

# **Refrigeration system in wind power generation**





## Overview

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Can a wind generator circulate a refrigerant?

In the case of rotational machines with high-speed rotation, natural circulation of the refrigerant is possible by utilizing centrifugal force. However, in wind generators, the rotational speed of superconducting generators is around two orders of magnitude slower than that of turbine generators (about 10 rpm).

How is refrigerant circulated in a rotational system?

In the rotational system, the refrigerant is circulated by its own pump. Fig. 1 shows a schematic of the cooling system in a superconducting wind generator, with a heat exchanger between the stationary system and the rotational system, and a pump installed in the rotational system. Fig. 1.

Can YBCO wire be used to wind a refrigerator?

A group from Furukawa Electric Co., Sophia University, and Niigata University has developed a field winding by using YBCO wire. Since installing a refrigerator in the rotational system is difficult, the refrigerant must be supplied from a stationary system to the rotational system, to cool the superconducting rotating machines.

What is a rotational cooling system?

In the cooling system, the refrigerants in the stationary and rotational systems are completely separated; heat between the two systems exchanges using a rotational-stationary heat exchanger. The refrigerant in rotational system is circulated by highly reliable pumps.



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for Wind Power Onshore and Offshore

Oct 4, 2022 · Engineered Solutions for a Perfect Application Fit We understand our customers' needs in wind turbine cooling and their specific requirements and challenges. AKG's ...

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Thermal and Mechanical Design for Refrigeration System of ...

Feb 11, 2020 · The analysis and design results are applied to develop a novel "neon-helium hybrid refrigeration system" for the 10 MW HTS wind power generator.

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Development of a cooling system for superconducting wind ...

Dec 1, 2016 · This paper describes with respect to 10 MW-class superconducting generators for wind power generation, a method to obtain efficient heat exchange between the stationary and ...

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Thermal and Mechanical Design for Refrigeration System of ...

Feb 11, 2020 · A 10 MW class high temperature superconducting (HTS) wind power generator is being developed using REBCO wires for offshore installations. The REBCO coil operates at 35 ...

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Cooling techniques in direct-drive generators for wind ...

Aug 26, 2022 · Abstract: Direct-drive generators are an attractive candidate for wind power application since they do not need a gearbox, thus increasing operational reliability and ...

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Design, optimization, and performance analysis of a

Dec 15, 2024 · This study aims to develop a sustainable cooling solution for refrigeration in remote areas, utilizing solely wind and solar power. Ensuring that the power generated aligns ...

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Optimizing Cooling Systems for Wind Turbine Components

Conclusion The optimization of cooling systems for turbine components is a vital element in the evolution of wind electric power generation. Through thoughtful engineering, advanced data ...

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An innovative cryogenic system for cooling ...

Jul 23, 2024 · Cryogenically cooled wind power generators have already been demonstrated on MW-scale, near-shore wind turbines (see ref. 1 & 2 below). But off-the-shelf small cryocoolers ...

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Evaluating the dynamic behaviour of wind-powered ...

Oct 1, 2022 · Looking for an alternative renewable energy source to meet the energy demand of refrigeration and air conditioning systems has been a matter of high priority. The current study ...

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Fabrication Of A Wind Power Refrigeration System Using ...

Dec 23, 2024 · The cooling influence Thermoelectric refrigeration system is larger than COP of



a single stage thermoelectric refrigeration system; however maximum rate of refrigeration is ...

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