

## Application leaflet

# ABB's innovative power electronics solutions for the shipping industry



**Shipping facilitates around 90 percent of the world trade. Although this proportion seems really impressive, it also entails a heavy impact on the global climate. Facing tight environmental regulations, the shipping operators and port authorities have to look for ways to reduce emission and noise levels. ABB's new Static Frequency Converters 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, 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 the 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 calls for decisive steps. And this is where the advanced technology steps in.

### ABB's solution

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.

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.

### Shore-to-ship power

The 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 used to create onboard electric power and plug into an onshore power source while berthed. The 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 contributes to a significant reduction of fuel and lubrication oil consumption, which means less pollution and money savings.

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 real benefits for terminal operators whose ferries berth daily 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 to control the reactive power on the ship as well as on the shore side. This feature permits maximum flexibility in adjusting the system to suit the customers' needs.

The SFC portfolio includes PCS100 (Power Converter System), suited for low-power (<2 MVA) applications, as well as PCS 6000, designed for medium-power (<14 MVA) operations. Both systems' modularity and scalability enable to parallel multiple units, which makes the solution adaptable to the different power requirements of the ships and to a variety of port infrastructures. Thanks to the small footprint design and the technical capability of indoor as well as outdoor placement, PCS100 and PCS 6000 SFC give the customer flexibility with the physical and spatial layout to harmonically fit to the surrounding architecture.

### Low operational impact

Another advantage of the system is its great 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 could open up a range of new opportunities.

For more information please contact:

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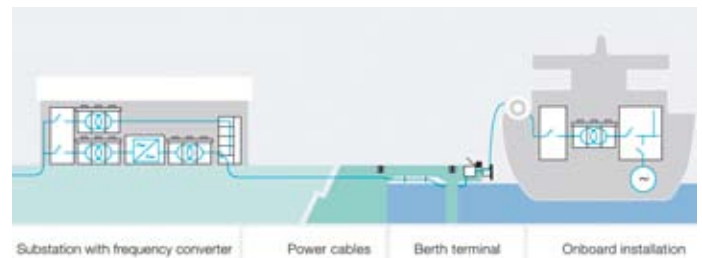
[www.abb.com/powerelectronics](http://www.abb.com/powerelectronics) (grid interconnection)

### References

ABB's most recent references include:

- turnkey shore-to-ship installation at the Stena Line ferry terminal in Rotterdam, the Netherlands,
- onshore substation supplying shore-to-ship power at the port of Gothenburg, Sweden.

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.



Overview of the shore-to-ship power connection



PCS100 SFC and PCS 6000 SFC

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