

WindSTAR transformers

Large offshore wind turbine transformers for collection grid at 33 kV and 66 kV



ABB's latest development in specialty transformer technology enables a new generation of powerful offshore wind turbines to operate at world record of 66 kV. With its so-called WindSTAR transformer, ABB is bringing step change in the scale of power and voltage ratings.

The challenge

Offshore wind turbine output has reached 8MW and is forecast to attain 12 MW by 2020. The transition from 33 kV to 66 kV transmission voltages will further reduce Levelized Cost of Energy (LCoE), encourage ongoing technology improvements and create more efficient wind generation systems. As turbine size increases, turbine transformers must remain compact and lightweight with a minimal footprint, while also meeting specific application needs, mechanical structural constraints and costs

ABB's solution

Based on 36 kV class established solution for large offshore turbine, ABB has developed a transformer able to step up voltage at world record and meet the most stringent electrical and mechanical requirements. This results in improved lifecycle and cost-efficiency.

Key features

- Design for power rating superior to 10 MVA
- Available for 36 and 72.5 kV class
- Well suited for installations in wind turbine tower or nacelle
- Compact and lightweight design with minimal footprint

- Robust slender transformer tank
- Vibration and short-circuit proof product
- Modular design for any customer request
- Made for durability in salt mist environments
- Sealed and vacuum-proof moisture-free tank
- Easy plug-in bushings on HV side
- Integrated Oil Forced Water Forced (KFWF) cooling
- Environmentally-friendly and fire safe ester insulation liquid
- High-temperature insulation material
- No live parts exposure
- Compliant with international standards and regulations for windmill transformers

Technical data	33 kV	66 kV
kV class	36 kV	72.5 kV
Rated power	> 10 MVA	> 10 MVA
Cooling	KFWF	KFWF
Insulation liquid	Ester	Ester
Insulation material	High Temp class	High Temp class
Tapping range	+/- 2x2.5%	+/- 2x2.5%
Low voltage	> 400 V	> 400 V
Frequency	50 or 60 Hz	50 or 60 Hz
Standards	IEC/IEEE or other technical standards	IEC/IEEE or other technical standards



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01 Offshore wind turbine output has reached 8MW and is forecast to attain 12 MW by 2020.

02 ABB transformers are specially designed to meet the specific application needs of the most powerful wind turbines.

Customer benefits and savings

- Best-in class solution to withstand sudden variable loading and typical extreme environmental events of offshore conditions
- Easy integration and installation into the turbine
- Optimized weight to lower wind turbine structural costs
- Optimized dimensions for ease of movement
- Personal safety : minimum or no protective safety distance needed
- Fire safety
- Maintenance-free hermetically sealed transformer
- Aimed to lower overall system losses and improve Levelized Cost of Energy (LCoE)
- Guaranteed loadability and extended life time for 30 years or more



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ABB as your competitive edge

- Extensive experience and long track records in offshore and subsea installations
- Proven technology from offshore oil & gas industry
- Estimated installed base of more than 1,000 units worldwide
- Key actor in international technical standard publication and in the forefront in developing new requirements for transformer
- Specialized service team for offshore interventions
- Offshore service agreement

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