

# Semi-direct drive wind power generator

What is direct drive wind turbine?

Direct drive wind turbine adopts multi-pole structure, which can achieve the direct coupling between the wind turbine and generator, so the gearbox can be omitted ,,,

What is direct drive permanent magnet synchronous wind turbine?

With the continuous progress of power electronic technology and computer control technology, large-scale wind turbine can use the technology of direct driven permanent magnet wind turbines. Direct drive permanent magnet synchronous wind turbine is characterized by low speed and high torque requirements,,,

Are 15 MW permanent magnet synchronous generators suitable for medium-speed wind turbines?

In this paper, preliminary design optimization of 15 MW permanent magnet synchronous generators (PMSG) for medium-speed wind turbine is proposed. It aims to eval

How big is a direct drive afpmg wind turbine?

However, the outer diameter of the generator is as high as 4.8 m. Kobayashi H et al. [8] designed a 6.5 MW direct-drive AFPMG, which has a diameter of 10 m. Too large radial dimensions has become an urgent problem for direct drive AFPMG wind turbine.

Which synchronous wind turbine design scheme has the least use of permanent magnets?

The electromagnetic design scheme of 50 poles and 180 slots has the least use of permanent magnets and the lowest cost. It can be selected as the best scheme for the production of the 1.5 MW semi-direct drive permanent magnet synchronous wind turbine. Table 2.

What is the frequency of a semi-direct drive generator?

Considering the higher speed of the semi-direct drive generator, the pole pairs of the generator designed in this paper is 16, and the corresponding frequency is 80 Hz.

In addition to supporting the turbine rotor, some direct-drive configurations require the main bearing to also support the generator rotor while maintaining an appropriate generator air gap. Coupled approaches to the modeling and assessment of wind turbine ... although the O& M cost impact for wind turbines can be more severe. For gearboxes, the ...

The semi-driven wind turbine combines the advantages of the direct-driven and doubly-fed generators, such as fast speed, small size and compact structure, that makes semi-direct-drive wind turbines more versatile and efficient for a wider range of uses [2 - 4]. However, the gearbox is driven by mechanical contact gears.

This article is based on a 12 MW high-power offshore semi direct drive permanent magnet synchronous wind generator as the research object. A cooling system with external casing water cooling and internal ventilation

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cooling of the rotor is designed, and 3D finite element calculation method is used to analyze and calculate the flow field and temperature ...

2 Generally, direct-drive generators are mostly custom built with the rest of the wind turbine and generator design standards such as the IEC 61400-1 or national derivations thereof are applied. Typical megawatt direct-drive permanent magnet (PM) generators have mean air-gap diameters (  $D_{\text{airgap}}$ ) between 4-6 m.

PDF | On Jan 1, 2021, Jungang Wang and others published Analysis of Electromagnetic Performance of Modulated Coaxial Magnetic Gears Used in Semi-Direct Drive Wind Turbines | Find, read and cite ...

DOE is funding projects to develop high-efficiency, lightweight wind turbine generators, all of which are developing direct drive technologies. Two of these generators are "superconducting" and do not use permanent magnets or rare earth materials.. Regardless of whether it's direct drive or geared, these components are massive (200-320 tons for a 10 ...

Partially superconducting direct-drive wind turbine generators with high-temperature superconducting excitation winding enable an increase of the rated unit power, higher efficiency, and a high, adjustable power factor. The high excitation ampere-turns allow for iron topologies that differ from conventional permanent magnet-excited generators. This study ...

Little over a year after Siemens erected its first 3.6-MW direct-drive "Proof of Concept" wind turbine, this November the company presented a new rather different 3-MW direct-drive concept. RenewableEnergyWorld was exclusively invited to the Brande HQ in Denmark to view the prototype and discuss the new turbine with Siemens CTO Henrik Stiesdal. A ...

In a significant leap for renewable energy, the world's largest offshore wind turbine, an 18-megawatt semi-direct drive unit, has been successfully installed at the coastal wind power test base in Shantou City, Guangdong Province. This groundbreaking installation sets a new global benchmark in offshore wind power capacity.. World First 18MW semi-direct-drive ...

The FR and RR are horizontally coaxially placed and connected to a dual rotor permanent magnet synchronous generator (DRPMSG) by two semi-direct drive gearboxes respectively. DRPMSG is connected to the power grid through a three-terminal converter. ... A semi-direct drive series dual-rotor wind turbine generator system (2021) CN214304168U ...

In this paper, the key design technology of direct drive permanent magnet synchronous wind turbine, especially the semi-direct drive permanent magnet synchronous wind turbine with primary gear is ...

Optimization of wind turbine generators can not be realized without considering mechanical, structural, hydraulic and magnetic performance of the drive train. An overview of the drive train technologies is illustrated in Fig. 5 for compari- ... oDirect drive: any drive train without a gearbox and low speed generator

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with many pole pairs ...

The semi-driven wind turbine combines the advantages of the direct-driven and doubly-fed generators, such as fast speed, small size and compact structure, that makes semi-direct-drive wind turbines more versatile ...

Direct-drive wind turbines have been implemented in offshore wind developments contributing to a wide range of advantages, such as overall mass reduction, simplification of the structure and compactness. ... Fig. 1 depicts a typical wind turbine direct driven powertrain configuration with a permanent magnet electrical generator, "PM". In ...

Fig. 1. We choose to model select topologies of direct-drive superconducting generators and PMSGs and optimize them for fixed-bottom and floating wind turbines at five different ...

The "Advanced High Density" direct drive PMG, supplied by power conversion specialist Converteam, is a more compact and lightweight design compared to earlier generation direct drive systems [origin: ]. 4.7 InnoWind. InnoWind has been working on new solutions for direct drive wind turbine for 20 years.

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