Grid-connected inverter application type

Overview

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This reference design implements single-phase inverter (DC/AC) control using a C2000TM microcontroller (MCU). The design supports two modes of operation for the inverter: a voltage source mode using an output LC filter, and a grid connected mode with an output LCL filter. High-efficiency, low THD.

Grid-Following Inverters (GFLI) and Grid-Forming Inverters (GFMI) are two basic categories of grid-connected inverters. Essentially, a grid-following inverter works as a current source that synchronizes its output with the grid voltage and frequency and injects or absorbs active or reactive power.

There are two main requirements for solar inverter systems: harvest available energy from the PV panel and inject a sinusoidal current into the grid in phase with the grid voltage. In order to harvest the energy out of the PV panel, a Maximum Power Point Tracking (MPPT) algorithm is required. This.

This application note describes the implementation of a 250 W grid connected DC-AC system suitable for operation with standard photovoltaic (PV) modules. The design is associated to the STEVAL-ISV003V1 demonstration board which demonstrates the possibility of implementing a full microinverter.

A grid converter, also known as a grid-tied inverter or power conditioning system, serves as the necessary electronic interface for these sources. It is designed to take the raw electrical output from a generator, like a solar array or a battery system, and transform it into the precise alternating.

Events: grid-connected, unplanned islnding at 10 s, planned reconnection at 15 s, reconnect to the grid. Both have smooth transients. Strategy II has slightly better transients in the output current. Strategy I has better transients in frequency, output current, and power. Strategy I reaches steady.

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