

Dual Axis Solar tracking System using PLC

Sayali Sunil Gatir

Student, Electronics and Telecommunication, Matoshri college of engineering and research center, Maharashtra, India.

Abstract

Sun is a low cost source of electricity and instead of using the generators. Solar panel can convert direct sun rays to electricity. Dual axis trackers have two degrees of freedom that act as axes of rotation. DC motor arrangement is used to rotate the panel to the desired position. The system tracks by comparing the intensity of light falling on the sensors. Based on the sensors output the motor can rotate the solar panel to meet the sun's maximum position. Power generation system in which the power is generated from solar and wind.

Keyword:- Wind generating system, solar panel

1. INTRODUCTION

The Conventional solar panel, fixed with a certain angle, limits there area of exposure from sun due to rotation of Earth. In pursuing to get the maximum energy converted from the sun, an automatic system is required which should be capable to constantly rotate the solar panel. The automatic solar tracking system solves this problem. There are single axis trackers and dual axis trackers. In this paper we will discuss PLC based dual axis tracker. Dual axis trackers have two degrees of freedom that act as axes of rotation. PLC based I/O configuration is used as the hardware along with the comparison unit of photosensitive resistance for detecting the ray strength and shift the panel towards the maximum output from the sun. Stepper motor arrangement is used to rotate the panel to the desired position. The system tracks by comparing the intensity of light falling on the sensors. Based on the sensors output the motor can rotate the solar panel to meet the sun's maximum position. Thus, solar panel can be driven by the motor which in turn gets the input signals from the PLC. Precise control of the stepper motors is possible by using the PLC. By giving a suitable delay between each step, the time for rotation of the solar panel to a particular position can also be controlled. This is a Hybrid power generation system in which the power is generated from solar and wind. In case the solar is not generating sufficient power than the wind plant will be activated and comparator will compare the power of solar and wind and sift the load to the power generated maximum from.

2. Proposed System

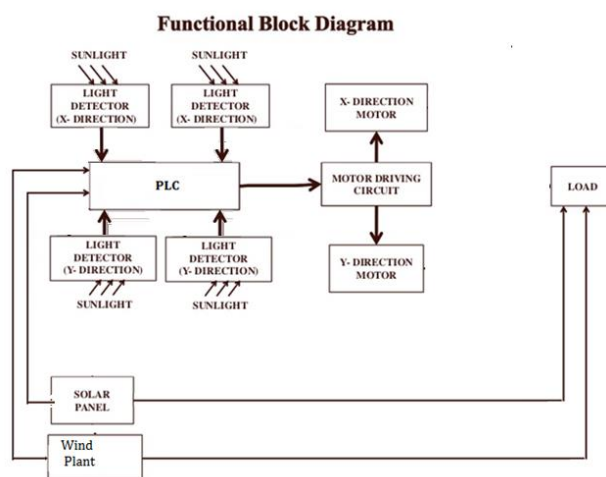


Fig 1.Block Diagram of Dual Axis Solar Tracking system

3.Working:-

The block diagram shows that there are four relays used in these circuit which are connector to the LDR. When the sun light falls on the direction of LDR then it signal given to the PLC. Then plc gives output signal to dc motor and with the help of relays it will moves toward direction from where it gets maximum sun light or else it will moves in the altitudinal direction accordingly to the intensity of the sunlight. If at the one direction LDR is getting less sunlight that is intensity of light is less, then it will detect the maximum sunlight from where it will get maximum light according to that it will move solar panel.

In this project two modules are used 1. sunlight 2.wind PLC will get the two signal in x-y direction according to the direction motor will rotate in exact 180 degree with the help of sensing LDR. As the LDR sense the sunlight then motor will move accoring to that direction respectively.In day time LDR will sense the sunrays so that with sensing the rays with LDR move the solar panel according to direction of sunlight. So the power generation is processed.

In many times there is cloudy weather or climate, in these case sunlight is not available so wind is also useful source for power generation. If wind energy is more than sunlight so it will use the wind plant turbine power generation principle. whenever the wind is high motor will rotated and the voltage gets induced in it and power is generated comparator is used in this circuit so like -wise it will compare the maximum intensity of sunlight and wind energy and it give signal to PLC.

4.Conclusion

It is a simple and cost- effective control implementation, an autonomous PV inverter to power the entire system, ability to move the two axes concurrently within their respective limits, ability to balance the tracking accuracy, and applicable to moving platforms with the Sun tracker.

It allows the sun's path from morning to evening and then gets back to the initial position facing towards east side.

So the system reserves a lot of energy by keeping the motors off during night time.

This technology of tracking is very easy and simple in design, reduced in cost and precise in tracking.

A variety of technologies for the solar energy are available on the market.

But this tracking technology which is based on dual axis has higher energy gain comparing with both fixed solar panel and single axis solar tracking technologies and it is also very efficient.

5. References

- I. International journal of Engineering research & Techno (IJERT) July 2017
- II. International Journal of Advanced Technology in Engineering and Science, 6june 2016
- III. International Journal for Research in Applied Science & Engineering Technology (IJRASET), Oct 2015
- IV . International conference on Engineering and Innovative Technology, SU-ICEIT, 12april 2016
- V. International Journal of Advanced Research in electrical, electronics and Instrumentation engineering. (IJAREEIE)