



# PCDS精细控压钻井系统

PCDS精细控压钻井系统集恒定井底压力与微流量控制功能于一体，通过环空压力监测与控制、回压补偿，可进行近平衡、欠平衡精细控压钻井作业，解决了发现与保护储层、提速提效及防止窄密度窗口井筒复杂的世界难题。



## ● 技术参数

- ▶ 额定压力.....35MPa
- ▶ 井底压力控制精度.....  $\pm 0.2$ MPa
- ▶ 系统运算周期.....500ms
- ▶ 压力计算精度.....0.1MPa

## ● 功能特点

- ▶ 欠/近平衡精细控压钻井
- ▶ 压力、流量双目标闭环监控
- ▶ 工况自适应、在线自诊断
- ▶ 井底恒压、微流量

## ● 应用

PCDS精细控压钻井系统先后在塔里木、川渝、印尼加帮等国内外多个油田的复杂钻井中推广应用，实现了深部裂缝溶洞型碳酸盐岩、高温高压复杂地层的安全高效钻井作业，有效解决了“溢漏共存”钻井难题，提高了水平段延伸能力，获得重大油气发现，取得显著应用效果，曾在塔中862H井创造了垂深大于6000m、完钻井深8008m的世界最深水平井纪录，塔中721-8H井创造了国内碳酸盐岩储层水平段1561m，目的层钻进日进尺150m最高纪录。





CPET

# PRESSURE CONTROL DRILLING SYSTEM (PCDS)

PCDS combines the techniques of constant bottom-hole pressure and microflux control. The system can implement NBD and UBD operations by monitoring and controlling the annular pressure with precisely providing back pressure. It can solve world-class challenges in the field of reservoir discovery and protection, drilling efficiency enhancement and narrow drilling window.



## SPECIFICATION

- ▶ Rated Pressure.....35MPa
- ▶ Control Accuracy of BHP..... $\pm 0.2$ MPa
- ▶ Operation Cycle of System.....500ms
- ▶ Precision of Pressure Calculation.....0.1MPa

## FEATURES AND BENEFITS

- ▶ Precise pressure control in UBD/NBD
- ▶ Simultaneous close-loop monitoring of pressure and flux
- ▶ Self-adaptation of drilling conditions & online self-diagnosis
- ▶ CBHP & Microflux control

## APPLICATION

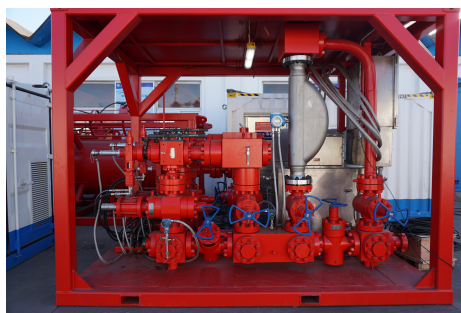
PCDS has been successfully applied in many complex oil and gas fields in China and overseas. The system solves drilling challenges of deep fractured carbonate cavities and HTHP formations, playing an important role in developing kick-loss coexistence formations and extending horizontal intervals. Therefore, significant oil and gas discoveries and remarkable delivery results have been widely recognized by our clients. In TZ862H whose vertical depth is over 6000m PCDS made TD exceed 8008m, breaking the world record of the deepest horizontal well. In TZ721-8H PCDS horizontally extended the carbonate interval to be 1561m and achieved 150m as the daily drilling footage in pay zones.





# 海洋控压钻井技术及装备

高性能、紧凑型、定制化海洋控压钻井专用装备适用于自升式平台、半潜式平台、生产平台等多类型作业平台和钻井工艺，配备环保型旋转防喷器，实现海洋钻井作业全程安全无污染。形成了海洋控压钻井技术，通过高精度动态模拟分析、施工参数实时监测和井筒压力精细控制，有效解决了溢漏发现难、复杂压力体系、浅层油气等海洋钻井难题。



## ● 技术参数

- ▶ 流量监测精度..... ≤ 80L
- ▶ 井底压力控制精度..... ± 0.1MPa
- ▶ 压力响应时间..... < 1s
- ▶ 最小装备尺寸..... 2.8m\*1m\*2.2m

## ● 功能特点

- ▶ 装备功能模块化灵活搭配
- ▶ 装备定制化加工与安装集成
- ▶ 井口返浆全密闭循环控制
- ▶ 井底恒压、微流量

## ● 应用

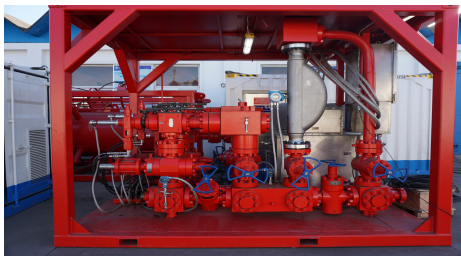
海洋控压钻井技术及装备在渤海湾渤中、曹妃甸、辽东湾旅大等区块实现海洋控压钻井规模化应用，提前发现并处置溢流、漏失等钻井复杂，保障井控安全；有效降低钻井液密度，大幅提高机械钻速，显著保护和发现油气藏，助力渤海湾盆地50年来最大深层气田勘探发现。在渤海湾生产平台应用安全环保型控压钻井技术，安全高效处理浅层气，保障采油树甲板人员安全，避免造成海洋环境污染。

在南海陆丰12-3油田开展深水大尺寸井眼控压钻井作业，稳定控制和监测大排量钻进，有效预防浅层高压地质流体对人员、环境、装备及地层垮塌等带来的危害。在惠州26-6油田模块钻机集成控压钻井装置，开展深水控压钻井技术应用，保障钻井作业安全。



# Offshore Managed Pressure Drilling Technology and Equipment

The high-performance, compact and customized offshore managed pressure drilling equipment is suitable for various types of operation platforms and drilling processes such as jack-up platform, semi-submersible platform, production platform, etc. The environment friendly rotating control device is equipped, implementing a safe and pollution-free offshore managed pressure drilling operation. Through high-precision dynamic simulation and analysis, real-time monitoring of operation parameters and precise control of wellbore pressure, the offshore MPD technique could effectively solve the drilling issues of kick and loss detection, complicated formation pressure, shallow oil and gas, etc.



## ● SPECIFICATION

- ▶ Precision of Flowrate Monitoring.....  $\leq 80L$
- ▶ Control Accuracy of BHP.....  $\pm 0.1MPa$
- ▶ Pressure Response Time.....  $< 1s$
- ▶ Minimum Equipment Size...  $2.8m \times 1m \times 2.2m$

## ● FEATURES AND BENEFITS

- ▶ Equipment function modularization
- ▶ Equipment customized manufacturing and installation
- ▶ Fully enclosed circulation control
- ▶ CBHP & Microflux control

## ● APPLICATION

The offshore managed pressure drilling technology and equipment have been applied in the Bohai Bay in a large scale. The incident of kick and loss is detected and managed, ensuring the well control safety. The drill mud density is reduced, significantly improving the ROP, protecting and discovering the reservoirs. The safe and environment friendly MPD technique is applied in Bohai Bay production platform, avoiding the marine environmental pollution. In LF12-3 oilfield of South China Sea, the deepwater large scale wellbore MPD operation is carried out to prevent the issue of shallow hydrocarbon. The offshore MPD equipment is integrated in the modular rig of HZ26-6 oilfield to implement the deep water MPD operations for the purpose of ensuring the safety of drilling operation.

