

Heat exchange of wind turbine generator set

How does a wind turbine generate electricity?

A wind turbine's generator is its core component, converting the rotational energy of the wind-driven rotor into electrical energy. This generated electric power is what the wind turbine system feeds into the grid. The process of generating electricity inevitably results in heat loss, causing the generator's copper windings to heat up.

What is an active air cooling system inside a wind turbine nacelle?

An active air cooling system inside a wind turbine nacelle features an air-to-air heat exchanger for managing heat in the generator (Vensys). This system is crucial for managing the increasing heat within the wind turbine's limited nacelle space, despite efficiency improvements.

How does a wind turbine convert kinetic energy to heat?

When converting between different forms of energy, a part of the available energy is lost, often as heat. In a wind turbine, kinetic energy is converted to electrical energy and the losses are transferred into heat. Generally, larger generators create more heat than smaller versions.

How does a generator heat exchanger work?

The circulating fan extracts the hot air inside the generator through the pipeline into the heat exchanger of the device, and the external circulation fan sends the cold air outside the cabin to the heat exchanger for hot and cold exchange.

How does a permanent magnet wind turbine cooling system work?

The measurement and control system in the cooling control cabinet of the permanent magnet wind turbine cooling system uses Siemens PLC as the control core. The PLC processes the signals collected by the sensor and monitors the generator cooling system in real time.

How is a wind turbine cooled?

Wind turbines are typically cooled by enclosing the generator in a duct and using a large fan for air cooling. Some manufacturers offer water-cooled generators that require a radiator in the nacelle to void the heat from the liquid cooling matrix. (On most wind turbines this cooling is accomplished...)

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