# Solar Inverter with Grid Power Generation

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**Abstract**
Power can be generated from either renewable or non-renewable sources. Renewable sources are liked to maintain a strategic distance from contamination emanation and rely on upon fossil energizes which is decreasing day by day. The proposed sun powered vitality transformation unit comprises of a sun oriented exhibit, Bidirectional DC-DC converter, single stage inverter and AC. The inverter changes over DC control from the PV board into AC power and offered it to the heap which is associated with the lattice. The photovoltaic sun powered vitality (PV) is the most direct approach to change over sunlight based radiation into power and depends on the photovoltaic impact. The most extreme power point following of the PV yield for all daylight conditions is a key to keep the yield control per unit cost low for fruitful PV applications. Framework associated PV frameworks dependably have an association with people in general power matrix by means of an appropriate inverter in light of the fact that a PV module conveys just dc power. This project presents the new design, Development and Performance Analysis of a Grid Connected PV Inverter. Demonstrate that the proposed framework can lessen the Energy Consumption radically from the power board and give a solid support to the Grid.

***Keywords:***
*Renewable energy, powered vitality(PV)*

## I. INTRODUCTION

Vitality request in India both in urban and provincial ranges in cease Lesley expanding, however the power utilities can't meet this quickly expanding request. This is the motivation behind why the vast majority of the business structures, for example, doctor's facilities, workplaces, shopping centers and so forth and additionally private structures in the nation are settling on move down power frameworks. These move down control frameworks are normally diesel generators and some of the time more than one generator is introduced to take care of their power demand .With increasing expenses and natural mindfulness, a large number of these structures are choosing Solar Photovoltaic (SPV) frameworks as go down power so as to decrease their reliance on diesel generators. These SPV frameworks which change over daylight into power, are normally introduced on the current rooftop best space of structures to meet the base load necessity. Arum of the mill rooftop beat SPV framework comprises of all or some of the accompanying segments relying upon its sort: Photovoltaic modules Charge controllers Inverters Module mounting structures Departure switchyard Wires Metering framework Aside from these segments, an essential pre requisites accessibility of sans shadow rooftop best space. Least shadow free territory required to introduce a common 1kW framework on housetop is around 30 sq. m. There are two sorts are such rooftop beat SPV frameworks framework free frameworks and matrix associated frameworks. Lattice free frameworks accompany either with or without battery move down. Batteries are utilized to store the abundance power produced amid the day to be utilized around evening time or when inadequate sun oriented power is produced because of overcast cover and so forth. Given underneath is arum of the mill delineation of battery go down sunlight based rooftop beat framework. Batteries are regularly not decided on as - they are costly requiring high speculation furthermore they have to be intermittently supplanted. Thus, contingent upon the size of the framework and its necessity, a building picks for a battery move down framework or without battery reinforcement. In the second case, the framework is by and large estimated with the end goal that power created amid the day from this SPV is used to meet its energy prerequisite and the night time or when there is insufficient power generated, electricity is drawn from the grid or diesel generator.

## II. LITERATURE SURVEY

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## III. System Architecture

The overall architecture of proposed system is shown in Fig 1. Bifacial solar cell are used to receive maximum radiation from the sun which produces more amount of power from the solar cell.

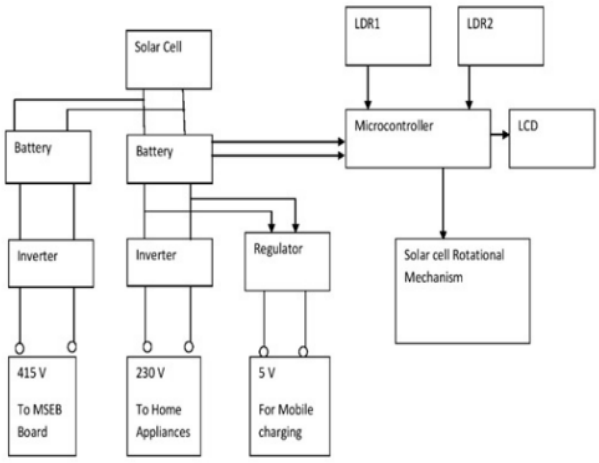


Fig. 1. System Architecture

Two batteries are implemented among which one Battery is for Home appliances and other is for MSEB Grid. One Inverter is for to change the solar cell DC voltage to 415 V AC for MSEB Grid and it can produce 50Hz frequency and other is for 230 V for Home and to produce 50Hz frequency. The supply output from inverter is processed by the MOSFET for amplifying the current to some specified range so as to get the required values of the voltage from the transformer. Two step up transformer are used in which one gives 230v and another gives 410v.

For Charging of Mobile we require 5 V DC output. Here we are used 7805 regulator which gives 5 V as output. LDR1 LDR2 is used to detect the position of the Sun. LDR convert the light intensity into Resistance and then by signal conditioning we have converted change in resistance into change in voltage. This voltage is given to the Microcontroller PIC16F887. D293D motor driver is used for rotating the solar panel in bidirectional way, this motor driver is dual h bridge which uses PWM to perform the task and rotate the motors. Then by detecting this analog input for LDR1 and LDR2 motor at Solar cell Rotational Mechanism is rotated. The Voltage and Current at Solar cell is calculated by Microcontroller and then it is displayed on LCD. The overall working flow of system is depicted in Fig 2

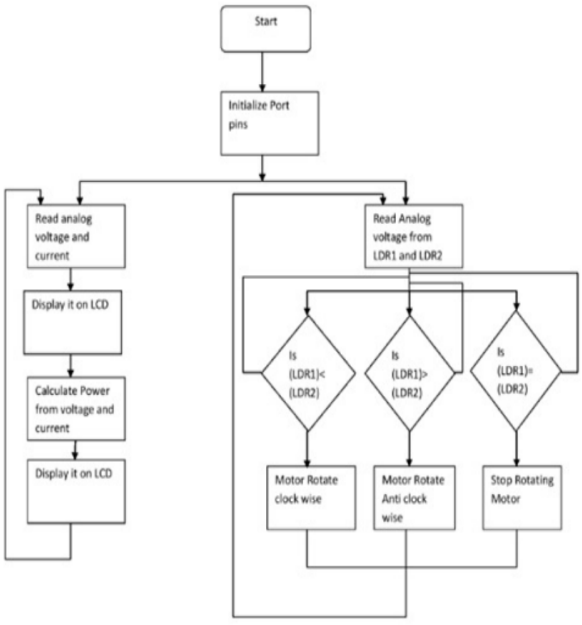


Fig. 2. Workflow of the proposed System

## IV. Experimental Results

Figure 3 shows developed hardware of proposed system which includes solar cell which receives radiations from the sun, we can also use bi-facial solar panel which can absorb more radiation.

After absorbing radiation, it can be used as a source of energy and received energy will be transferred to battery of 12V which act as inverter in the proposed system. Simple PWM dc to ac voltage inverter circuit based on IC SG 3524 is used in the system. The SG3524 IC chips is a fixed frequency PWM (Pulse Width Modulation) voltage regulator control circuit, with in different outputs for single ended or push pull applications. The SG3524 IC integrated circuit has all the functions necessary for the production of a regulating power supply, which enables us to have constant frequency 50Hz to all the section of entire circuit. The Inverter current output is amplified by MOSFET to some specified range so as to get enough source of energy to be utilized by the transformer. In the proposed system, two step up transformer are being used for the two different purposes. One transformer gives the voltage of 230V, whereas, another transformer is capable of providing 415V. Both the purposes have their different application of Home Appliances and another one gives 415V for MSEB purpose.

Fig. 3. Prototype Hardware of proposed system

The developed hardware is activated by the power supply of 230v from transformer to the application of home appliances like tube light, bulb, fan, cooler and Television etc. For mobile charging purpose we are getting constant 5v by using voltage regular in the circuitry. The power value of solar panel is displayed on the LCD as shown in Fig. 4. The microcontroller PIC 16F887 is programmed to monitor the values on LCD and also one motor is used to change the direction of solar panel for getting maximum amount of radiation. Two limiting switches are also used in the system to change the direction of solar panel to align with direction of sun radiation. Fig. 5 depicts use of proposed system for activating/controlling home appliance and Fig 6 displays LCD panel with current and voltage rating respectively.

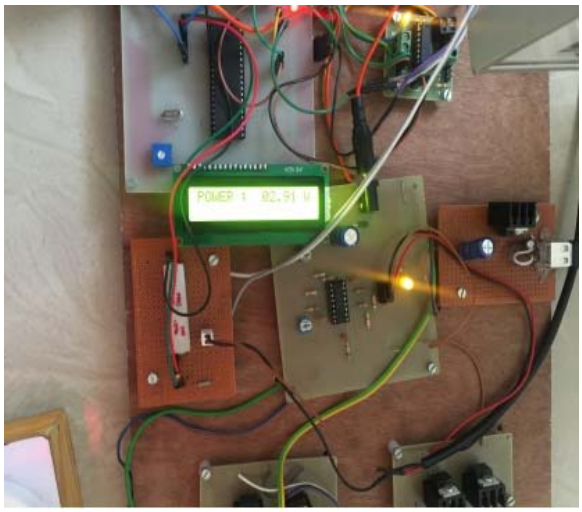

Fig. 4. Power reading displayed on LCD

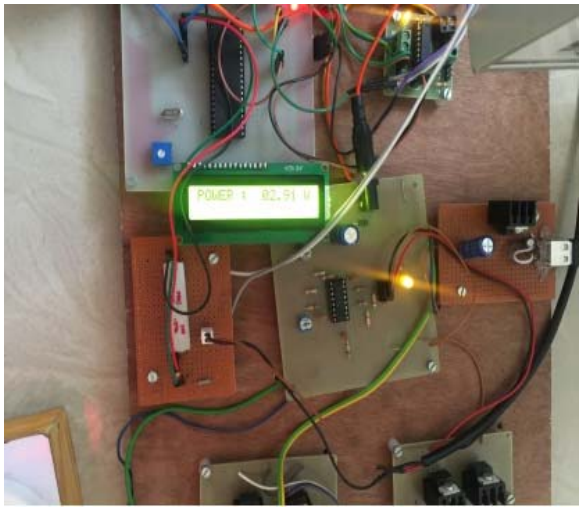

Fig. 5. Proposed system activating/controlling home appliance

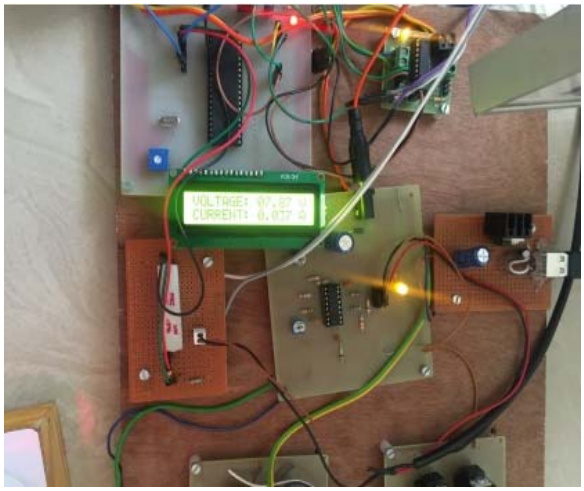

Fig. 6 LCD panel with current and voltage ratings

## V. Conclusion

In the grid interactive system, the solar power which may be available in excess of the demand during period of high sunshine is fed to the grid and is utilized elsewhere. This also improves the grid voltage and power factor. The grid interactive system having some storage for the energy, obtained from PV, can compensate the voltage of a pure, grid connected system. The system has been designed to supply continuous power to a dedicated local load with the power to the load carrying from the solar array, grid, or battery bank in the order of preference. Satisfactory steady state performance experienced from the system in terms of energy conservation indicates that the grid interactive PV system is Economically Viable and Technically Feasible for Grid Interaction of Solar PV Generation. This is an innovative and a promising option for large scale penetration of this technology will be helpful to alleviate the dependence on grid.

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