

PERPUSTAKAAN UMP



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SOLAR POWER INVERTER

MOHD HAFIZUDDIN BIN MOHAMED ARIFFIN

**A Report Submitted In Partial Fulfillments of the Requirement of the Degree of
Bachelor of Electrical Engineering (Power System)**

Faculty of Electrical Engineering

University Malaysia Pahang

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LIST OF ABBREVIATIONS

WORD	DESCRIPTION
AC	Alternate Current
DC	Direct Current
LED	Light Emitting Diode
OS	Operating System
PWM	Pulse Width Modulation
PCB	Printed Circuit Board

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ABSTRACT

The solar power inverter is the one of the critical component in a solar system that has been developed. It is highlights the aspects of power electronic packaging concerning functional and packaging integration in solar inverter technology. Basically, it performs the conversion of the variable DC output of the Photovoltaic (PV) module(s) into a clean sinusoidal 50- or 60 Hz AC current that is then applied directly to the commercial electrical grid or to a local, off-grid electrical network. Communication capability is also included so that the user can control or monitor the inverter. The user also can report on power and operating conditions provide firmware updates and control the inverter grid connection. For systems with battery energy storage, the controller can control the charging as well as switch over to battery power once the sun sets or cloud cover reduces the PV output power. The controller executes the very precise algorithms required to invert the DC voltage generated by the solar module into AC. This controller is programmed to perform the control loops necessary for all the power management functions necessary including DC/DC and DC/AC.

ABSTRAK

Penyongsang kuasa solar adalah salah satu komponen penting dalam sistem solar yang telah dibangunkan. Ia menekankan aspek kuasa pembungkusan elektronik mengenai integrasi berfungsi dan pembungkusan dalam teknologi penyongsang solar. Pada asasnya, ia melakukan penukaran keluaran arus terus (DC) ubah fotovoltai (PV) modul ke dalam yang bersih sinusoidal 50 - atau 60 Hz AC semasa yang kemudian digunakan secara langsung ke dalam grid elektrik komersil atau untuk tempatan, luar petak rangkaian elektrik. Keupayaan komunikasi juga dimasukkan supaya pengguna boleh mengawal atau memantau penyongsang. Pengguna juga boleh melaporkan kepada kuasa dan keadaan operasi yang menyediakan kemas kini peralatan tegar dan mengawal sambungan grid penyongsang. Bagi sistem dengan penyimpanan tenaga bateri, pengawal boleh mengawal caj serta beralih kepada kuasa bateri sebaik sahaja matahari terbenam atau litupan awan mengurangkan PV kuasa keluaran. Pengawal melaksanakan algoritma yang sangat tepat yang diperlukan untuk menukarkan voltan arus terus (DC) yang dihasilkan oleh modul solar ke arus ulang alik (AC). Pengawal ini diprogramkan untuk melaksanakan kawalan gelung perlu bagi semua fungsi pengurusan kuasa yang perlu termasuk DC / DC dan DC / AC.

CHAPTER 1

INTRODUCTION

1.1 Solar Energy

Alternative energy is one way to solve the problems occurring in recent years. Solar power is one of the alternative energy. The development on the use of solar power has also opened minds scholars to investigate more deeply on the factors necessary to solar energy. Solar energy is vital to support life on earth, it helps to grow our food, light our days, influence weather patterns, provide heat, and can be used to generate solar electricity. Solar electricity relies upon man-made devices such as solar panels or solar cells in order to provide a source of clean, and low cost renewable energy. As solar energy technologies become more advanced, we are able to exploit the energy that received from the sun to provide a greater, significant amount of electricity.

Solar energy is becoming a popular energy source due to the fact that it is the most abundant and most cost effective energy source on the planet. Put simply, solar energy is energy derived from the sun, and this energy is not only clean, but renewable and costs nothing. Solar energy is created when the power of the sun is harnessed in order to produce energy.

It is said that the amount of energy that the Sun provides to the Earth in a single day can power the entire planet and all of its energy needs for a whole year. Because solar energy is available as long as the Sun is available, it is also considered a renewable source of energy. It is a clean source of energy as well, due to the fact that it does not produce byproducts or pollutants that will harm the environment.

Today's technology allows for the harnessing of solar energy through cells known as solar cells. These are also called photovoltaic cells. Photovoltaic cells are placed in direct sunlight and as the sun hits these cells, a chemical reaction takes place to produce electric currents. These currents are then converted into electricity that can be used to power everyday items or even households.

However, solar energy requires a stable quantity of light throughout the year. For example, the country's solar energy needs are as auxiliary power for the people who live in the city instead of the population living in rural areas it is a priority because of its distance away from the power plant or generation.

1.2 Overview of the project

Generally, the importance of solar power has been explored and the various ways and methods have been used to produce the solar power. However, the power generated is direct current form and must be converted to alternating current for various uses. For example, to set the 100W motor must use alternating current. So, to turn on the motor, direct current needs to be converted first to an alternating current. That converter is known as inverter. The function of the inverter is to convert the direct current to alternating current.

1.3 Objective

The main objective of this project is to develop and design DC to AC power inverter.

1.4 Problem Statement

The main problem statement is the increasing of the amount of power consumption especially for people living in rural areas where power plant or generation cannot get there. Meanwhile, the urban population and industrial also was to find ways to reduce the high cost of living is through the use of electricity.

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