

***Abstract: A Novel NDZ-free Anti-islanding Method for Three-phase PV-AF Power Generation System***

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**Abstract**

Islanding is a condition which a distributed power generation system (DG) continues to energize a local load after the system has been disconnected from the utility grid. The unintentional islanding may result in a safety hazards for personnel and damage to the power system. For these reasons, anti-islanding protection is required. Several active type of conventional anti-islanding protection methods still have the power quality problems caused by the reducing of the non-detection zone (NDZ).

This paper proposes a novel NDZ-free anti-islanding method for three-phase PV-AF (Photovoltaic system in which shunt active power filter (AF) function is included) power generation system. If the PV-AF system is disconnected from the utility under the power matching condition, the PV-AF system increases the compensation component as much as the inverter system required, and the AF function compensates the detected harmonic components repeatedly. Therefore, the harmonic components will be increased dramatically, and eventually results in the frequency variations and voltage distortions through which the islanding can easily be detected without causing any power quality problems during normal state.

The effectiveness of the proposed anti-islanding method is demonstrated through both the simulation results by PSCAD/EMTDC and the experimental results with a 1-kW three-phase inverter using an intelligent power module and the TMS320F2812 (150-MHz-class microcontroller). The simulation results by PSCAD/EMTDC are well coincided with the real experimental results.

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