

AC SOLAR GENERATOR WITHOUT INVERTER

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Abstract -It is heard about the promise of cheap solar energy now for decades. At least in the world's sunniest areas all the cities would be supplementing their power with clean renewable solar power. Sadly this is not the case. Since past and in future also, AC power will be produced by AC generators. The generators are powered by mechanical energy provided by waters turbines (hydro-electric) or steam turbines powered from coal, natural gas or nuclear fuel. The mechanical energy rotates the coils of the generator in a magnetic field to produce voltage. Because the conductor coil of the generator flips direction during rotation in the magnetic field the resulting voltage produced in sinusoidal or AC. Modified standard solar cells are so arranged into a circular pattern mounted on a base. Above the solar cells, a spinning disk is mounted powered by a DC electric motor. The DC motor gets its power from small DC solar cells mounted in the corners of the base. The disk has portals cut into it allowing light to pass through to every other solar cell below it. As the disk spins each the banks of solar cells is alternately exposed to light and alternately produce power. When the portal is half of way between the two cells the voltage cancels and drops to zero. The resulting voltages sinusoidal or AC. It can even be configured to produce three phase AC power.

Key Words: solar cell, ac solar generator, spinning disk, DC motor.

1. INTRODUCTION

A solar cell gives DC power at its output terminals. Many cells connected in series with each other gives increased voltage at the terminals. Some modification in the connections and controlling the time of exposure of cells in sunlight gives out a different output response which is nothing but an AC sinusoidal waveform. This modification is done by considering number of plates, their voltage and current ratings.

On the foundation (rigid base), main solar modules are mounted in circular manner. The number of solar plate selected is 16. Thus 16 plates are arranged in circular form.

These modules are fixed over the base made of thermocol sheet because thermocol sheet is easy to cut in desired shape as per our requirement. There are two layers of sheet fixed one over another. On lower sheet, solar modules are fixed permanently which is of low thickness.

Another sheet having more thickness is used to make slots each of size exactly equal to size of a single solar module.

Number of slots is equal to the number of solar modules ie. 16 slots are made over upper sheet. .

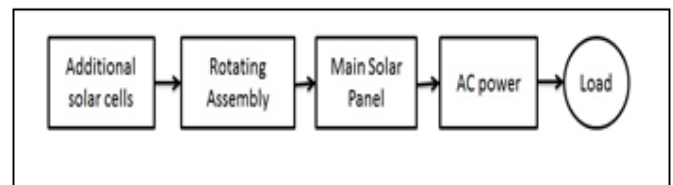


Fig: Block diagram of AC solar generator

1.1 Output Voltage Generator

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1.2 Measurement of Sine Wave

After reading output voltage and waveform on CRO (cathode ray oscilloscope) we got desired values of voltage and expected accurate AC sine waveform.

Initially we perform lots of test on old structures, that time the waveform we get has **square wave** type shape. After that it is kept in mind that assembly should

close from all sides. Then a closed assembly is made with high accuracy and lots of perfections. Finally waveform we get is **purely sinusoidal wave**.

Also some minute amount of ripples were found which then compensated by applying a capacitor in parallel with the output terminals and we get highly accurate and pure sine wave as shown in figure 5.1.

2 MEASUREMENT OF FREQUENCY

Frequency plays most important role in this experiment, as load side must requires 50Hz whatever the variation in waveform of voltage happens.

Frequency of the output power can be measured either by multimeter or by CRO (scope). At the end of experiments, finally we get a frequency of 48.26Hz for some constant time period as shown in figure and sometimes it touches to exactly 50Hz.

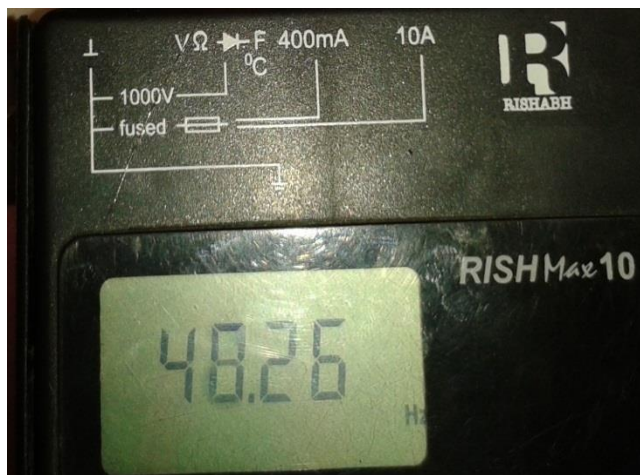


Fig -1: Name of the figure

Frequency is affected by only speed of the rotor. As speed increases, frequency increases and vice-versa.

3. CONCLUSIONS

In these paper after examining the information obtain in the in data analysis section it can be said that the proposed AC solar generator system to produce AC solar power mention theoretically.

Expected value of voltage has been obtained corresponding use DC motor will be capable to run on solar plate and produce required speed responsible for production of required frequency AC solar generator is an efficient system to produce direct AC power from solar energy without using inverter and batteries.

AC solar generator saves the losses produce in inverter circuit i.e. about 4-12% of power it's save hence Efficiency of generator increases about 4-12% .

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