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Solar Sun Seeker for Energy Maximization

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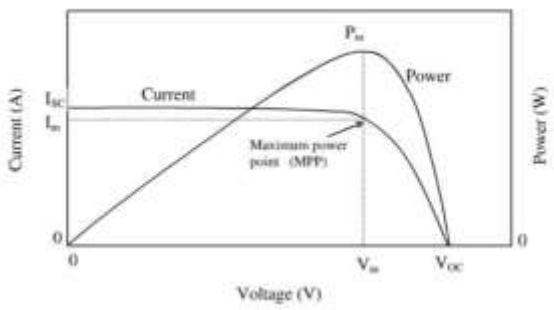
Abstract – A single axis solar sun seeker is a device or a system used to orient the panel towards the direction of Sun's movement. As the sun moves from east to west according to that solar panel will also move in the same direction of sun. This system works well when the panel pointed near the sun, so that a solar tracker can effectively fixed their position, at any cost of system complexity. There are different types of solar panels but one best type of solar panel is the heliostat which have the movable mirror that reflects the moving sun to a fixed location and other type of solar panels also used as well. The accuracy requirement for the solar panel depends on the applications like concentrator, which requires high degree of accuracy to ensure that concentrated sunlight can directed precisely to powered device. and concentrator solar panel would not work without the tracking system so that a single access solar tracker has been chosen for more accuracy
Keywords: Solar tracker, reflector, concentrators, heliostat etc.

INTRODUCTION

A single access solar Sikar is a system that position itself in the direction of the sun's movement. The main application of the solar panel is to track sun and position the solar panel in the direction of the sun rays so that they can consume more energy from the sun by the direct interaction. The tracker has been used in this to adjust the position of the face of the solar panel to the Sun. By direct interaction of the sun to the solar panel, solar panel consume more energy and that can be converted into the power. The solar tracker that has been used in the system, difficult to determine the location of the Sun relative to the panel being aligned. The complexity includes computers that can process difficult algorithms which enable the system to track the position of the Sun, and sensors which provide information to the computer about the cells position when it attached to the solar panel with a very simple circuit board and it can drag the sun without the need of computer.



THEORY

A single exis solar tracker is a system that orient itself towards the sun. Solar panels can be parabolic, heliostat etc. For flat solar panel system tracker have been used to minimise the angle of incidence of the incoming sunlight and the solar panel. In few cases this type of error is known as cosine error. By reducing this cosine error angle increase the capacity of energy collected from the fixed power generating system. In the photovoltaic applications

have predicted that solar trackers can be used for at least 85% of the commercial installation.

Block Diagram

It can be explained by following block diagram:

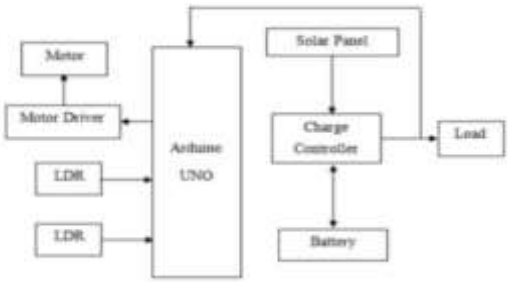


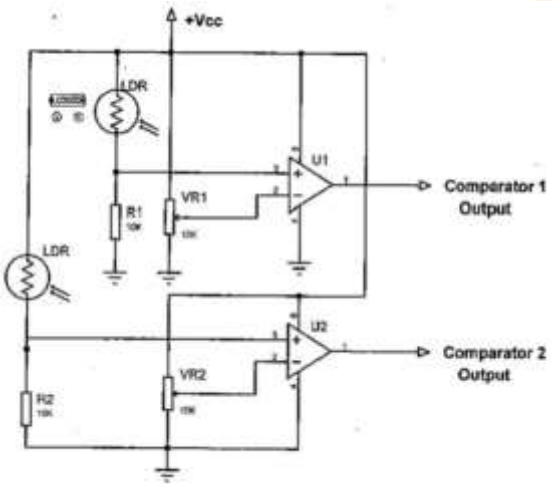
Fig: Block diagram of solar sun seeker

WORKING PRINCIPLE

The materials which we used in designing this system are following: Light Dependent Resistors, 555 timer, comparators, transistors, resistors, diodes, relays, 12V battery and 12V DC motor. The block diagram of the sun-seeking system is shown in the above fig. The solar sun seeker is divided into four units : comparator unit, speed control unit, driver unit and battery charger unit. Comparator Unit the heart of the solar sun seeker because it is use for comparing the two units. Comparator circuit is formed by LM358 a Dual Op-Amp which is used as a comparator. LDR is connected in series with two registers R1 and R2. The intensity of falling light on LDR is directly proportional to the voltage across the register it means when light increases voltage also increases. When the voltage at the non-inverting terminal is higher than the voltage at the inverting terminal then the output of the voltage comparator will be high. The inverting terminal of

each comparator is connected to a variable resistor (VR1 and VR2 respectively), which is used to set the reference voltage. Thus, the sensitivity of both LDRs can be adjusted by varying the 10kΩ pot. The different combinations of these HIGH and LOW outputs of both comparators

determine the direction of rotation of the motor or its non-rotation. However, LM358 which is used in comparator circuit is not enough to drive a motor. Due to this we use driving motor. The direction of rotation of motor is controlled by relays which is 12 V and each relay is connected to the output of the comparator and these comparators also connected to the collectors of transistors Q1 and Q2 and both transistors are acts as a switch. The output of the comparator acts simultaneously means when U1 is high then U2 is low and when U2 is high then U1 is low. When the transistor Q1 switch is on then it allows the current to flow into the first relay and the resulting current rotates the motor in clockwise direction. However, when the transistor Q2 switch is on then it allows the current flow into the second relay and the resulting current rotates the motor into anticlockwise direction. The motor only rotates with HIGH-LOW combinations of both comparators. That is, the motor only moves when either of LDR1 or LDR2 receives more light intensity than the other, but the movement stops immediately when the two LDRs, which are fixed on the edge of the solar panel, gets to a position where they receive equal amount of light intensity, that is, when the sun's ray are perpendicular to the solar panel.



The output of the astable multivibrator is fed to two parallel NPN transistors Q1 and Q2 which act as switch to the signal going to the base of the relay-switching transistors Q3 and Q4. This unit is included in the design in order to pulsate the movement of the motor in both directions. This eliminates any indiscriminate movement of the motor.

Conclusion

A single axis solar tracking system is totally different wkth normal fixed solar panel because in normal fixed solar panel we can extract the solar radiation less in compare with single axis solar tracking system.

The L293D motor have enough torque to drive the panel. These motors are noise free and are affordable, making them the best choice for the project.. The compact, cost effective and reliability of this solar tracker is intended to suitable for the rural usage. The purpose of renewable energy from this work offered advance in idea to help the people. This system can be designed to provide electricity to the entire home by changing solar panel, using more efficient sensors, and designing the charge controller.

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