

TIME OPERATED AUTO SOLAR PANEL TRACKING SYSTEM FOR OPTIMUM POWER GENERATION

ABSTRACT

In the report advantages of the sun tracking collectors in comparison with stationary collectors are expounded. The realization principle of equatorial mounting of the sun tracking system and structural performance of the sun tracking collector with reflectors is viewed. The solar collector was provided with reflectors at the collector's rear side. The experimentally obtained energetic parameters of the sun tracking collector are compared to those of the ordinary flat-plate solar collector, and the assessment of energetic parameters is given. The placement of the sun tracking system elements on the collector with reflectors, functional scheme, working principle and characteristics of the sun tracking system are shown. The possibilities for improvement for the solar collectors with reflectors and their meaning are discussed.

The solar PV modules are generally employed in dusty environments which is the case in tropical countries like India. The dust gets accumulated on the front surface of the module and blocks the incident light from the sun. It reduces the power generation capacity of the module. The power output reduces as much as by 50% if the module is not cleaned for a month. In order to regularly clean the dust, a sun tracking- cum- cleaning system has been designed, which not only tracks the sun but also cleans the modules automatically. This automated system is implemented using microcontroller which controls the stepper motor coupled solar panel. This mechanism does not require any sensor or synchronization for tracking the sun. In this mechanism, the solar panels make a rotation of 360° in a day, which results in sliding of cleaning brushes twice over the PV modules. In terms of daily energy generation, the presented tracking- scheme provides about 30% more energy output as compared to the flat PV module (module kept stationary on ground) and about 15% more energy output as compared to PV module with single axis tracking. The implementation and working of 360° sun tracking system with automatic cleaning is described in this paper.