Transformer pioneers

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Dear Reader,

The commercial application history of transformers dates back to the end of the nineteenth century. The world's first full AC power system, built by William Stanley, was demonstrated using step-up and step-down transformers in 1886. The transformer played a critical role in the outcome of the so-called war of currents, tilting the balance in favor of Tesla's AC vision. ABB (then ASEA) delivered one of the world's first transformers in 1893, integrating it with the first commercial three-phase AC power transmission link – another of the company's innovations – connecting a hydropower plant with a large iron-ore mine in Sweden.

Today, with a presence in over 100 countries, more than 50 transformer factories and 30 service centers, ABB is the world's largest transformer manufacturer and service provider with an unparalleled global installed base and a vast array of power, distribution and special application transformers. These transformers can be found wherever electricity is generated, transported and consumed – in power plants and substations, industrial complexes, skyscrapers and shopping malls, ships and oil platforms, locomotives and railway lines, wind parks, solar fields and water treatment plants.

Their most important function is to transform or adapt voltage levels, stepping them up for long-distance high-voltage transmission from the power plant, and stepping them down for distribution to consumers. ABB transformers contribute to grid stability and power reliability, while ensuring the highest safety standards and striving to increase energy efficiency and reduce environmental impact.

Besides setting new records in transformer power ratings for both AC and DC transmission, ABB has pioneered a number of innovative transformer solutions over the past 120 years. The most recent of these is the development of a 1,100 kV UHVDC converter transformer – the highest DC voltage level in the world. This will enable up to 10,000 MW of power (the capacity of 10 large power plants) to be transmitted efficiently over distances as long as 3,000 km.

Earlier this year ABB also introduced a PETT – a revolutionary traction transformer that uses power electronics to reduce its size and weight while increasing the energy efficiency of the train and reducing noise levels.

Other recent pioneering developments include 1,200 kV AC technology, subsea transformers that can supply power at a depth of 3,000 m, ultralow sound transformers for noise-sensitive environments, and innovative amorphous core and biodegradable-oil-based transformers. ABB has also introduced high-efficiency distribution transformers, both liquid and dry-type, that can reduce energy losses by 40 to 70 percent.

ABB continues to develop innovative asset optimization, refurbishment and maintenance solutions to serve the existing global installed base.

ABB transformers can help customers address new challenges and opportunities like the integration of renewables and distributed power generation as well as accommodating new types of electrical loads such as data centers and electric vehicles – shaping the evolution of more flexible, stronger and smarter grids.

We hope you enjoy reading this *ABB Review* special report in which many of ABB's accomplished engineers share technology perspectives across a range of applications.

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