

## 电网故障下双馈感应式风力发电系统的无功功率控制策略

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摘要

双馈感应式风力发电机已逐步成为风力发电的主流机型, 通常情况下双馈感应式发电机组采用单位功率因数运行的无功功率控制策略。电网发生故障后会导致发电机端电压下降, 此时传统的单位功率因数运行方式可能无法保持系统稳定运行, 需要风力发电场向系统提供无功功率以帮助系统恢复稳定运行。文中以一座由双馈感应式风力发电机组成的9 MW风电场为例, 在电网电压下降为正常水平15%的情况下, 分别对保持单位功率因数运行和利用网侧变换器进行无

功补偿的控制策略进行了仿真分析, 仿真结果表明, 故障清除后通过双馈感应式风力发电机的网侧变换器对电网进行无功支撑可以明显增强系统恢复稳定运行的能力。

关键词 [风力发电](#); [变速恒频](#); [双馈感应式发电机](#); [电压跌落](#); [风电场](#)

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### Reactive Power Control Strategy for Doubly-Fed Induction Wind Power Generation System Under Fault in Power Network

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Abstract

Doubly-fed induction generator (DFIG) is progressively becoming the mainstream of wind power generation, commonly the reactive power control strategy using unity power factor is applied to DFIG units. The power system fault makes terminal voltage of DFIG descended, so the traditional unity power factor operating mode may not maintain the stable operation of power system this moment and it is needed to provide reactive power by wind farm to help power system to recover stable operation. In this paper, taking a 9 MW wind farm consisting of DFIG units for example, the simulation of the two situations, i.e., keeping the unity power factor operating mode and the control strategy using grid side converter to implement reactive power compensation, is respectively conducted under the condition that the network voltage descends to 15% of rated voltage. Simulation results show that when power system fault is cleared, the reactive power support provided by grid side converter of DFIG units can enhance the capability of recovering stable operation of power system obviously.

Key words [wind power generation](#); [variable-speed constant-frequency \(VSCF\)](#); [doubly-fed induction generator \(DFIG\)](#); [voltage-dip](#); [wind farm](#)

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