

Title: Integrated Power and Automations System for Enhanced Performance of DP Class Drilling Vessels

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Abstract

With the introduction of IEC 61850 communication standard in marine power systems new opportunities for increasing the operational performance (efficiency and safety) of DP drilling vessels are made possible. The first drilling vessels are now under construction using this communication technology, and new functionalities are gradually being implemented. Firstly the functionality of faster communication between protection systems and control systems make it possible to operate with closed bus tie in DP2 and DP3 operation. This is achieved by introducing enhanced feature such as

- Block based protection functions.
- Ultra-fast load reduction schemes.
- Enhanced engine and generator protection functions integrated in the main power switchboards.

Secondly, with more Intelligent Electronic Devices (IEDs) such as IEC61850 enabled protection relays onboard, the Power- and Automation systems are getting closer than ever. The ABB System 800xA automation platform is tailor-made to fully utilize the new communication standard in a way that power- and automation are not merely two systems exchanging data with each other, but more like one single system where all information is available anywhere instantly. This again opens the door to real-time condition-based monitoring and maintenance, and fully fledged asset management. The 800xA platform supports the fast horizontal communication of IEC 61850 enabling advanced control loops, but IEC 61850 also support vertical communication where large amount of data can be collected and used for diagnostic and monitoring, typically using the protocol OPC on Windows computers. Such diagnostic data can be accessed locally through dedicated terminals or as an integrated part of the automation system, e.g. through the power management system user interface. This opens for cost effective solutions for collecting and monitoring data from entire drive-train e.g. protection relays, frequency converter, motors, generators, control and automation systems. This in result allows introducing techniques known nowadays as multi-sensor data fusion. Crew onboard, that is equipped with such a diagnostic system gain on receiving precise information about the origin of the fault and can immediately be supported from remote by expert technicians.

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