Rotor and stator in wind power generation

How does a rotor winding work?

As the wind speed increases, the rotational speed must also increase to maintain optimum tip-speed ratios. In such circumstances, the machine operates at super-synchronous speeds (s < 0). The mechanical power flows to the grid through both the stator windings and the rotor windings and their converter.

Should a stator winding be connected to a series Star design?

The stator winding should be connected to a hybrid delta star designwith series delta at moderate speed and series star at lower speed,using a switching converter if the wind speed is higher. Overall block diagram of proposed switching converter

Does a Delta-Star stator winding save power?

Kumaresan N, Subbiah M (2003b) Innovative reactive power saving in wind-driven grid-connected induction generators using a delta-star stator winding: part II estimation of annual Wh and VARh of the delta-star generator and comparison with alternative schemes. Wind Eng 27 (3):195-204

How to change stator winding?

The stator winding switching converter and the switching controller must be designed for changing this stator winding. MATLAB was used to program the controller algorithm on the Arduino platform. A firing scheme for the generator for the TRIAC unit converter has also been demonstrated.

How does a wind generator work?

An adequate value of excitation capacitor is employed to generate the rated voltage in the absence of a load. The controller is equipped with a speed sensor to track how the generator's speed varies with wind speed. The stator winding connection is altered by the controller algorithm based on wind speed.

Can brushless doubly fed generators penetrate offshore wind power generation?

This study presents a novel brushless doubly fed generator (BDFG) with the hybrid rotor, which has several outstanding advantages, so as to penetrate into large-scale offshore wind power generation. In this study, the magnetic field modulation of the hybrid rotor is studied in detail.

where represents the stator and rotor mutual inductance; ... The power generation capacities in PDS and OPDS are compared in the normal condition. There is no fault in all WTs in this case. ... OPDS reduces the wake from the upwind WT by reducing the power reference. The wind velocity deficits of the downwind WTs are reduced so that more power ...

In this paper, a deflection type dual-stator switched reluctance wind power generator is proposed. This kind of generator can effectively improve the power generation efficiency ... the outer side of the rotor. The stator

structure of the generator consists of inner sta-tor and outer stator, both of which have 12 teeth and have centralized ...

Induction Generator in Wind Power Systems Yu Zou ... is applied to both rotor- and stator-side converters to achieve desirable control on voltage and power [6,7]. In this chapter, a brief introduction of wind power system is presented first, which is ... The controlled rotor power must be dissipated by heat in the resistor c. Still need ...

In, Li et al. presented an outer-rotor Vernier PM machine with a toothed-pole stator for wind power generation, as shown in Figure 7(d), whose stator tooth is split into three small teeth at the end. It was shown that these outer-rotor Vernier PM machines can offer low-speed operation to directly capture wind power and enable high-speed rotating field design to ...

The description of the information given in Fig. 1 is as follows: (a) the rotor spindle diameter, (b) the stator outer diameter, (c) the angle between poles, (d) the stator inner diameter, (e) the upper distance between the stator ...

Variable speed operation of the DFIG wind turbine based on the active and reactive power abilities, lower cost of the converter and power losses are decreased as compared to wind turbine by using the fixed speed generator. Variable speed wind turbines with the new standards are effective because of their improved efficiency in capturing more ...

A Unified Architecture for Doubly Fed Induction Generator Wind Turbines using a Parallel Grid Side Rectifier and Series Grid Side Converter Patrick S. Flannery Giri Venkataramanan ... A detailed schematic of the three phase power converters, stator and rotor windings of the DFIG, and the interconnection transformer is shown in Fig. 3. As may be

The speed regulating wind turbine adopts the principle of direct grid connection of generator similar to traditional hydropower and thermal power generation, that is, the speed ...

Recent surveys of wind power plants have reported several failures including internal generator (stator and rotor), electrical system, control system, drive train, sensors, gear box, mechanical brake, hydraulics, yaw system, structure, hub and blades/pitch faults [].Generally, the main faults of electrical machines (DFIG) can broadly be classified as stator winding faults, ...

In, Li et al. presented an outer-rotor Vernier PM machine with a toothed-pole stator for wind power generation, as shown in Figure 7(d), whose stator tooth is split into three small teeth at the end. It was shown that these ...

Currently, among the topologies of wind energy conversion systems, those based on full power converters are

growing. The permanent magnet synchronous generator (PMSG) uses full power converter to allow ...

Distributed wind power generation systems often require a novel approach in generator design. In this paper, prototype development of axial-flux generator with a counter-rotating field and ...

The RSC provides a magnetising current to the rotor windings and controls both active and reactive power at the stator terminals. Furthermore, the RSC controls the stator active power to extract the maximum possible ...

Wind power is the fastest growing renewable energy and is promising as the number one source of clean energy in the near future. Among various generators used to convert wind energy, the induction generator has attracted more attention due to its lower cost, lower requirement of maintenance, variable speed, higher energy capture efficiency, and improved ...

The generator rotor is the central rotating component that consists of a magnet or field winding. It is responsible for converting mechanical energy, such as that from an engine or turbine, into electrical energy through the principle of electromagnetic induction. The generator stator surrounds the rotor and houses the stator windings. These ...

This paper proposes an indirect vector control strategy less sensitive from the machine parameters than the conventional scheme [8].Voltages are referred to a q - d synchronous frame, aligned with the rotor flux vector, for the stator-side converter. The grid-side converter is controlled by means of vector control strategy decoupling active and reactive power.

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