MI SWACO
A Schlumberger Company

i-balance

Real-time, automated managed pressure drilling control system

APPLICATIONS

- Uncertain pressure margins, such as exploration and appraisal projects
- Narrow pressure margins found in depleted reservoirs and deepwater
- HPHT wells
- Highly fractured zone and wellbore stability challenges

BENEFITS

- Safely and efficiently access new or additional reserves
- Characterize pore and fracture pressure profiles
- Minimize wellbore breathing and ballooning
- Reduce chance and severity of influxes and losses
- Limit stuck pipe incidents due to wellbore stability

FEATURES

- Near-constant bottomhole pressure during operations
- Part of a comprehensive pressure management well plan
- Fully automated response to pressure changes
- Independent and simultaneous control of multiple chokes
- Support for pressure trapping or an automated auxiliary backpressure pump

The i-balance* real-time, automated managed pressure drilling control system uses a real-time hydraulics model powered by VIRTUAL HYDRAULICS* drilling fluid simulation software and third-party data to continuously calculate the bottomhole pressure. It controls worm-gear-actuated position-based chokes to apply surface pressure on the well and maintain the target bottomhole pressure at the specified control depth. The i-balance system incorporates a look-ahead feature that allows to predict the surface backpressure to be applied during the following connections and until section TD.

The system is part of an engineered approach that develops a comprehensive pressure management and well plan, including equipment selection; layout and installation; surface and downhole pressure and flow rate objectives; operational procedures, contingency responses, hazard identification, rig crew training, and regulatory compliance.

Compound	Length, in [cm]	Width, in [cm]	Height, in [cm]	Weight, lb [kg]
@balance control (HPU and PLC)	48 [122]	40 [102]	71 [180]	2,500 [1,134]
Choke manifold	84 [213]	84 [213]	80 [203]	8,880 [4,018]

Operations

During drilling operations, mud circulates through the main choke(s). If more flow is needed, it is possible to circulate through multiple chokes. As the rig pump slows down to make a connection, the automated controller begins closing the active choke(s) to maintain the pressure determined by the integrated VIRTUAL HYDRAULICS software model. In the event the active choke(s) become(s) nonresponsive or jammed, the controller will automatically switch to the next choke and alert the operator. The i-balance system can run 1 to 3 chokes depending on the application.
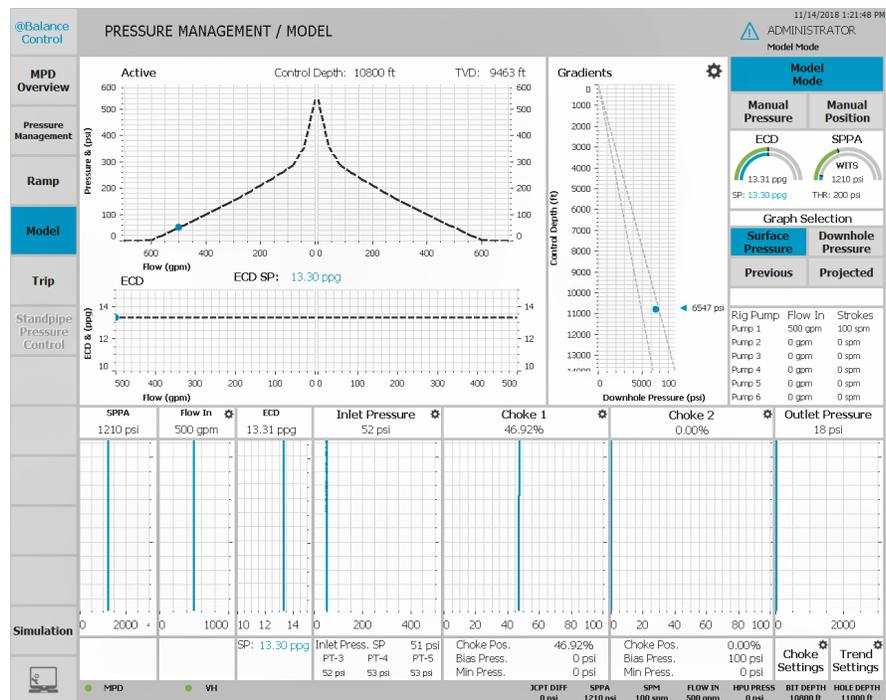
The i-balance system uses the integrated real-time hydraulics model powered by VIRTUAL HYDRAULICS software to maintain appropriate pressure.

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