

Title: DP3 Class Power System Solution for Dynamically Positioned Vessels

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Abstract

Dynamically positioned vessels use electrically driven propellers to keep position during oil & gas drilling operations, station-keeping, anchoring, port maneuvering, etc. One of the requirements for the safe operation of the vessel is that no such faults can occur that may result in significant loss of vessel position.

In marine isolated power systems there will typically be installed relatively low number of generators (4 to 8) where the overall power system will be typically split into 2 to 4 sections and each section typically contained in separate engine room, isolated with fire- and watertight wall. Each generator shall supply power to one or more large electric consumers, e.g. electrical frequency converters (VSD). These engine room sections are connected by *bus-ties* to allow that any generator in the system can provide the power to any of the consumers e.g. thruster(s) or drilling loads.

It has been well known for number of years, that operation with closed bus i.e. connected sections and sub-sections in different engine rooms, will allow for significant reductions in fuel consumption and running costs of the engines. Operating system with only two engines will allow operation on higher power per individual engine where the fuel economy will be better.

Depending on the vessel operational profile and current operational philosophy, the closed bus mode may allow for up to 5% of fuel savings per year. Reductions in the maintenance costs of the engines may also be very significant, i.e. 30% or more.

The disadvantage of running the system in closed bus interconnected mode may make system more vulnerable to faults, so any fault e.g. short-circuit or generator failure may make a total vessel blackout. This paper presents the technical solution of fault tolerant power system, able to cope with high integrity against any known fault and failures. This enables the power system to operate with full safety in closed bus / closed ring mode during DP2 and DP3 operations.

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