

Single-phase single stage string inverter for grid connected photovoltaic system

ABSTRACT

This paper presents the development of single-phase single stage string inverters for grid connected photovoltaic system. The inverter is designed to generate an AC current in phase with the grid voltage and to extract the maximum power from the PV array. The maximum power point tracking (MPPT) is achieved by adjusting the modulation index and phase angle of the inverter's voltage accordingly using fuzzy logic control algorithm. The prototype system is tested using 2 series of STP170s-24/Ac PV modules. Insulated Gate Bipolar Transistors (IGBTs) are used as power switches while the Sinusoidal Pulse Width Modulation (SPWM) scheme is used as the switching technique to synthesize the output waveform. Simulation model was developed in MATLAB/Simulink environment to study and evaluate behavior of the proposed converter. The results of the prototype system show good agreement with the simulation model.

Keyword: Inverter; Maximum power point tracking (MPPT); String inverter; Photovoltaic (PV); Grid connected photovoltaic (GCPV)