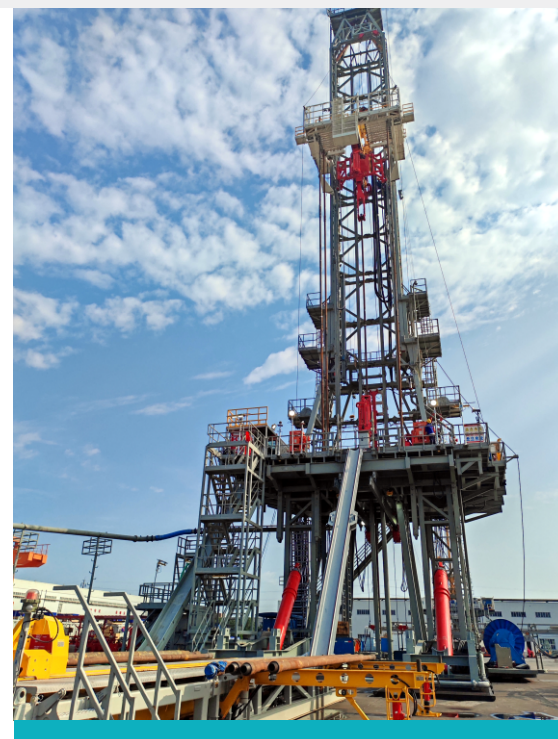
Geothermal Rig

- Specially developed for geothermal resources
- Full automatic rapid tripping system and direct drive top drives
- Meet the needs of cluster well operations in small well site
- Can be installed by an 80t crane
- Floor area not exceeding 2000m²

Geothermal energy is one of the clean energy. Honghua Group has developed 1000HP geothermal automatic rig for geothermal resources development.

The drilling rig adopts the design idea of small module transportation and installation, which meets the requirements of an 80t crane installation. The operation area of the rig does not exceed 2000m²; the rig is equipped with a multi-directional skidding device to meet the needs of cluster well operations in small well site. The rig is equipped with a full automatic rapid tripping system and direct drive top drives independently developed by Honghua Group. This is the first time that Chinese national-made automatic machinery has broke the foreign monopolies.

The export of the whole rig to developed countries marks the international high-end market recognition for the automatic control level of Honghua's rig, and also the beginning of Honghua entering into the new energy market.

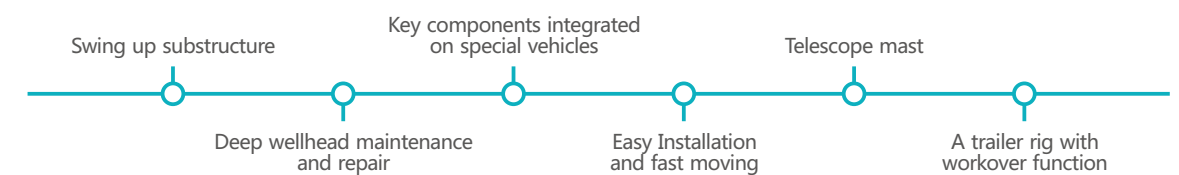


Electric Workover Rig

The electric workover rig of Honghua Group is a new type of special equipment specially for workover treatment. It adopts electric drive and has a high degree of digitization and automation.

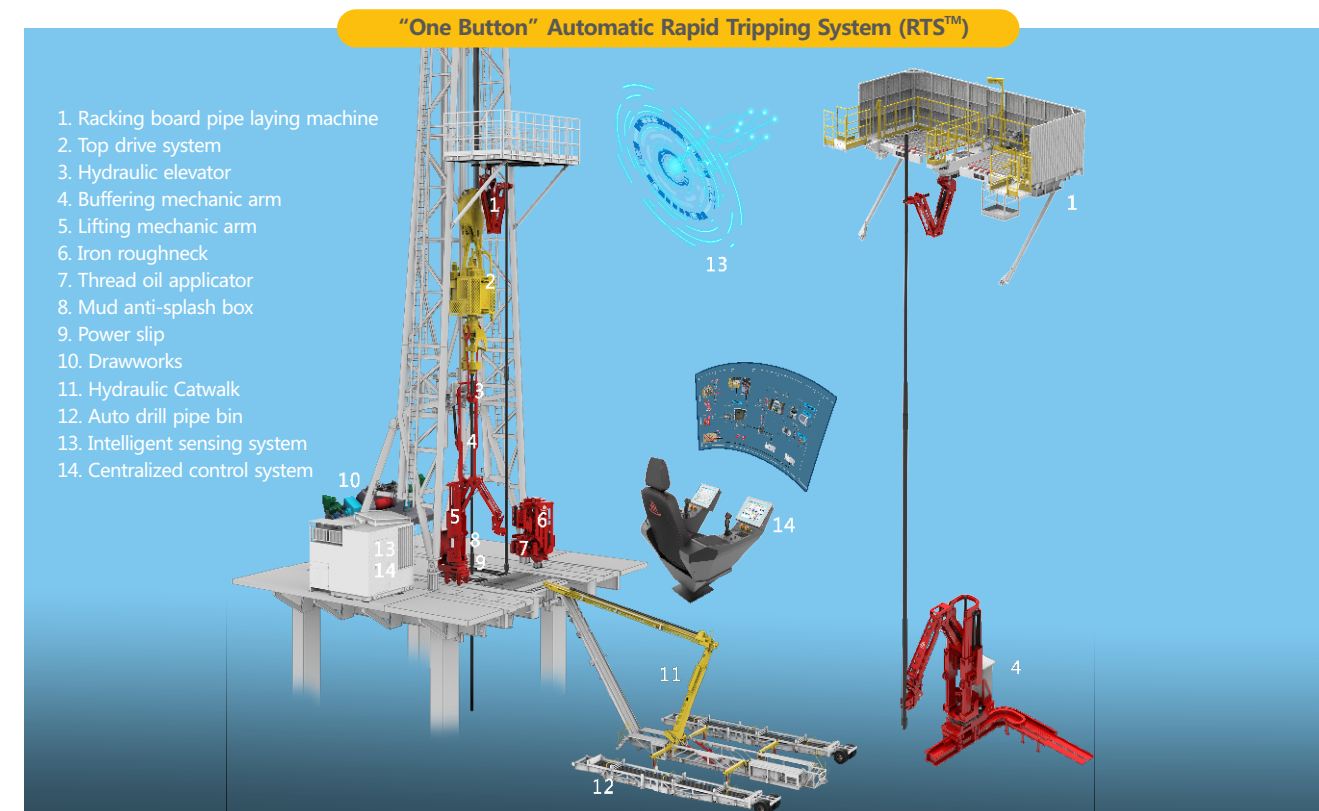
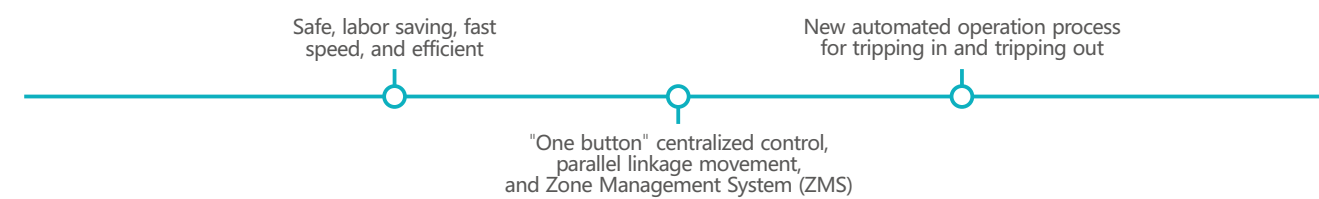
The mast, drawworks, HPU, BOP control device, top drive, wireline spooler and driller's cabin for the workover rig are integrated in one module of the main engine truck and transported as a whole. It has the advantages of high integration, few modules, quick disassembly and assembly, etc.

The workover rig components are configured flexibly according to actual customer requirements. For example, the derrick may be available in telescopic mast. Substructure can be in ordinary form or be equipped as special work table for workover rig. Also, the Honghua direct drive drawworks and direct drive mud pump can be chosen for their compact size and simple structure. The workover rig can be equipped with an automatic rapid tripping system that offers high working efficiency and a high degree of automation. It can also be equipped with a BESS, which can intelligently manage the energy consumption of the rig, reducing energy consumption.



Automatic Rapid Tripping System

The "One button" automatic Rapid Tripping System (RTS™) aims to achieve safety, labor saving, speed improvement, and efficiency enhancement. With the means of "One button" centralized control, parallel linkage movement, and Zone Management System (ZMS), a new automated operation process for tripping in and tripping out is generated. Under the premise of safety and reliability, "One button" automated operation is used to replace the distributed operation of multiple people in the original system, reducing labor intensity, parallel linkage equipment operation, improving tripping efficiency, and reducing well construction cycles and costs. The RTS™ is divided into two types, i.e., lifting type and push type, according to drill string dealing process. The RTS™ is composed of control system, automated pipe handling machines. The control system is made of centralized control system, ZMS system and "One button" linkage movement system, which involves the operation of these equipment, including tubular racking machine, iron roughneck, drill floor mechanic arm, power slip, hydraulic elevator, drawworks and top drive system etc.



The power hydraulic catwalk is used to transport pipe strings between the drill pipe rack and the drill floor, and it is an important component of an automated pipe string processing system. Three control methods: wireless remote control, local operation, and integrated operation in the driller's room (open control interface).



The pipe racking machine is installed on the mast to replace the derrickman in transporting the upper end of the drilling tool from the hydraulic elevator to the fingerboard, realizing automatic pipe laying operations in the high altitude area of the racking platform, realizing unmanned operation at high altitude, reducing labor intensity, and improving operation safety.



The drill floor mechanic arm is installed on the base to replace the roughneck man and push/lift the pipe string at the wellhead and set back area, realizing automatic transfer of drilling tools and pipe strings between the wellhead and set back area, wellhead make up, etc. Two series are available: fully electric driven push-pull drill floor mechanic arm, electrohydraulic composite lifting drill floor mechanic arm.



Iron Roughneck is used to make up and break out pipe strings at wellhead and mouse hole locations. Iron Roughneck can be operated through wireless remote control, remote operation on the operating console, emergency operation on the body, and centralized control operation in the driller's room (open control interface). These operations are safe and efficient.

Direct Drive Top Drives

Honghua Group realize the large-scale industrial application of direct drive top drives technology in the world, which fills a number of technical gaps in China. With electro-mechanical hydraulic deep integration and motor direct drive technology, the Direct Drive Top Drives is characterized by high transmission efficiency, high reliability, informatization and intelligentization, leading the new development of top drive technology.

- The motor directly drives the main shaft, reducing the transmission energy loss and with the higher mechanical efficiency, less fault point and the higher reliability.
- The direct drive motor has high protection level, high insulation level, early warning, strong overload capacity and high reliability.
- Non-gear lubricating oil and cooling filtration system reduce the sealing mechanism for simple structure and easy maintenance.
- The fast sliding drilling function, i.e. "torsional pendulum" system, is configured to solve the problem of "backing pressure" of drilling during sliding directional operation.
- The anti-stick-slip vibration function, i.e., "soft torque", achieves smooth torque, eliminates stick-slip vibration, and improves drilling rate.



Hydraulic Top Drive/Casing Device

- The hollow axle motor directly drives the main shaft, reducing the transmission energy loss and with the higher mechanical efficiency, less fault point and the higher reliability.
- Non-gear lubricating oil and cooling filtration system reduce the sealing mechanism for simple structure and easy maintenance.
- Under the same power, hydraulic top drive can get a wider torque range compared to the electric top drive.
- Top drive has high integration, constant power control, high overload capacity, high efficiency, high reliability and low maintenance cost.
- Stepless speed regulation within rated speed range.
- HPU can be driven by diesel engine or motor according to customer requirement.
- Equip with disc brake, which is more reliable to release reverse torque.



The multiple safety anti-falling design and combined die plate technology improves the safety and performance parameters of the equipment and effectively solves the problems such as the difficulty in tripping in the casing of long horizontal wells and the easy accumulation of cuttings, laying the foundation for high-quality well cementation.

- Suitable for a wide range of casing sizes: 4 1/2"~20"
- Equipped with a hydraulic station with double motor pump sets, one for use and one for standby, high safety
- Equipped with an intelligent operating system for simple and efficient operation
- Equipped with a safety interlock device and an anti-fall ring to effectively prevent the casing from falling



Mud Pumps

Honghua Group provides a full range of triplex and quintuple pumps from 500HP-3200HP and related products. Mud pump variety, support single motor and dual motor configuration, whether AC, DC or permanent magnet motor, can be configured according to customer needs.

HHF-2000 Triplex Mud Pump Unit



- Compared with the 1600HP high-pressure pump, the overall dimensions and interface dimensions of the 2000HP high-pressure pump remain basically the same. The weight of a single pump increases by approximately 1800kg.
- High life power end: Adopting high-strength welded frame, forged crankshaft, and hard toothed herringbone gear.
- The hydraulic end design is easy to replace cylinder liners and pump valves: it can be interchanged with consumable parts of other manufacturers' F series or SW fluid ends, and is suitable for various cylinder liner and piston quick change devices.
- Multiple driving methods: Belt, chain, motor direct drive, and other methods can be used.
- There is no need to add adjusting shims during the installation of the lower guide plate.
- Capable of meeting working conditions such as water-based mud, oil-based mud, low-temperature environment, and high-temperature environment.

HH2400/2600/3200 Quintuplex Mud Pump Unit



- For 7000 meters drilling rigs can realize one unit running while one standby for approximately 70% of operation time;
- Compared to the 2200HP belt driven triplex pump set, the volume is reduced by 40%, the weight is reduced by 30% and the efficiency is improved by 7%;
- Drilling with large displacement and high pump pressure increases the mechanical penetration rate by about 18%;
- Total pump unit width, including gear boxes on both sides, is less than 3 meters, and there is no need to disassemble during transportation;
- Multiple options: single/dual motors, AC, DC, and permanent magnet motors can be configured.
- The pump health diagnosis system can be configured to display and judge the working status of each valve at the hydraulic end in real time.
- The hydraulic quick-action tool of Honghua bonnet, cylinder liner and piston rod can be configured to greatly reduce the labor intensity.

Drawworks/Hoisting System

Drawworks



- Honghua can provide a full series of 350HP~6000HP drawworks to meet the requirements of different rigs, with load capacity from 90 to 900 metric tons.
- Drawworks drive mode includes AC VF drive, DC SCR drive and mechanical drive respectively.
- One step parallel gear (or planetary gear) single shaft driven-AC VFD drawworks is reliable at work with small size, light weight and less maintenance work.
- Adopts AC motor to drive directly.
- The main brake is band brake or hydraulic disc brake, auxiliary brake has been equipped with eddy current brake.
- Equipped with separate AC drive device and computer auto control system, as well as the auto bit feeding function, and the functions of real time control, monitoring and analysis of tripping in condition and drilling condition, to realize optimizing drilling operation.

Hoisting System



- Honghua has first-class forging workshop and relevant processing equipment, capable of producing 135 to 675 metric tons lifting system components of full series of traveling blocks, hooks, elevator links, etc.
- The hoisting system components are made of heat-treated high-strength alloy steel, and passed through rigorous inspection and test.
- Full series of integrated traveling blocks and hooks are available.

Electronic Control System

It is suitable for AC drive rigs with the drilling depth of 1000-12000 meters.
It is applied in normal temperature land rig, desert fast moving rig, arctic rig, marine rig, training drill, helicopter hoisting drilling rig, stepping translation rig, coil tubing rig, shale gas rig, singles rig, etc.



Complete set of rig electric control system

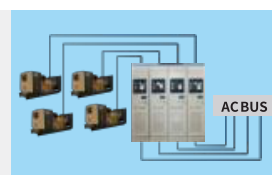
- (1) Drive system
- (2) Power and control system
- (3) Power distribution system/well power system
- (4) Flame/gas detection system
- (5) Instrument system/Well site video surveillance system/drilling control system
- (6) Well site broadcast & intercom system

Power and Control System

Diesel/gas power generation

Generator control system

Selected product and control logic adapted to sudden rig load changes, more than 20 years of experience to enhance system stability and reliability
The PMS system to reduce fuel consumption and achieve energy saving and environmental protection



Industrial power grid access



Drive System

Rig AC VFD electronic control system

The VFD drive system uses AC-DC-AC drive technology, single transmission or multiple transmission solutions, integrated VFD and control assembly for high reliability.
Equipped with Honghua Electric's new generation driller control system UNISON® with perfect protection function and excellent control performance.



VFD system

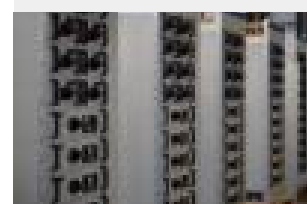
VFD drive
PLC control
MCC
Generator control



Power Distribution System

Low voltage power supply and distribution system

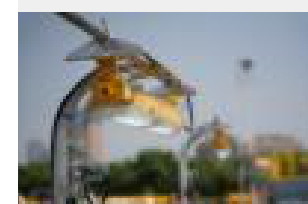
Centralized power supply and local distribution
Safe and reliable system, optimized and reasonable design, and reasonable cabinet structure



Well Power System

Well site power distribution and lighting system

Flexible centralized and decentralized power supply and distribution mode
Explosion-proof lamps and fittings, high degree of fast-moving, high interchangeability



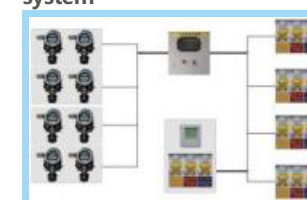
Instrument System

RigView® rig instrument system



Rig data monitoring and automatic alarm for exceptions to improve rig safety and efficiency
Data visualization, optional system configuration and seamless integration with the intelligent drilling system OPERA®

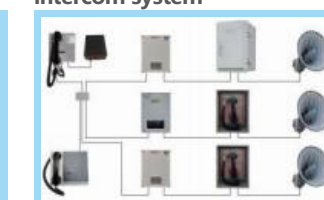
Flame detection/gas detection system



Complete detection of H2S and HC detection in air and mud
Reasonable configuration for fixed and portable (H2S, HC, multifunction detector) types

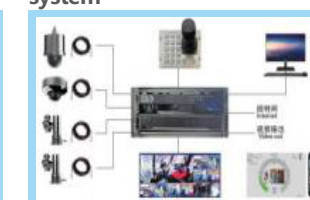
Auxiliary System

Well site broadcast & intercom system



Solutions for Hostless Broadcast Call System, Handsfree Intercom System, Hosted Emergency Broadcast Call System, Network Communication System, etc
Explosion-proof, non-explosion-proof, wall-mounted, desk station and other equipment for strong environmental adaptability

Well site video monitoring system



Explosion-proof and anti-corrosion digital network HD camera
Driller's HMI+ HD large screen, red zone management, safe and reliable, with long backtracking time

Rig Control System

UNISON® rig control system



Perfect control function of main equipment and achieve more efficient
Multi-screen switching for more flexible operation
Integrated control and integrated operation
Fast diagnosis and easy maintenance
VFDView® data visualization for easier backtracking

ZMS zone management system

Rig equipment monitoring and safety interlock to prevent mis-operation
Perfect fault tolerance mechanism, complete process recording and comprehensive zone management

PMS power management system

Digital control platform, independent energy management system and massive data acquisition and analysis
Reduce the fuel consumption of generator set, reduce carbon emissions and achieve energy saving and high efficiency

Digital Drilling Solutions

Smart APP- AI Drilling



OPERA® field application



Intelligent drilling system OPERA®

Integration of AI Drilling, friction testing, automatic slide orientation and other intelligent APP for drilling activity and provides unparalleled precision control and high consistency to realize the "automatic driving" in the drilling field.