
SOLAR BASED HYBRID SOLAR INVERTER – AN OVERVIEW

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ABSTRACT

Inverters are generally utilized in the home-grown as well as modern conditions to act as second line of source in the event of force cut structure the power utility lattices. Notwithstanding, because of low limit of the battery the inverter ceases to exist with the utilization of weighty burden apparatuses. This venture is planned so that it conquers this limit utilizing sun based energy. Cross breed Inverter with Sun based Battery Charging Framework comprises of an inverter controlled by a 12V Battery. This inverter creates up to 110V AC with the assistance of driver hardware and a weighty burden transformer. This battery gets charged from two sources, first being the mains power supply itself. In the event that the mains power supply is accessible, the transfer changes to the association utilizing mains power supply to supply to the heap. This power supply additionally charges the battery for involving it as back up whenever there is blackout. The utilization of sun powered charger to charge the battery gives an extra benefit of excess power in the event that the blackout of mains is dragging out. Hence, this inverter can keep going for longer length's and give continuous power supply to the client.

Keywords: Hybrid Inverter, Solar Charger, Battery.

I. INTRODUCTION

Nowadays, the renewable energy resources are taking a leading role. One of them is solar, from the past few years the industries, hospitals, educational institutions and shopping malls depends on the diesel generator set as an auxiliary supply. In case of power failure, these diesel engine drive generator set are not economical as the cost of fuel, maintenance and efficiency considerations made them to be worst and later on some of the industries adopted the emerging technology the solar to have a compensation of all these factors. At present, all the consumers irrespective of loads have adopted the solar panels. The solar panels works efficiently only during day light time and it cannot deliver power on a cloudy or rainy day as that on a sunny day. So, the solar panels are chosen to deliver at day time and the remaining time the load is energized by the grid. Such that the load utilizes solar and at times by delivering it to the grid too. It is fine but the major problem arises here while utilizing this solar power to the confined loads through the same bus which is also fed from the grids. When there is excess generation of power through panels, it send back to the grid and at low power generation during rainy and cloudy days the loads are powered with the grids. This paper helps in protecting the load when there is no sufficient power supplied from solar panels. The load is altered between solar and grid connected modes based on the incoming voltage levels, Electrical energy is generated at reasonable size and transmitted in the bulk form such that many grids connected to this to achieve a reliable and efficient system to the consumer. The instantaneous power demand by the consumers is satisfied by the power generation during peak loading and this is achieved through generation of power through nonrenewable resources with instantaneous output at the consumer end. This cause a severe crisis on the future needs so the present power demand and future needs are to be satisfied by having an alternate resource as renewable energy resource. The renewable resources are the sources which are perennial so their use in generation has to be encouraged from the consumer side.

Microgrid: It is a small-scale power grid that can operate autonomously with the area's main electrical grid. A normal grid is the Power Grid has a centralized generating station with a very large power generation capacity. Whereas a Microgrid is a comparatively small grid and has decentralized energy generation units like solar,

wind, biogas etc. . It can be islanded in case of failure of power grid. Operating modes of Microgrids: Microgrids can be operated in two modes. (A) Grid connected mode (B) Solar mode.

Grid Connected Mode: A grid connected system allows you to power your home or small business with renewable energy during those periods when the sun is shining . Any excess electricity you produce is fed back into the grid . When renewable resources are absent, electricity from the grid supplies the requirements, reducing the expense of electric storage devices like batteries.

II. RESEARCH METHODOLOGY

A single phase full bridge inverter converts DC power to AC power. For this mainly four switches are required. Switches are triggered with a very high frequency. Output voltage waveform follows the switching pattern. Depending on the load characteristics the current waveform varies. For resistive load current will be in same phase with voltage, it will be lagging for inductive load and leading for capacitive load.

III. HARDWARE USE

- Arduino nano : Digital programmable microcontroller use for control relay as per the voltage levels
- LCD : 16x2 LCD Use to display the status
- Relay : 5V SPDT relay use to switch the load from grid and inverter
- Solar Panel : 5 W 9V DC
- Battery : Lithium Ion 12V 22000mAH
- Inverter : 50 W CFL inverter

Software Use

Arduino IDE for programming Arduino nano

IV. SOLAR BASED POWER INVERTER

At the point when there is adequate solar based energy, the inverter is utilized to switch the sun powered energy over completely to the heap straightforwardly. At the point when there is inadequate sun oriented energy, the inverter will utilize the battery to supply capacity to the heap. At the point when the sun's beams communicate with the photovoltaic framework, electrons start to move, delivering direct current. Sun based power frameworks are one of the power frameworks where sun oriented energy consumed by sunlight powered chargers is switched over completely to coordinate current. The home apparatuses significantly work on single stage ac supply [4]. To deliver ac supply, a solar based inverter is utilized which changes over factor dc yield of a photovoltaic sunlight based charger into exchanging current. This air conditioner power then, at that point, can be taken care of into your home to work your machines. The abundance power can be taken care of into the matrix (electrical power lines) or into home battery stockpiling. Fig.1-Inverter block outline.

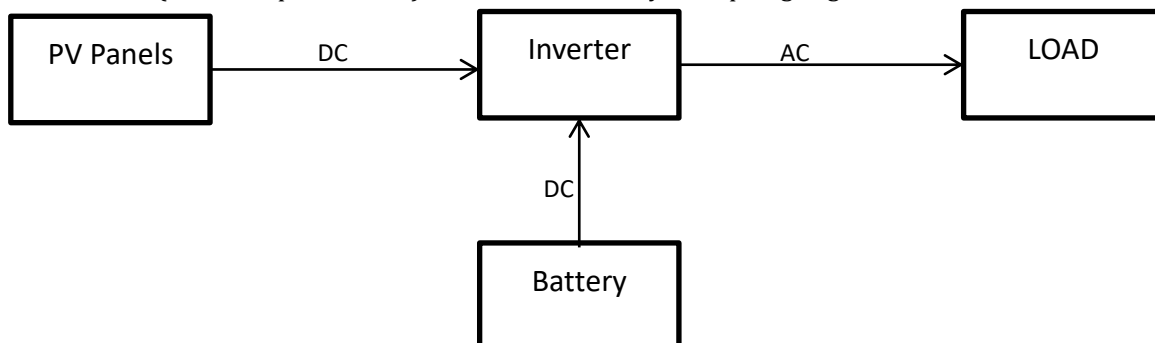


Fig.1: Block Diagram of Solar based Power Inverter

V. IOT BASED SOLAR BASED POWER INVERTER

To make the solar powered inverter easier to understand remote innovation is included the customary circuit. There are different remote innovations accessible like Zigbee, Wifi, Bluetooth, GSM, and so forth. Wifi can be effortlessly thought to be as it's modest and truly versatile for home mechanization. The gadgets like PCs,

tablets and telephones can be effortlessly associated with wifi and can be handily observed. In any case, any two equipment parts can be associated together utilizing remote advances.

VI. DESIGN TECHNIC

The proposed paper involves two main areas. First is power electronics where solar power inverters are used to generate alternating current. It consists of different components like photovoltaic cell, battery, inverter, filter circuits and other electrical components which convert direct solar or battery based electricity into alternating current which can be used for domestic home appliances or industry [3]. Secondly smart solar inverter is used with Grid to the inverter like power usage and with different load activation. For this functionality devices like arduino controller, ESP8266 wifi module, crystal oscillator, lcd and so on are incorporated. These are used to provide comfortable and effortless output to the user about inverter operating time, load consumption, battery used etc[Bhambulkar, A.V. ,2011;Ganorkar R. A. et al. ,2014;Rahul Mishra et al.,2013;John, B, 2012].

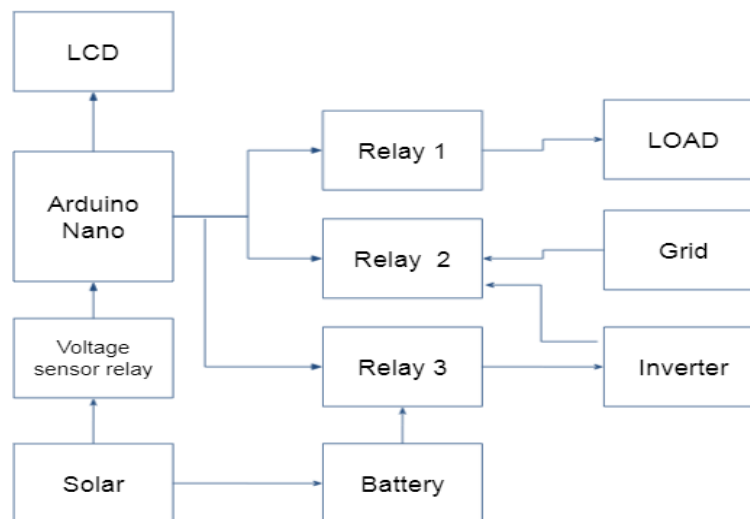


Fig.2: Block Diagram IOT Based Solar based Power Inverter

VII. CONCLUSION

The sun being the incomparable power, everybody has boundless admittance to its energy. Thus, gathering this limitless asset of energy will make us free of energy somewhat. Going the sunlight based way will not take a lot to begin with at first, at least at a miniature level, this would save and put less tension on the power networks and diminish power utilization bills. The said solar based energy can be outfit with the assistance of inverters and can be monetarily accessible to each family. This would likewise lessen the reliance on petroleum derivative energy which is non-sustainable and furthermore has higher fossil fuel by products.

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