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# ABB's innovative power protection solutions for the oil and gas industry



## Backbone of today

The petroleum industry could be regarded as a backbone of today's industrial civilization, continuously providing the major source of the world's energy. Oil and gas operations are usually realized in sparsely inhabited, remote locations, including the bitter cold of the arctic, through the burning heat of the deserts, to extreme offshore conditions.

Not only do these environments themselves present a considerable challenge, but also the electricity grid which might be particularly weak in such locations. To maintain seamless and secure operations in these outlying areas, efficient, high-quality and uninterrupted power supply is of primary importance.

## ABB's Power Protection offering

ABB's Power Protection portfolio provides a comprehensive platform for operators of petroleum industry plants for offshore and onshore applications. This unique line-up of advanced technology addresses the global challenge for improved grid quality, which is affected by many aspects, such as voltage, current, reactive power, active power, and frequency.

As the offshore and onshore product configurations are often unique configurations, a gradual product assessment policy is pursued. Comprehensive supply, installation, testing and commissioning is all included in the product and service package.

## Versatility in applications

- PCS100 Static Frequency Converter (SFC) enables the connection to and from grids with different frequencies e.g. ships 60 Hz to 50 Hz land lines.
- The PCS100 Active Voltage Conditioner (AVC) protects sensitive systems and loads in industrial applications from voltage fluctuations and dips.
- PCS100 Reactive Power Conditioner (RPC) enables power conditioning, maintaining voltage quality and required power factors.
- The PCS100 Industrial UPS (UPS-I) protects continuous processes from outages or interruptions caused by power failures.
- The DPA modular online-swappable UPSs such as the Conceptpower DPA or the DPA UPScale protects critical loads against supply aberrations including total mains failures.

## Shore to ship power

In the petroleum industry, oil and gas platforms have been identified as a prime candidate for enabling significant energy and displaced carbon emission savings. ABB's platform-to-ship frequency conversion solution allows 60 Hz commercial vessels, including oil tankers, container ships as well as floating storage and offloading vessels to turn off their diesel engines and tap into cleaner energy source, that is electric power from the 50 Hz platform.

Ships usually operate on 60 Hz grids with many countries globally having 50 Hz land lines. The PCS100 SFC systems provide the answer to bridging the gap in today's environments where different voltages and frequencies occur. They emulate a generator allowing simultaneous operation of on-board supply units.

## Protecting commercial operations

Protection from voltage fluctuations is a major concern for high end industrial power users. As far as refinery operations are concerned, adequate protection helps to minimize the risk of exploration or, for example, reduce the time required to drill a well. Costs associated with damage and down-time from electrical disturbances are severe for up, mid and downstream operation.

This waste of money and resources includes direct impact associated to facility electrical systems, equipment and software, as well as the costs of downtime and lost revenue. The PCS100 AVC provides extremely fast and full correction of voltage dips. It can correct sags and surges of 30 percent for 30 seconds and 10 percent continuously. During short interruptions to mains, the PCS100 UPS-I bridges the time required to power up diesel generators. The offline UPS system will take up operation only if the threshold voltage is reached. The PCS100 UPS-I features high overload capacity, robustness and an efficiency of more than 99 percent.

### Assurance of power

Assurance of power supply is important in many industrial settings, but, on an offshore oil platform, it is absolutely crucial. Because the offshore environment can be very harsh and remote, the UPS also has to be rugged, with high availability and reliability, and repair and maintenance should be simply accomplished by non-experts. The flexible design of the DPA UPS provides a “pay-as-you grow” model, ideal in situations where requirements may change with time. This scalability means that there is no need to over-specify the original configuration as power modules can simply be added, as needed, without any footprint penalty.

Servicing is easy as modules can be replaced without powering down. The UPSs are based on ABB's unique and proven Decentralized Parallel Architecture (DPA™). With DPA, each UPS module contains all the hardware and software required for full system operation. Modules share no common components, and, as a result, system uptime is maximized. The footprint of the DPA UPS is very small – a bonus in the offshore world where real estate is scarce and expensive.

The modular and standardized ABB uninterruptible power supplies (UPSs) bring many advantages to the oil and gas industry. Modules can be swapped online, i.e., removed or inserted, without risk to the critical load and without the need to power down or transfer to raw mains supply. This unique aspect of modularity directly addresses continuous uptime requirements, significantly reduces mean time to repair (MTTR), reduces inventory levels of specialist spare parts and simplifies system upgrades. This approach pays off too when it comes to serviceability and availability the two most critical parameters of any UPS in oil and gas applications.

The delivery often includes an external input transformer, an external battery charger, an IP 31 protected rating cabinet and the capability of charging a NICD battery set, to provide a long back-up time.

### Ensuring high quality power

PCS100 RPC minimizes voltage dips caused by direct online motor starts. It can correct voltage unbalance, poor power factor and low order harmonic problems caused by DC & AC motor drives. With accurate control of the power factor the RPC is particularly suited to ensure backup generators can operate correctly, even with leading power factor loads.

### Customer reference

ABB's platform-to-ship frequency conversion solution has proved spectacularly successfully for A.P Moller-Maersk. The PCS100 SFC supplies a 60 Hz floating storage and offloading vessel with electric power from a nearby 50 Hz oil and gas platform, eliminating the need to power ship systems with its own diesel engines.

“I am glad to inform you that the project onboard Nkossa II has now been in operation for over six months, and the static frequency converter system - rated 3 MW - is operating fully according to the expectations and technical specifications”. (A.P Moeller-Maersk)

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

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