

Design and Implementation of a 3KW Single-Phase Grid-Connected Photovoltaic Inverter Using Hysteresis Current Controlled Method

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Photovoltaic solar system is a power conversion system in which the solar energy could be converted and captured through solar cells and imposed to power network. Traditionally these solar modules should be directly connected to power lines; whereas the form of output current in solar cells is DC. So a DC to AC conversion mechanism appears necessary. Despite many empirical research works with different approaches, new efficient techniques for energy conversion in solar systems seem necessary in power engineering yet.

In this research work, we have developed and implemented a new 3 K-Watt DC-AC inverter with hysteresis current control approach. Proposed method comprises Full Bridge Converter, Single Phase Inverter and MPPT. In this method to control output current, a sinusoidal reference voltage have been generated using power line and compared with a flexible hysteresis band. It means the output current has to be regulated in a specific band over sinusoidal reference signal. Whenever output current exceeds upper band of hysteresis or decreases to lower band, some DC-DC full-bridge switches would be switched on which regulates output current.

The main advantage of proposed method is the fact that switching frequency follows a flexible strategy which enables the possibility of smaller size transformers. Also a dead time controller has been developed and implemented. The proposed controller shows a theatrical reliable system.