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Design and development of PLC-based solar tracking system

Overview

In this paper, a PLC-based sun-tracking system for parabolic trough solar concentrator which could track the sun along one axes was designed and implemented.What is a solar tracking system?

This is the true position of the sun as seen from an observer on the surface of the earth. From fig. A solar tracking system refers to a system which is able to track the movement of the sun throughout the day for maximum energy efficiency and have it at a perpendicular angle to the plane of the solar panel.

How accurate is solar tracking?

When in range, the system has a tracking accuracy of ±1°. Data analysis from research shows that even a single axis three-position system can increase efficiency and make solar tracking a worthwhile endeavour. Automated tracking, Linear motors, PLC, Solar tracking, Solar panels.

Can linear motors be used to create a solar tracking system?

This thesis project aimed to explore the programming of linear motors in an attempt to create a solar tracking panel system, and to examine the value of sun tracking as opposed to fixed panels. The program described in this paper utilizes Siemens' adaptation of a sun tracking algorithm to create single and dual axis tracking.

Can a single axis three-position system improve solar tracking efficiency?

Data analysis from research shows that even a single axis three-position system can increase efficiency and make solar tracking a worthwhile endeavour. Automated tracking, Linear motors, PLC, Solar tracking, Solar panels. Figure 1. Sun vector components in a diurnal circle course of the sun (Prinsloo &.

What is Siemens SIMATIC s7-1200 solar tracker?

Siemens SIMATIC S7-1200 is one of the PLC lines which provides solar tracking

for the end user. Fig. 2 shows the SIMATIC S7-1200 solar tracker control architecture for dual axis tracking. As it can be seen in the figure the zenith and azimuth drive the motor movement in the dual axis system. Figure 2.

Does a dual axis tracking photovoltaic system increase electricity?

One such research project conducted and published in Turkey, draws a parallel between dual axis tracking and fixed systems, determining that there is a 30.79% increase in the electricity obtained from the dual axis tracking photovoltaic system compared to the fixed photovoltaic system.

Design and development of PLC-based solar tracking system

Design and Implementation of a Sun Tracker ...

Jan 31, 2013 · The dual threats of energy depletion and global warming place the development of methods for harnessing renewable energy resources at the ...

Design, Construction and Test of a Solar Tracking ...

Mar 7, 2022 · The solar tracking system, include a quadrate array of sensor made up of four Light Dependent Resistor, Potentiometer, Servo motors and a Microcontroller. The designed system ...

DESIGN OF A SCADA SYSTEM FOR A SOLAR ...

Oct 17, 2023 · Abstract and Figures This paper presents the design and implementation of a solar panel data monitoring system using a SCADA ...

Design and Implementation of the Dual-Axis Solar Tracking System

Oct 31, 2013 · The capability of photovoltaic (PV) panel to generate energy approximately follows the intensity of the sunlight on the panel. A dual-axis solar programmable logical controller ...

PLC Based Solar Tracking System

Dec 23, 2024 · PV) panel to generate energy approximately follows the intensity of the sunlight on the panel. A dual-axis solar programmable logical controller (PLC) based automatic solar tra ...

Design and Implementation of PLC-Based ...

PDF , On Jan 1, 2016, Jinping Wang and others published Design and Implementation of PLC-Based Automatic Sun tracking System for Parabolic ...

Design and Implementation of PLC-Based Automatic ...

Dec 8, 2018 · Abstract. A sun-tracking system for parabolic trough solar concentrators (PTCs) is a control system used to orient the concentrator toward

the sun always, so that the maximum ...

PLC based Solar Panel Tracking System with Automatic ...

Mar 13, 2018 · This paper presents a new design of a Three-axis solar tracking system which is based on Programmable Logic Controller (PLC). The automatic tracking system of solar ...

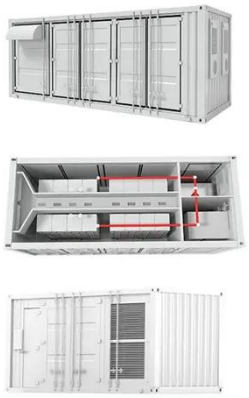
(PDF) Dual Axis Solar Tracking System Using PLC ...

Jun 1, 2016 · The Siemens S7-1214 DC/DC/DC PLC is used to control the dual axis solar tracking system rotation.

Design of Single Axis Solar Tracking System Using PLC

Aug 2, 2019 · The objective of this paper is to develop an automatic solar tracking system where solar panels will keep aligned with the Sunlight in order to

maximize in harvesting solar power. ...



Design and Implementation of PLC-Based Automatic Sun tracking System

The work presented here is a design and development of PLC based sun tracking control system for PTC. Sun tracking control system consists of a Programmable Logic Controller (PLC) and ...

Design and Implementation of an Automatic Single Axis Solar Tracking

Aug 7, 2021 · The power consumption rate is increasing daily, and people are greatly dependent on conventional energy sources. If it continues, the conventional energy sources will end very ...

Design and Simulation of a Solar Tracking ...

Sep 27, 2022 · After installing a solar panel system, the orientation problem arises because of the sun's position variation relative to a collection point ...

Design and Implementation of Solar Tracking ...

Solar energy is quick turning into significant methods for sustainable power source asset. With solar tracking, it will end up conceivable to create more ...

Design and Implementation of Hardware ...

Dec 27, 2023 · This paper concentrates on the development of a closed-loop tracking of the sun that precisely follows the sun's trajectory, allowing ...

Design and Implementation of PLC-Based Automatic ...

Jan 6, 2024 · In this paper, a PLC-based sun-tracking system for parabolic trough solar concentrator which could track the sun along one axes was designed and

implemented. In the ...

Solar tracking systems: Advancements, challenges, and ...

Dec 1, 2024 · Optimizing solar energy capture is crucial as the demand for renewable energy sources continues to rise. The research evaluates various types of STS, including passive, ...

PLC Based Solar Tracking System

Jun 10, 2025 · 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 ...

Control algorithms applied to active solar tracking systems: ...

Dec 1, 2020 · The required tracking precision depends primarily on the acceptance angle of the system, which is generally tenths of a degree. Control

algorithms applied to active solar ...

Impact Factor: PLC Based Solar Tracking System

Jun 10, 2025 · This project aims to design and implement an automatic solar tracking system using a combination of simple yet effective components. A Mitsubishi Fx2S- 30M PLC acts as ...

Dual-axis solar tracking system with different control ...

Oct 1, 2023 · A sensor-based feedback controller compares sunlight intensity to a threshold, driving a motor to rotate the dual-axis tracking motor and turn the PV panel toward the sun. ...

PLC Based Solar Axis Dual Tracking System

Feb 27, 2021 · This project deals with the design and execution of a solar tracker system dedicated to the PV conversion

panels. The proposed single axis solar tracker device ensures ...

Review on sun tracking technology in solar PV system

Nov 1, 2020 · This paper begins with a brief introduction to the solar PV cells and the materials used in their construction. It also discusses the types of solar PV systems and types of solar ...

Design and implementation of a novel automated sun tracking system ...

Novel automated sun tracking system for distributed heating. Design and encapsulate function block of PLC based on SPA. Economics and heat efficiency analysis were conducted using ...

Design of an intelligent solar tracking system based on PLC

Jul 18, 2023 · In order to solve the problem of low photoelectric conversion efficiency in solar power generation, a

solar photovoltaic power tracking system based on PLC is proposed. This ...

Design and Implementation of Single Axis Solar Tracking System

Feb 1, 2025 · In this study, the design and implementation of a polar single-axis tracking system is presented to improve the energy efficiency of PV system through angular variation during the ...

Solar Tracking System: Working, Types, Pros, and ...

Mar 9, 2024 · Other elements include PV cells, PLC, signal processing units, sensors, electromagnetic, and mechanical motion control modules, along with ...

Solar tracking control systems design strategies: A review

Apr 19, 2024 · There are many different strategies when it comes to designing solar trackers. They can be either single

or dual-axis. They could be passive with no motors or gears or ...

Design and Practical Implementation of Dual ...

Oct 3, 2020 · Abstract and Figures This paper introduces a design and realization of low cost solar tracking system with smart monitoring system for electrical ...

PLC Based Solar Tracking System

Using sunrise and sunset times to facilitate dual axis tracking is an atypical and unproven method, and warrants more research before implementation. On the ...

A Programmable Logic Controller to Control ...

ABSTRACT This study describes a system that uses the Programmable Logic Controller (PLC) to control the motion of a two-axis sun-tracking surfaces. The ...

Design and Implementation of PLC-Based Automatic ...

Abstract. A sun-tracking system for parabolic trough solar concentrators (PTCs) is a control system used to orient the concentrator toward the sun always, so that the maximum energy ...

Design and Implementation of PLC-Based Automatic Sun tracking System

Oct 3, 2016 · A sun-tracking system for parabolic trough solar concentrators (PTCs) is a control system used to orient the concentrator toward the sun always, so that the maximum energy ...

Design and Implementation of PLC-Based Automatic Sun tracking System

Abstract Read online A sun-tracking system for parabolic trough solar

concentrators (PTCs) is a control system used to orient the concentrator toward the sun always, so that the maximum ...

Industrial automation AC500 for PLC solar systems

Mar 14, 2024 · Precision control of solar tracking systems ABB has developed solutions based on programmable logic controller (PLC) that enables collectors, mirrors and panels to capture ...

Design and Simulation of a Sun Tracking Solar Power ...

The simulation is realized on Matlab/Simulink platform. The simulation consists of four modules: solar tracking cells, signal conditioning circuit, controller, and motor. The simulation provides ...

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