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PLC Based Solar Tracking System

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Abstract: *Sun is a low cost source of electricity and instead of using the generators; solar panel can convert direct sun rays to electricity. Conventional solar panel, fixed with a certain angle, limits there area of exposure from sun due to rotation of Earth. This project presents the design and development of an automatic solar tracking system to enhance the efficiency of solar energy collection. The system uses a Mitsubishi Fx2S- 30M PLC as the central controller, ensuring precise and reliable operation. A 12-volt solar panel serves as the primary energy harvesting component, while a DC motor adjusts the panel's orientation based on sunlight intensity. To detect the sun's position, the setup employs five Light Dependent Resistors (LDRs) strategically positioned to sense light from various directions. These sensors feed analog signals into the system, allowing the PLC to compute the optimal angle for maximum solar exposure. Limit switches are installed to restrict the motor's movement within a safe mechanical range, preventing over-rotation. A Switch Mode Power Supply (SMPS) is used to convert AC input to a stable DC output, powering the PLC and control components. The system is designed to operate autonomously with a reliable power supply, offering a low-maintenance and efficient solution for solar energy systems. This integration of simple yet robust components results in a smart and cost-effective solar tracking mechanism suitable for small-scale applications*

Keywords: PLC , Solar Panel, Worm Gear Box Motor, LDR, Limit switch, SMPS

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