



Application brochure

# Power protection solutions Oil and gas industry

Power and productivity  
for a better world™



# Power protection

## Oil and gas industry



The petroleum industry can be regarded as a backbone of today's industrial civilization, continuously providing the majority of the world's energy. Oil and gas operations are often located in sparsely inhabited, remote areas, ranging from the frigid arctic, to the hot deserts, to extreme offshore environments.

These environments present a considerable challenge, along with the electricity grid which can be particularly weak in such locations. To maintain seamless and secure operations in these outlying areas, an efficient, high-quality and uninterrupted power supply is of primary importance.

ABB provides a comprehensive portfolio of power protection solutions for operators of petroleum industry plants for offshore and onshore applications. Whether the problem is sags, surges, outages, harmonics, power factor correction or frequency excursion, ABB has the solution.

As the offshore and onshore product configurations are often unique configurations, ABB's solutions can be tailored for individual requirements. Comprehensive supply, installation, testing and commissioning are also included in the product and service package.

ABB's power protection products have been integrated into many oil and gas applications. From LNG regasification plants, to floating production storage and offloading vessels, ABB provides UPS and power conditioning solutions for all your oil and gas needs.

# Power protection

## Versatility in applications

Upstream

Midstream

Downstream

Electrification systems

Services for oil and gas

**Upstream:** ABB has supplied power protection solutions to upstream oil and gas plants, both onshore and offshore. This includes static frequency converters to power 60 Hz plants from 50 Hz supplies, floating production storage and offloading (FPSO) applications and power factor correction.

**Midstream:** For pipeline compressor/pumping stations, ABB offers power conditioning and UPS solutions for seamless operation, avoiding costly shutdowns. Designed to each customer's requirement, ABB provides efficient and reliable power protection solutions for midstream applications.

**Downstream:** Refineries and processing plants use sophisticated processes to control equipment such as DCS, PLC and industrial computer systems. Plants and processes that require power protection can benefit from voltage conditioning, power factor correction and back-up power. Installing ABB's power protection products to provide plant wide productivity improvement will not only improve your productivity, it will minimize waste of materials and improve efficiency.

**Electrification systems:** Proven, modular solutions minimize project-specific design, resulting in shorter lead times and lower cost. ABB's uninterrupted power supply systems cover the entire oil and gas logistics chain, from exploration and drilling to distribution and retail. Our presence covers the main oil and gas flows around the world. Onshore or offshore, IT or electrical systems, ABB offers cost-effective solutions proven in the harshest of operating conditions.

**Services for oil and gas:** ABB integrates a full line of power systems, power conversion products, power management software, remote monitoring, turnkey integration services and site support. ABB offers service at every step for installation projects, from detailed design to a full installation. We also provide a full range of globally available maintenance services that can be used independently or packaged into a maintenance agreement adjusted to a company's particular situation.



# Portfolio for oil and gas applications

## Industrial UPS systems



**PCS100 UPS-I**

**Single-conversion industrial UPS**

System rating: Up to 3 MVA

Power range: 150 kVA to 3 MVA

Efficiency: Greater than 99 %

Backup time: Configurable

**Applications:** Critical processes and pump stations. Used to bridge the gap between grid loss and generator starts.



**PCS100 MV UPS**

**Medium voltage single-conversion UPS**

System rating: Up to 6 MVA

Power range: 2,4,6 MVA

Efficiency: Greater than 99 %

Backup time: Configurable

**Applications:** Critical processes such as extrusion.



**Cyberex® PowerBuilt™**

**Double-conversion industrial UPS**

System rating: Up to 80 kVA

Power range: 10 to 80 kVA

Efficiency: 86 %

Backup time: Configurable

**Applications:** Back-up power for SCADA, emergency operations, DCS systems, PLCs, DC relay systems process controls and telecommunication systems.

# Portfolio for oil and gas applications

## Conditioning and frequency conversion



PCS100 AVC-40

### Active Voltage Conditioner

System rating: Up to 3.6 MVA

Power range: 150 kVA to 3.6 MVA

Efficiency: Typically 98 %

**Applications:** Compressor stations, auxiliaries, critical processes.



PCS100 RPC

### Reactive Power Conditioner

System rating: up to 2 MVAR

Power range: 100 kVAR to 2 MVAR

Efficiency: 97 %

**Applications:** Motor starts, LNG, FPSO, processes such as correcting power factor onboard the vessel.



PCS100 SFC

### Static Frequency Converter

System rating: Up to 10 MVA

Power range: 125 kVA to 10 MVA

Efficiency: 96 %

**Applications:** FPSO, LNG, offshore to onshore, clean bus.

# Applications for oil and gas

## Floating production storage and offloading

### Upstream



### Midstream

### Downstream

### Electrification systems

### Services for oil and gas

For floating production storage and offloading (FPSO) applications, solutions like the PCS100 Static Frequency Converter (PCS100 SFC) can be used for frequency conversion from the grid/onshore platform to the vessel. The PCS100 Reactive Power Conditioner (PCS100 RPC) can correct power factor onboard the vessel, while the UPS, such as the Cyberex® PowerBuilt™, are used for power backup of the marine automation system, instrumentation and control system, electric motors and telecom systems.

#### Applications

**Armada D1:** ABB has delivered systems worldwide including the Armada D1 (previously known as the Monte Umbe vessel). Since the vessel operates most equipment at 50 Hz, some of the ship's equipment still requires a 60 Hz supply. ABB's PCS100 SFC is supplying the remaining 60 Hz loads.

**NKOSSA II:** A 3300 kVA PCS100 SFC unit was commissioned to shift power to and from 60 Hz to 50 Hz frequencies, linking LPG floating storage and offloading vessel NKOSSA II with its connecting production platform.

*"I am glad to inform you that the project onboard Nkossa II is now in operation, and the static frequency converter system – rated 3 MW – is operating fully according to the expectations and technical specifications". (A.P Moeller-Maersk)*

## Application layout

### Shore connection / FPSO



### Onboard 60 Hz



Compressors, air conditioning and more



# Applications for oil and gas

## Offshore platform

### Upstream



### Midstream

### Downstream

### Electrification systems

### Services for oil and gas

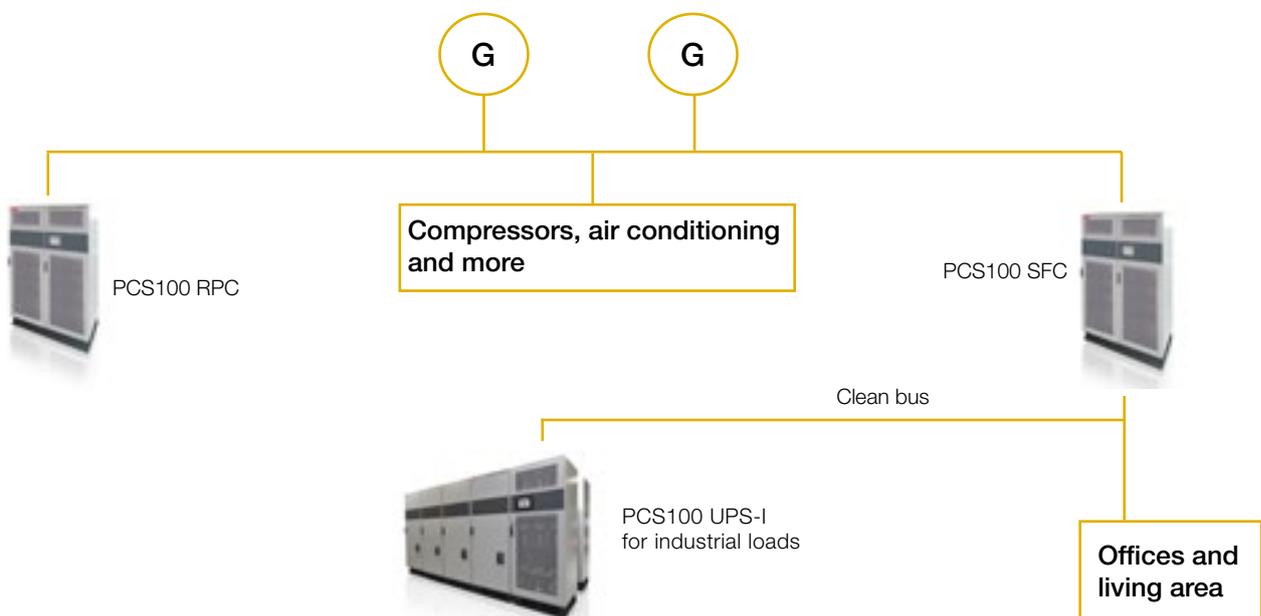
Oil and gas platforms are located in remote and harsh environments demanding self-sufficiency in energy and water needs and rugged mechanical design. They need to house all equipment necessary to extract oil and gas to be delivered directly by pipeline or to a platform facility. In order to protect the power of critical power systems such as oil pumps, water pumps and emergency systems (including emergency lighting or fire protection system). ABB offers a complete electrical solution based on voltage and frequency converters and true online, double conversion UPS systems.

Voltage and frequency regulation problems can be solved with the PCS100 RPC and the PCS100 SFC. The PCS100 SFC creates a clean bus, while the PCS100 RPC corrects power factor. The power backup for critical loads, DCS, PLCs and emergency systems can be provided with high availability and reliability by ABB's Cyberex UPS. Their robust design with high IP rating, isolation transformers, modular power modules, batteries and distributions ensure the integrity of the critical loads and avoid expensive downtime and equipment damage.

#### Applications

**Gulf Coast and Canadian Offshore:** Key Gulf Coast USA and Northeast Canada offshore operations, respectively, chose ABB's Cyberex UPS Systems for their offshore oil ports to back up their process control units.

## Application layout



# Applications for oil and gas Vessels

Upstream

Midstream



Downstream

Electrification systems

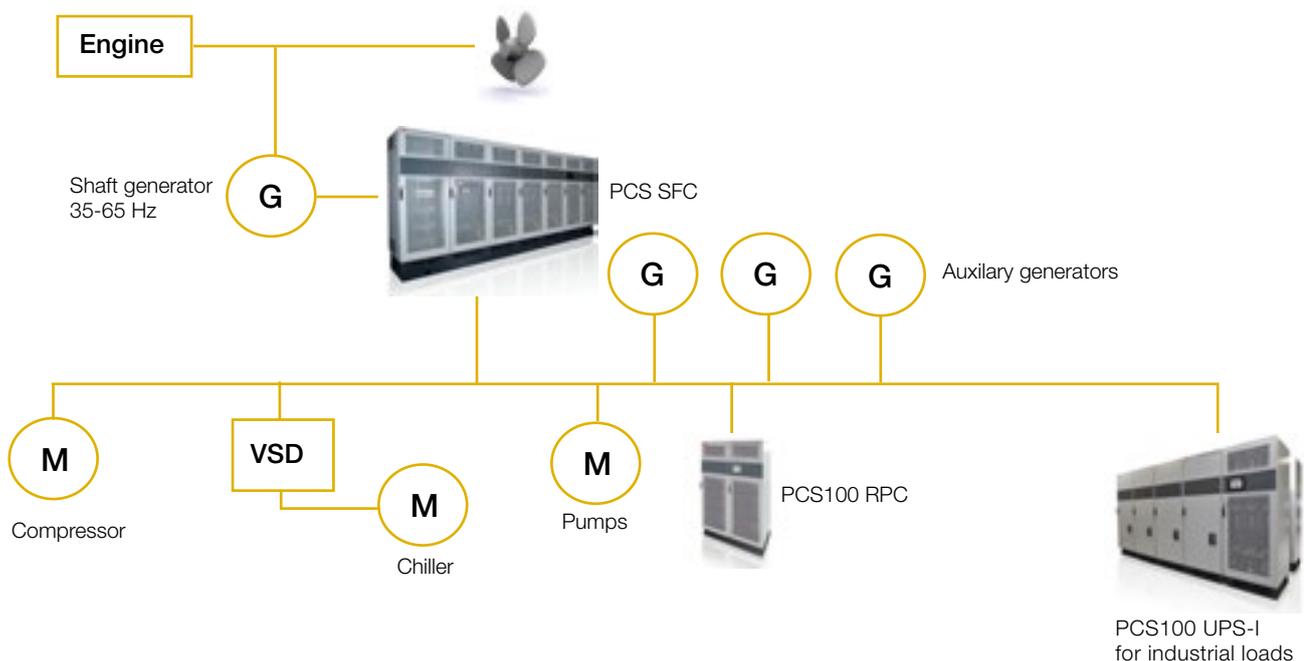
Services for oil and gas

Fuel can be saved on vessels that have shaft generators by reducing/optimizing engine speed. The PCS100 SFC is connected between the shaft generator and the main switchboard of the vessel. The frequency on the output of the PCS100 SFC is converted to 60 Hz to feed the ships loads. The PCS100 SFC can also operate in parallel with the auxiliary diesel generators, while the PCS100 RPC corrects power factor on the distribution line.

### Applications

As the LNG market grows rapidly, the fleet of LNG carriers continues to experience tremendous growth. ABB has delivered power conversion systems for LNG vessels in Qatar, consisting of several PCS100 SFCs.

## Application layout



# Applications for oil and gas

## Pumping stations

Upstream

Midstream



Downstream

Electrification systems

Services for oil and gas

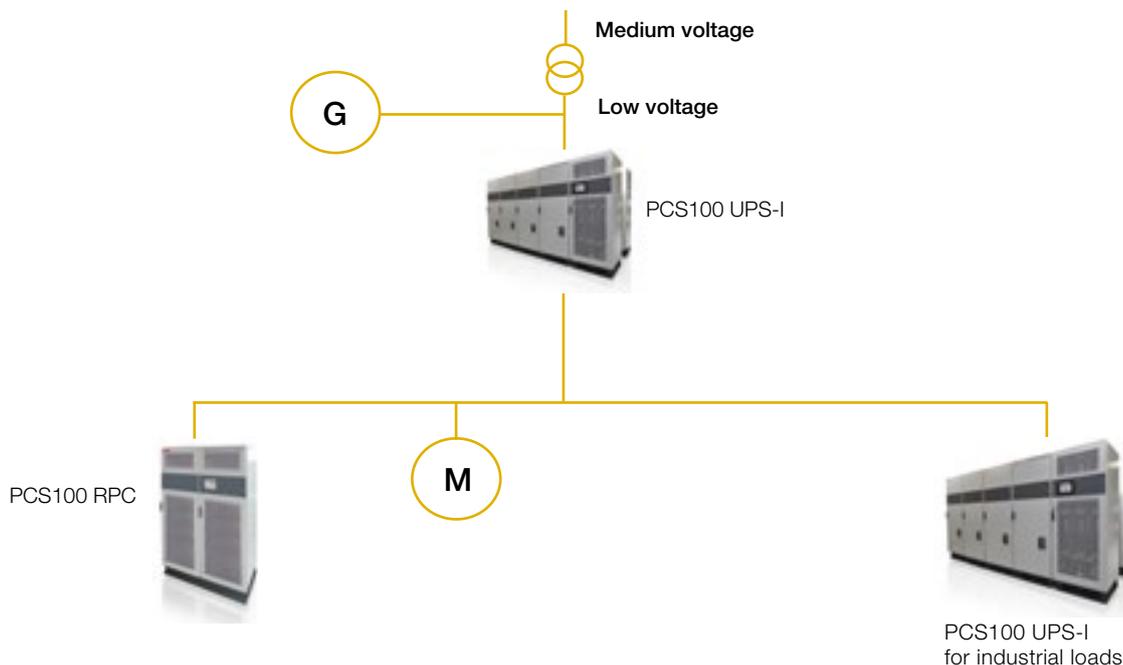
Availability of large critical oil and gas pumping stations can be greatly improved by installing the PCS100 UPS-I and the PCS100 RPC. The PCS100 UPS-I bridges the gap from utility power to standby generator, avoiding costly shutdowns. The PCS100 RPC controls the reactive power flow into the AC network.

The threat of lost production or the possibility of damage to work in process is a central manufacturing concern. The Cyberex PowerBuilt industrial UPS features an insulated gate bipolar transistor (IGBT)-based pulse-width modulation (PWM) inverter design that employs active current limitation for higher short circuit tolerance. The active short-circuit method ensures the best possible current clearing waveform, while still protecting the inverter from catastrophic failure. In the event of a load side short circuit or over-current that cannot be supplied by the inverter, the UPS logic will transfer away from the active inverter source, thereby preventing the fault condition from damaging the inverter.

### Applications

**Pipeline Operations:** A leading multinational oil and gas company chose ABB's Cyberex true-online double conversion UPS systems to back up their pump station's DCS systems to prevent power quality problems related to power fluctuations.

## Application layout



# Applications for oil and gas Plants/processes

Upstream

Midstream

Downstream



Electrification systems

Services for oil and gas

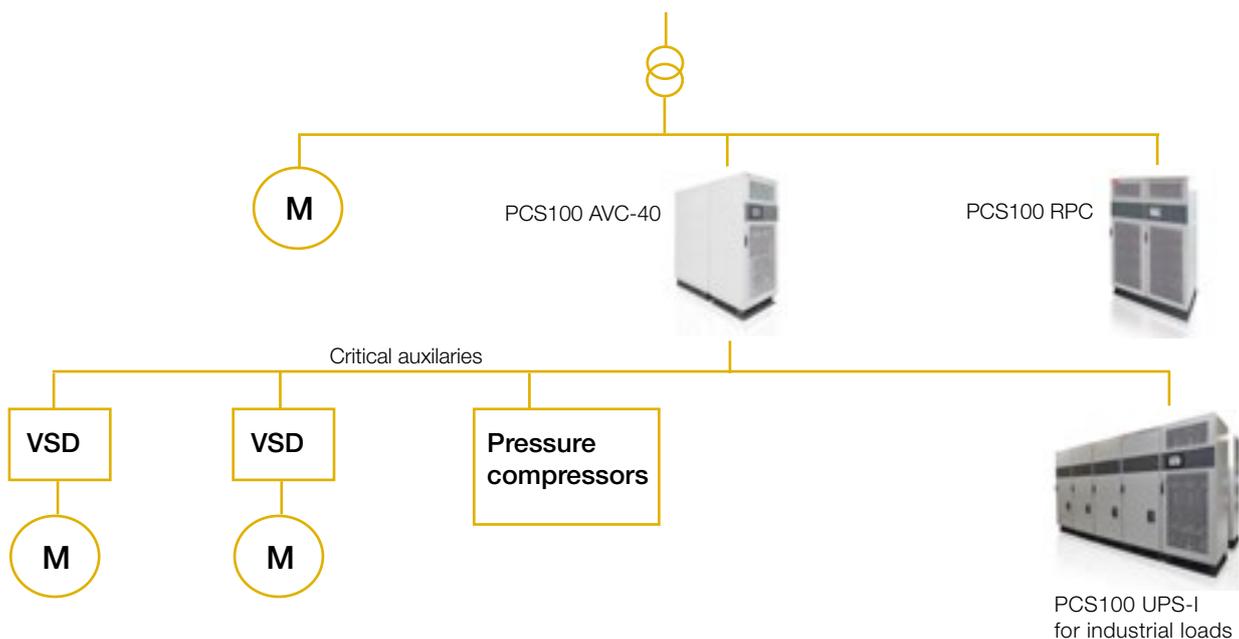
Refiners without power protection can cost millions of dollars every year in wasted of resources and materials. Minimizing electrical disruptions and preventing power failures in oil and natural gas refineries to avoid production loss and damaged equipment is crucial. Ensuring a reliable power backup for vital loads as DCS or emergency switchgears panels improve the productivity of the plant.

### Applications

**Sibur Gas:** Sibur, a uniquely global positioned gas processing and petrochemicals company, is utilizing an ABB solution for one of their substations. Four 330 kVA PCS100 AVC-40s, are providing power protection to Sibur Plastic's workshop, "Styrene", in Russia.

**Gubkinskiy GPP:** Gubkinskiy GPP is the northernmost gas processing plant in Russia. It was built as part of the "Sibneftegazpererabotka" association in 1988. Today, it is a branch of a leading gas processing enterprise JSC "SiburTyumenGaz" which main activity is associated petroleum gas (APG) acceptance and processing. Gubkinskiy GPP produces a broad fraction of natural gas liquids (NGL). ABB has developed and implemented two PCS100 AVC-40s to protect power systems for Gubkinskiy GPP. This eliminates voltage sags caused by the external power grid.

## Application layout



# Applications for oil and gas Extrusion

Upstream

Midstream

Downstream



Electrification systems

Services for oil and gas

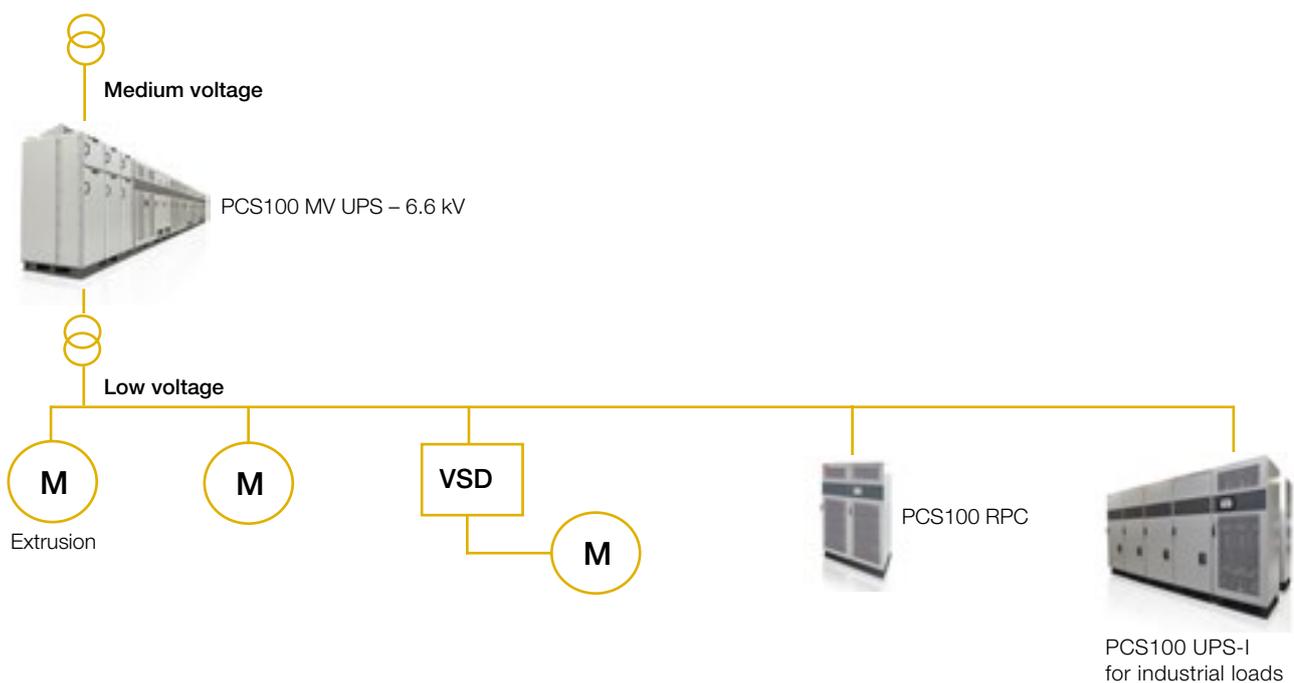
Plastics and downstream chemical processing require a continuous clean electricity supply. The PCS100 MV UPS or PCS100 AVC-40 are ideal solutions. Motors and variable speed drives might create power factor and harmonic problems and the PCS100 RPC is a well positioned mitigation solution.

The UPS, such as the Cyberex® PowerBuilt™, is used to provide back-up power for process control, security, DCS, PLCs and communication systems.

## Applications

**Petroleum process control:** An American multinational energy corporation chose ABB's Cyberex Industrial UPS to back-up and support numerous process control units in select gas to liquid (GTL) projects located throughout central Africa. These GTL plants convert natural gas into premium environmentally friendly fuel, diesel and GTL naphtha products.

## Application layout



# Electrification systems

## Upstream, midstream and downstream

Upstream

Midstream

Downstream

Electrification systems



Services for oil and gas

Oil and gas operations are being driven by the quest for more efficient, cleaner and cheaper production methods and increasing environmental pressures. Success in this business environment requires advanced technology, both in equipment and in control functions. ABB's comprehensive portfolio of UPSs, offer proven solutions to protect the processes and systems in the chemical, oil and gas industries. ABB can provide back-up power for all systems for up, mid and downstream applications.

### Upstream

Emergency lighting, emergency shutdown  
Process control systems  
Data processing (control rooms, SCADA systems)  
Motor control, gas turbine control  
Navigation, telecommunication systems

### Midstream

Emergency lighting, emergency shutdown  
Process control systems  
Automation  
Data processing (control rooms, SCADA systems)  
Pump, motor control  
Navigation, telecommunication systems

### Downstream

Emergency lighting, emergency shutdown  
Process control systems  
Automation  
Data processing (control rooms, SCADA systems)  
Motor control, gas turbine control  
Telecommunication systems, computer systems



# Power protection

## Full service

Upstream

Midstream

Downstream

Electrification systems

Services for oil and gas



**Service is really what makes ABB stand out in the power protection industry**

**ABB services span the entire product ownership life cycle**

- Pre-purchase engineering
- Installation and commissioning
- Technical support
- Training
- Preventive and corrective maintenance and maintenance spare parts kits
- Retrofit and refurbishment
- Globally available, supported by regional service hubs and operating in more than 100 countries
- Spare part availability and stocking
- Preventative maintenance
- Onsite repairs
- 24 x 365 local support line

**Custom tailored service contracts**

- ABB services can be packaged into a custom service contract
- Service contracts provide customers with improved cost controls, increased operational efficiency, lower capital expenditures, and extended ABB product life time



# ABB's global network



ABB is one of the world's leading engineering companies, helping customers to increase industrial productivity and to lower environmental impact in a sustainable way.

With strong market positions in its core businesses, ABB Group operates in around 100 countries and employs about 150,000 people.

ABB's technology competence, broad application, know-how and global presence offer customers easy access to leading engineering solutions and systems.

Innovation and quality are key characteristics of ABB's service and product offering.

ABB is headquartered in Zurich, Switzerland. ABB Ltd shares are traded on the stock exchanges in Zurich, Stockholm and New York.

The ABB Group was formed in 1988, when the Swedish Asea and the Swiss BBC Brown Boveri merged under the name ABB. Asea's history dates back to 1883. BBC Brown Boveri was founded in 1891.

We provide our customers with efficient and reliable UPS and power conditioning solutions, to help them operate effectively in every step of the oil and gas supply chain.



# Contact us

For more information contact your local ABB representative or visit:

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

[www.abb.com/oilandgas](http://www.abb.com/oilandgas)

[www.abb.com/converters-inverters](http://www.abb.com/converters-inverters)

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