Solar Inverter Project Using SG3525

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ABSTRACT

The high energy demand and the constant depletion of fossil fuels lead us to shift our focus to renewable energy sources which are not only the future unlimited source of energy it is also eco friendly and viable for the environment . Solar energy is the oldest form of renewable energy. This paper focuses on design of solar inverter which is required to run an AC loads which is mostly used as consumable purpose .The power output of the designed inverter is 100w, input voltage is 12v, output is 220v, and 50Hz square wave output.

Keywords: *fossil fuel, AC, DC*

INTRODUCTION

In today's climate with increasing energy demand and increasing environmental concerns, alternative uses of non-renewable and polluting fossil fuels should be explored. One such alternative is solar energy. Solar energy is simply energy that is generated directly from the sun and collected elsewhere, usually on the earth. The sun produces its energy through a thermonuclear process that converts about 650,000,000 tons of hydrogen into helium every second. This process produces heat and electromagnetic radiation. Heat remains in the sun and is important for maintaining a thermonuclear reaction. Electromagnetic radiation (including visible light, infrared light, and ultraviolet radiation) radiates in all directions in space. Only a small part of the total radiation produced reaches the earth. Radiation that reaches Earth is an indirect source for almost every type of energy used today. The exceptions are geothermal energy and nuclear fission and fusion. Fossil fuels also come from the sun; They were once living plants and animals that depended on the sun for their life. Most of the world's energy needs can be met directly from solar energy. More can be given indirectly. Practicality as well as advantages and disadvantages are taken into account. It also records the currently used solar energy usage. Due to the nature of solar energy, two components are required to have a working solar generator. These two components are the collector and the storage unit. The collector simply collects the radiation that falls on it and converts some of it into another form of energy (either electricity and heat or heat). Storage devices are required due to the volatile nature of solar energy; at any given time only a small amount of radiation is received. For example, at night or when the weather is very cloudy, the amount of energy generated by the collector is quite small. Storage devices can store excess energy generated during periods of peak productivity and release it when productivity drops. In practice, a backup power supply is usually added for situations where the amount of energy required is greater than the energy generated and stored in the vessel.

USES OF SOLAR ENERGY

People use energy for many things, but some everyday tasks use the most energy. These tasks include transportation, heating, cooling and power generation. Solar energy can be used for all four tasks with varying degrees of success.

LITERATURE REVIEW

ENERGY SOURCES

An energy resource is something that can generate heat, live energy, move objects, or generate electricity. Substances that store energy are called fuels. Human energy consumption has continued to increase throughout human history. There are two types of energy sources:

1) Non Renewable energy sources

2) Renewable energy sources

Non Renewable Energy Sources

Renewable energy comes from sources that will either be depleted or not replenished in our lifetimes – or even in many, many lives. Most non-renewable energy sources are fossil fuels: coal, oil and natural gas. Carbon is a key element in fossil fuels.

Renewable Energy Sources

Wind, solar and biomass are three new renewable energy sources. Renewable energy is usually defined as energy that comes from resources that are naturally replenished on the human time scale, such as sunlight, wind, rain, tides, waves, and geothermal energy.

SOLAR ENERGY AS FUTURE

Solar energy has two main advantages over fossil fuels. The first lies in the fact that it is renewable; It will never end. The second is the impact on the environment.

COMPONENTS USED

1 .The solar battery recharger,

2. The solar panel

3. Rechargeable battery

4. The inverter.

1. Solar Battery Charger

A battery charger is a device used to inject energy into a Celor secondary (rechargeable) battery by passing an electric current through it. The charging current depends on the technology and the capacity of the battery to be charged. For example, the current required to charge a 12V car battery is very different from the current required for a cell phone battery. The solar charger, as the name suggests, is actually a charger, which in this case charges a sealed 6V 4.5AH battery. The solar charger is powered by a 12V 500mA solar panel. Solar panels, which in turn convert sunlight into electricity. The charger converts the raw 12V from the solar panel into a regulated voltage for the sealed battery.

The solar charger has:
1. Custom Voltage Control.
2. Auto power off when the battery is fully charged.
3. Filtered input from solar panels.
4. No backflow from the battery.

2. Solar Panel

A solar panel (also solar module, photovoltaic module or photovoltaic panel) is a connected and packaged set of solar cells, also called photovoltaic cells. Solar panels can be used as components of larger photovoltaic systems to generate and supply electricity in commercial and residential applications. Since a single solar panel can only produce a limited amount of energy, many installations consist of several panels. A photovoltaic system usually includes a number of solar panels, an inverter and sometimes a battery and connection cables.

Fig. Solar Panel

3 Rechargeable Battery

The battery used in this project is a rechargeable lead sulfate battery rated at 12V 4.5AH. This type of battery is great for charging. A rechargeable battery or rechargeable battery is a group of one or more electrochemical cells. They are called secondary cells because their electrochemical reactions are electrically reversible. Rechargeable batteries come in a variety of shapes and sizes, from button cells to megawatt systems installed to stabilize power distribution networks. Various chemical combinations commonly used include: Lead Acid, Nickel Cadmium (NiCd), Nickel Metal Hydride Polymer (Li-Ion Polymer). (NiMH), Lithium Ion (Li-Ion) and Lithium Ion.

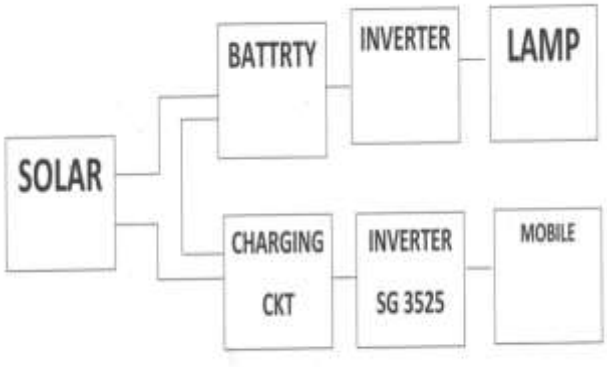
4. The Inverter

Since the normal DC current cannot be used in most applications, therefore, it is necessary to convert the DC current to AC in some way, so an inverter is used, which converts DC to AC within a suitable range for use in household appliances. In this project, DC power from a sealed 6V battery is fed to an inverter, which then converts it to AC 140V - 220V, enabling charging of a regular cell phone charger. An inverter is an electrical device that converts direct current (DC) into alternating current (AC), wherein the converted alternating current can be any desired voltage and frequency with appropriate transformers, switches and control circuits. Solid-state inverters have no moving parts and are used in a wide variety of applications, from small switching power supplies in computers to large electrical installations for high-voltage DC applications that transport mass energy. Inverters are usually used to provide AC power from a DC source such as solar panels or batteries. The inverter performs the opposite function of the rectifier.

Fig: 02 Rechargeable Battery

WORKING

Solar inverters, or PV inverters, convert the alternating current (DC) output of photovoltaic (PV) solar panels into alternating current (AC) that can be supplied to the commercial power grid or used by the local off-grid power grid. It is an important component in photovoltaic systems and allows the use of available devices. The solar inverter has special features adapted for use with photovoltaic grids, including maximum power tracking and island protection. The solar inverter works by converting the AC or DC output of your solar panels into 120V/240V AC or AC. The devices in your home use AC power instead of DC power, so a solar inverter will need to convert the DC output collected from your solar panels.



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