

ARTICLE

# ABB's PCS100 SFC converter technology helps save 20 percent fuel on ships



ABB has supplied two 875 kVA PCS100 Static Frequency Converters (SFCs) to provide voltage and frequency stabilization on two RO/RO (roll on/roll off) Vessels, Corona Seaways and Hafnia Seaways. RO/RO vessels are transporting large volumes of cargo between Denmark and the Baltic countries and consume vast amounts of fuel oil. Thanks to MAN Diesel and Turbo's technology and ABB, saving on fuel costs by 20 percent can now be achieved.

## Contributing factors in lowering fuel consumption

Shipping is hard pressed to continually find new ways to lower the consumption of fuel. This is due to environmental restrictions and high bunker oil prices. MAN Diesel and Turbo worked together with ABB to test whether it was possible to reduce the fuel consumption of the ship by lowering its engine speed. When the propeller speed was reduced, this also reduced the RPM of the shaft generator leading to a lower AC Bus voltage and a lower AC Bus frequency. This resulted in significantly lower fuel consumption.

MAN Diesel's Sales Manager, Christian Wollerup Sørensen, mentioned that a 20 percent saving on fuel consumption is a major advantage within the shipping industry, "There is a lot of money at stake when vessels are bunkering fuel oil, so a saving in the region of 20 percent makes a huge difference".

The technology behind this result was MAN Diesel and Turbo's highly efficient Alpha Kappel propeller design combined with flow optimizing Rudder Bulbs and ABB's PCS100 SFC. The ship's electrical equipment operates on a 50 Hz grid with a voltage of 400 V. In order to maintain the voltage and frequency when the shaft generators speed is lowered to 1500-1260 RPM, ABB's PCS100 SFC regulates the voltage and frequency to 50 Hz with a voltage of 400 V. With ABB's technology in place, this enables the ship's electrical system to carry on working at the same frequency without having to consume additional fuel.



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01 MAN Diesel and Turbo's Alpha Kappel propeller

02 ABB's PCS100 Static Frequency Converter

The other contributing factor that lowers fuel consumption for these ships are the new propellers. The propellers weigh in at 10 tons and have a diameter of 5 meters. This is a special designed propeller, designed as an aircraft wing tip and has a bend of almost 90 degrees. Due to this feature, the propeller reduces turbulence around the propeller tip and therefore lowers the flow separation from the pressure side to the suction side of the propeller. This collaborative energy efficiency saving solution allows for less fuel consumption per voyage.

**Putting the design to the test**

The vessels had a very small confinement space and a great deal of planning was needed in order to place the transformer and PCS100 SFC into the designated area. For this to happen, a door had to be moved and vents needed changing and steel reinforcements were installed to support the transformer and the PCS100 SFC. Thanks to ABB's compact design, the transformer and PCS100 SFC were able to be fitted into the existing auxiliary engine room.

ABB was also responsible for all the installation work before the ship left the shipyard, which included the expansion of the main switch board with three 1600 A breakers and cabling into the confined spaces.

**Additional information**

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**A good result**

Brian from MAN Diesel and Turbo commented about the successful result achieved with ABB and the importance of a reliable partnership. "We have been very satisfied with the cooperation with ABB, and realize the great importance to choose a partner who can provide the best technical solution and providing local technical support at a high level. When we deliver a quality product from MAN Diesel, we need to be 100 percent sure that the quality is accepted by our customer and is sure that our partners can deliver the same level of professionalism and quality".

MAN Diesel's Promotional Manager, Brian Grusgaard, is confident that in the future, ABB and MAN Diesel will be able to continue their relationship and produce good solutions for existing and future customers. "The longer we can drive down the power to the propeller shaft, the higher efficiency and saving of fuel we can achieve. At the same time, there is less wear and tear as a side-effect, because of fewer revolutions. And we have seen throughout the ship - the gearbox, propeller shafts and propeller blades can be optimized to save fuel. The savings are too palpable, proved by the pay-back period".

View ABB's PCS100 SFC solutions brochure [here](#)

To find out more about ABB's power protection solutions:

Web: [www.abb.com/ups/PCS100](http://www.abb.com/ups/PCS100)

Email: [powerconditioning@abb.com](mailto:powerconditioning@abb.com)