Dry-type transformers from ABB
The ideal solution for the oil and gas industry
Dry-type transformers for the oil and gas industry
ABB’s products and solutions for the oil and gas industry

The oil and gas industry
The oil and gas industry is one of the world’s most important industrial sectors. The global demand for energy is increasing steadily, and is met to a large degree by this segment.

The deposits are to be found at a wide range of locations, and the production conditions are constantly posing new challenges for the companies involved.

ABB plays a leading role in all areas in the oil and gas industry, from drilling, on- and offshore production and transportation with ships or pipelines, all the way through to final processing in the refinery. ABB is regarded as a technology leader, and is constantly developing new products and solutions.

ABB is one of the world’s leading companies in the automation and power engineering sectors, and offers a global network of services with its facilities all over the world.
ABB’s dry-type transformers – ideally suited for on- and offshore application

**Offshore**

In the offshore area, the demands for safety and reliability are particularly stringent. Whether it’s for energy supply to the crew quarters, the power supply to the drilling module or the production compressors, the toughest of standards are demanded.

Installations can be on drilling platforms, production rigs or on any Floating Production Storage Offloading (FPSO) unit. In no other field are the expectations for the material used as high as in the offshore area. Incorrect material can lead to devastating accidents and result in heavy financial losses. ABB’s dry-type technology is exceptionally safe and reliable. Both the electrical and the mechanical properties of this technology ensure a maximum of reliability and enable it to be used in virtually every environment.

As almost no combustible materials are used during manufacture, this technology is highly recommended, with regard to the fire load and explosion hazard.

**Onshore**

In onshore plants equipment is exposed to very diverse conditions. As the production plants are located both at -60 °C in Siberia and at +60 °C in the deserts of the Middle East, mechanical stability and protection against environmental influences are of particular importance.

The RESIBLOC® is the only dry-type transformer that has been tested both in the laboratory and in practical operation at temperatures of -60 °C.

At the same time, many of ABB’s dry-type transformers are located in the deserts of the world, and are protected against the high temperatures and sandstorms by specially constructed enclosures.
Terminals
Due to the typical location in coastal and sometimes arctic areas, these sites entail special demands in terms of corrosion protection. The ABB dry-type transformers already have a multitude of references in these operating conditions. Thanks to the vast experience which ABB has gained in this area over recent years and is able to offer a highly reliable solution for a wide variety of conditions.

Refineries
Due to the variety of applications found in a refinery, very disparate requirements apply here on transformers. On the one hand, standard distribution transformers are required for general energy supply, and on the other hand other special transformers for the various drive systems of the pumps, compressors or extruders, which can be installed in a wide variety of environmental conditions.

In this case, ABB dry-type technologies offer the requisite flexibility and experience. As we manufacture both standard transformers and special transformers, we are able to offer a suitable solution for virtually every requirement.

Transportation
Whether with ships at sea or with on- and offshore pipelines, availability is of particular importance in the transportation of oil and gas. Thanks to virtually maintenance-free transformer technology, the availability of the transformer has been assured. Firstly, the cost of spare parts and service is kept as low as possible and secondly, the outage costs due to maintenance work are reduced to a minimum.

The transformers are suitable for outdoor installation as well as for installation in containers. They can be offered as an integrated, compact or mobile solution together with the medium and low-voltage switchgear.
RESIBLOC and vacuum cast coil transformers

For the oil and gas industry, ABB offers with the RESIBLOC and vacuum cast coil (VCC) transformers, two advanced dry-type technologies available upon the customer’s requirements. Both technologies, with all advantages of dry-type transformers, play a leading role in highly demanding categories of application.

ABB has been using its technologies in maximally challenging projects for almost 40 years now.

Besides the distinctive features of the transformer, which are responsible for successful processing of a project, we have also gained a head start in experience during the course of the numerous projects concerned.
Dry-type transformers are entirely oil-free, and the use of other flammable materials has also been reduced to a minimum, thus avoiding any contamination in the transformer's surroundings and eliminating any additional fire risk.

The unique fiberglass reinforced insulation of the RESIBLOC provides an extremely robust medium-voltage transformer conforming to IEC 60076-11 standards, and complying with most international standards.

ABB vacuum cast coil dry-type transformers are moisture-proof, suitable for operation in very humid or heavily polluted environments. For this technology, the encapsulation process for high voltage winding ensures optimum insulation and mechanical characteristics, and provides for high reliability during operation.

Both, RESIBLOC and VCC transformers are available for indoor and outdoor installation.
HiDry
With ABB’s HiDry transformers, ABB is able to offer transformers up to 63 MVA rated power, and insulation voltages up to 72.5 kV. These transformers are an environmentally friendly, safe and extremely reliable solution, which has been designed to meet the most stringent of customer specifications and international standards.

EcoDry
The new ultra-efficient dry-type transformers designed with reduced losses and superior efficiency up to 99.6%, for customers evaluating environmental impact and total operational costs.

Converter transformers
ABB is one of the market leaders for low and medium-voltage drive systems. The demands made by these modern power electronics on the components connected, such as transformers, are very stringent, and require a great deal of experience in this area. Harmonic loads and their effects play an important role in the design of transformers. Here, too, the advantages are of great importance, particularly the electrical properties of the transformer technologies, and together with the drive systems and motors from ABB provide a highly reliable solution for 6-, 12-, 18-, 24- and 36-pulses. Thanks to a close cooperation within the company, the components are ideally matched to each other. All ABB transformers are manufactured for ABB ACS drives and various non-ABB drives.

Air-to-water cooler
Air-to-water-cooled transformers offer options for high classes of protection and an even more compact construction. This is a completely self-contained cooling system, where the ventilation air is cooled inside the enclosure, and not dependent on the cooling air available. The transformer and enclosure size is greatly improved by the use of external heat exchangers; the transformer’s height is reduced, a major advantage when required for offshore modules, as heights can be particularly low. Full transformer output is constantly assured through the use of a twin forced-cooling fan system mounted on the enclosure. The heat exchanger can use the second cooling fan as back-up, ensuring full cooling capacity in the event of a fan failure. In addition, special enclosures allow the transformers to be placed outdoors.
Air-to-air cooler

A further example of the innovative approach adopted in the field of transformer technology is what is called an air-to-air thermosiphon cooler. The cooling principle here is similar to that in air-to-water cooling, but air is used instead of water as the external cooling medium. This means that such a solution can be used very flexibly, and can also be installed at locations where a continuous supply of water is not available. Thermosiphon is a special physical method for heat exchange. This process takes place only due to the density difference of hot and cold heat transfer fluid. Pumps or any other electrical controls are not necessary. Besides energy and material savings, a more compact and soft design are appreciable advantages.

With special encapsulations the dry-type transformers can be placed outdoors – enclosures of course onshore as well as offshore.

Transformer designs

A great variety of accessories is available today, with many options as demanded by any application, project, or to meet national or local regulations, or in response to any individual preference. Some examples are given below:

- Enclosure protection up to IP54
- Arc guard system
- On-load tap changer (OLTC)
- Anti-vibration dumpers
- Cable boxes
- High and low voltage cast resin bushings
- Galvanized painting
- Space heaters
- Temperature monitor

Further information as well as current reference lists are available under customer request.
Test procedures
The demands with regard to acceptance inspections and special test procedures are exceptionally stringent in the oil and gas sector, and compliance with the rules of individual classification societies must be observed in virtually every offshore project. ABB offers its customers optimum basic conditions for successful acceptance inspections. Thanks to rigorous focusing on industrial customers, ABB knows the typical requirements of these customers and the classification societies involved. Consequently, we also ensure in this area that the project is processed efficiently and at the most economical cost to the customer.

Order processing
Due to the long durations involved, the frequently larger quantities and the complexity of projects from the oil and gas industry, special knowledge of order processing is also required in the case of pure product suppliers. The employees concerned must in most cases have project management experience and also possess an understanding of technical matters. They are the interface between the customer and the engineering departments in the factory. Thanks to the specific focus on industrial customers and the wealth of experience in the processing of special projects, with the RESIBLOC and vacuum cast coil technologies, ABB is the ideal partner for the oil and gas sector.

Project management and documentation
The oil and gas sector is an industry demanding careful customer attention and detailed documentation. Only by using an excellent project management system it is possible to ensure on time deliveries and provide customer support and documentation. To ensure a long product service life, complex testing, witness testing and a larger than regular documentation package are part of the normal product package. It is only possible to show the necessary competence after many years of supply experience and close cooperation with our customers.
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