

ARTICLE

ABB's innovative power electronics solutions for the shipping industry



Shipping facilitates around 90 percent of international trade. Although this figure seems impressive, it also entails a heavy impact on the global environment. Facing tight environmental regulations, shipping operators and port authorities have to find ways to reduce emission and noise levels. ABB's new Static Frequency Converter technology helps to keep these to a minimum, ensuring necessary legislation compliance.

Pollution control

In the majority of ports, ships at berth use their diesel generators to run amenities, such as heating, ventilation and cooling, as well as galley equipment. Because of that, they produce noxious emissions which have a negative impact not only on the surrounding environment, but also on the global climate.

At the same time, noise and vibrations from ships seriously affect the life quality of local communities. Mounting pressures to reduce the pollution generated by the world's fleet and the rising costs of fuel have forced ship-owners to adopt a proactive approach to measuring and monitoring combustion, which is reflected in such schemes as marine fuel management (MFM).

However, going green and becoming compliant with the demanding requirements of regulatory authorities, such as IMO/MARPOL and EU, call for decisive steps. And this is where advanced technology steps in.

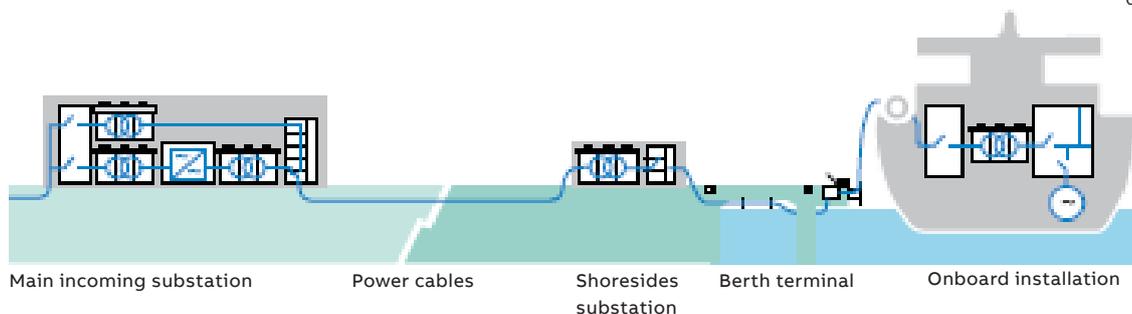
Shore-to-ship power

Shore-to-ship electric power supply, also known as "cold ironing," is the most reasonable and cost-effective choice for greener ports and fleet. The solution enables ships to shut down their diesel generators and plug into an onshore power source while berthed. However, most ships' power generation units operate at a frequency of 60 Hz, whereas local grid in most parts of the world is 50 Hz. This means that providing ships with electricity requires a shore-side electricity supply arrangement.

ABB's solution

As a technology pioneer in high voltage installations for marine applications, ABB offers Static Frequency Converters (SFCs), which are a safe, economic and highly efficient solution converting the grid electricity to the appropriate load frequency. This leading-edge frequency conversion technology guarantees a seamless automated power transfer of the ship load from the onboard power plant to the onshore source and back.

This solution contributes to a significant reduction of fuel and lubrication oil consumption, which means less pollution and improved financial benefits. Shore-to-ship power is especially applicable to ships operating on dedicated routes, and vessels that consume large amounts of power while in port. This could bring



02



03

01 Overview of a shore-to-ship power connection

02 General overview of onshore power supply

03 PCS100 SFC

real benefits for terminal operators whose ferries berth each day for a fixed number of hours.

Versatility, integrity and unrivalled flexibility

The SFC system is internally configured as an arrangement of modular rectifiers and inverters controlled by a power electronic controller. This unique line-up produces sine wave voltage to supply the output load. The converters also allow for the control of reactive power on the ship as well as on the shore side. This feature permits maximum flexibility in adjusting the system to suit the customer's needs. The SFC portfolio includes PCS100 (Power Converter System), suited for low-power applications, as well as PCS 6000, designed for medium-power operations.

The modularity and scalability of these systems enable multiple units to be paralleled, which makes the solution adaptable to the different power requirements of ships and to a variety of port infrastructures. The PCS100 and PCS 6000 SFC have a small footprint design and can be placed indoors or outdoors. This gives the customer flexibility with the physical and spatial layout to harmoniously fit to the surrounding architecture.

Low operational impact

Another advantage of the system is its superior availability due to high reliability and low maintenance (MTTR<30min), which leads to low operational costs. The cost of ownership may be further reduced thanks to the possibility of incorporating renewable energy sources, such as wind or hydro power, solar panels and fuel cells, which can open up a range of new opportunities.

ABB's offering includes comprehensive turnkey shore-to-ship power solutions, from electrical infrastructure on ships (retrofits or new installations) to electrical infrastructure in ports, as well as connection and control solutions to ensure personnel safety and seamless power transfer.

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

Web: www.abb.com/ups

Email: powerconditioning@abb.com

ABB LTD.
Power Protection NZ
111 Main North Road
4110 Napier,
New Zealand

Additional information

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB AG. Copyright© 2018 ABB All rights reserved