Document details

Journal of Physics: Conference Series
Volume 949, Issue 1, 2 January 2018, Article number 012020
4th International Conference on Mathematical Applications in Engineering 2017, ICMAE 2017; Faculty of Engineering, International Islamic University MalaysiaKuala Lumpur; Malaysia; 8 August 2017 through 9 August 2017; Code 133244

A PWM Controller of a Full Bridge Single-Phase Synchronous Inverter for Micro-Grid System (Conference Paper)

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Abstract

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Nowadays, microgrid system technology is becoming popular for small area power management systems. It is essential to be less harmonic-distortion and high efficiency of the inverter for microgrid applications. Pulse width modulation (PWM) controller is a conventional switching control technique which is suitable to use in the microgrid connected power inverter system. The control method and algorithm of this technique are challenging, and different approaches are required to avoid the complexity for a customized solution of the microgrid application. This paper proposes a comparative analysis of different controller and their operational methods. A PWM controller is used to reduce the ripple voltage noise while a continuous current mode provides a small output ripple which gives steady-state error as zero on fundamental and cutoff frequency. To reduce the ripple current, higher frequency harmonic distortion, switching loss and phase noise, LC low pass filter is used on either side of input and output terminals. The proposed inverter is designed by MATLAB 2016a simulation software. A balanced load resistance (RL = 20.5 Ω) of star configuration and a dual input DC voltage of ± 35V are considered. In this design, the circuit parameters, the fundamental frequency of 50 Hz, the PWM duty cycle of 95%, the cutoff frequency of the switching controller of 33 kHz are considered. The inverter in this paper exhibits THD of 0.44% and overall efficiency approximately of 98%. The proposed inverter is expected to be suitable for microgrid applications. © Published under licence by IOP Publishing Ltd.

Indexed keywords

Engineering controlled terms: Computer software, Cutoff frequency, Efficiency, Electric inverters, Harmonic distortion, Low pass filters, MATLAB, Pulse width modulation, Voltage control

Compendex keywords: Comparative analysis, Continuous current modes, Customized solutions, Fundamental frequencies, Higher-frequency harmonics, Power management systems, Pulse width modulation controllers, Switching controllers

Engineering main heading: Controllers

Funding details

Funding number	Funding sponsor	Acronym
FRGS15-190-0431	Ministry of Education	MOE

Funding text

This research has been supported by the Malaysian Ministry of Education through the Fundamental Research Grant Scheme under the project ID: FRGS15-190-0431.

ISSN: 17426588
Source Type: Journal
Original language: English
DOI: 10.1088/1742-6596/949/1/012020
Document Type: Conference Paper
Volume Editors: Ural B.,Rakhimov A.,Daoud J.I.,Saburov K.,Chowdhury M.S.H.
Sponsors:
Publisher: Institute of Physics Publishing

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