



Direct electrical heating system
Reliable flow assurance

From topside till subsea operation in oil and gas field

ABB Direct electrical heating (DEH) system provide a reliable solution for preventing formation of hydrate and wax in the flowlines and pipelines. The DEH system is based on ABB's proven and reliable standard components.

The formation of hydrates is a well known challenge when the well stream cools down. Several solutions are available, such as the use of chemicals or ABB's environmentally friendly electrical pipeline heating.

ABB has over the last 30 years successfully designed, manufactured and implemented a large number of electrical systems to the oil & gas industry. ABB offers system solutions, products and services for the entire field of electro-technical installations. ABB is a leader in subsea electrification, and has developed tailor made solutions and supplied power to the world's first two subsea gas compressions systems.

Secure flow assurance

Formation of hydrate occurs at low temperature and high pressure. The petroleum industry spends over US\$ 700 million each year to prevent it in wells, pipelines and equipment. ABB's tailor made DEH system is able to provide ultimate reliability and dependability. Combined with our knowledge, commitment, certified quality procedures and extensive experience, we have full confidence in safety and protection.

Tailor made for topside solution

ABB's DEH systems consist of a tailor made topside package installed in the platform's local equipment room(LER), or delivered as a complete module/containerized solution.

The main components for the topside DEH systems are transformer, compensation unit, symmetration unit, and control and protection products. The DEH system from ABB ensure cost effective and environmental flow assurance without the use of chemicals.

Power transformer

ABB provides both dry or oil immersed power transformers.

Features for the power transformers include:

- Well proven design for marine and offshore installations
- Indoor or hazardous area use
- Onload tap changer is designed for adjusting the voltage ratio between "heat up" and "keep warm" mode

Compensation unit

- Consists of capacitors for cos ϕ correction and capacitors for load balancing
- The units can be delivered with inrush resistors and bypass vacuum contactors to limit the inrush current during the energizing phase, if required.



All coming from ABB standard products

Symmetration unit

- Consists of inductors and capacitors. Inductors are dry type, or oil immersed, arranged so that load balancing is achieved
- The units have offload taps for tuning the load balancing
- Inductors for indoor or hazardous area use

Control and protection

ABB Relion® family provides protection, monitoring and control of the DEH system. Relion IEDs implement the core values of the IEC 61850 standard. These products interoperate with other IEC 61850-compliant IEDs, tools and systems, including to transfer parameters and event lists to the ICSS through IEC61850 or alternative Modbus TCP/IP. Their performance meets comprehensive communication tasks. They provide versatile functionality, as well as maximum flexibility and performance to meet the highest requirements of any application.

670 and 615 series IEDs include high performance GOOSE messaging. It is also possible to transfer all necessary information to the main control system with time-stamping.

Fibre optical measurement

ABB's supervision system includes, in addition to standard "control and protection", also:

- Fibre optical break fault
- Distributed Temperature Measurement (DTS)

Gulfaks DEH pipeline heating system

Gulfaks is an oil and gas field in the Norwegian sector of the North Sea, operated by Statoil. Gulfaks south is located on Block 34/10 and 33/12, at a depth of 130 to 220 meters. The recoverable reserve is 65 million barrels.

ABB provides DEH solution to Statoil's Gulfaks A platform. All electrical and control products conform to international standard, from transformer to output cable connection. In addition, ABB is responsible for design and in-house engineering. The system will be delivered in 2014.

Nakika DEH pipeline heating system

Power and control system for Pipe heating in Nakika
The Nakika field extend over Missisipi Canyon blocks in the Gulf of Mexico. It has recoverable reserves of 300 million barrels of oil equivalent and a production rate of around 110,000bpd oil and 500 million cubic feet of gas a day.

To prevent ice plug in the pipeline located at 2500meter depth, a container is placed on board a vessel. The subsea transformer is lowered to the midline assemble on the pipe segment.

ABB DEH system is made by ABB products only, we have dedicated department with experienced specialists can provide all kind of support for subsea applications.



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