ISSN:2348-2079

Volume-7 Issue-2

International Journal of Intellectual Advancements and Research in Engineering Computations

Automation of solar adsorption refrigeration system

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ABSTRACT

The performance of a photovoltaic (PV) array is affected by temperature, solar isolation, shading and array configuration. Often, the PV arrays get shadowed, completely or partially, by the passing clouds, neighboring buildings and towers, trees, and utility and telephone poles. Under partially shaded conditions, the PV characteristics get more complex with multiple peaks. Yet, it is very important to understand and predict them in order to extract the maximum possible power. In the usual series connected wiring scheme, the residual energy generated by partially shaded cells either cannot be collected(if diode bypassed) or, worse, impedes collection of power from the remaining fully illuminated cells (if not bypassed). Rapid fluctuation of the shading pattern makes maximum power point (MPP) tracking difficult; generally, there will exist multiple local MPPs, and their values will change as rapidly as does the illumination. In this paper, a portable solar PV system that effectively eliminates both of the aforementioned problems is described and proven. And also Parallel-configured PV systems are compared to traditional series configured PV systems with hardware experiments.

INTRODUCTION

The use of electricity generated from solar energy has become more common recently, perhaps because of the environmental threats arising from the production of electricity from fossil fuels and nuclear power. However, in many applications, such as solar power plants, building integrated photovoltaic, or solar tents, the solar photovoltaic arrays might be illuminated non-uniformly. The cause of no uniform illumination may be shadows from clouds, trees, booms, neighbor's houses, or even the shadow of one solar array on the other, etc [1-3].

EXISTING SYSTEM

In spite of their advantages, these systems present some drawbacks, such as low coefficient of performance and intermittent character of the cycle, which constitute barriers to a more widespread application of this technology.

PROPOSED MODEL

The proposed PV system adopts the parallel configuration at the individual cell level, so that every cell in the PV panel can achieve its MPP under nonideal conditions. In contrast to the electric utility scale applications where one needs as many power converters as PV modules, in the low-power case, only a single low cost converter is required. This paper shows specifically the performance gain of this arrangement and the efficacy in real world conditions [4-7]

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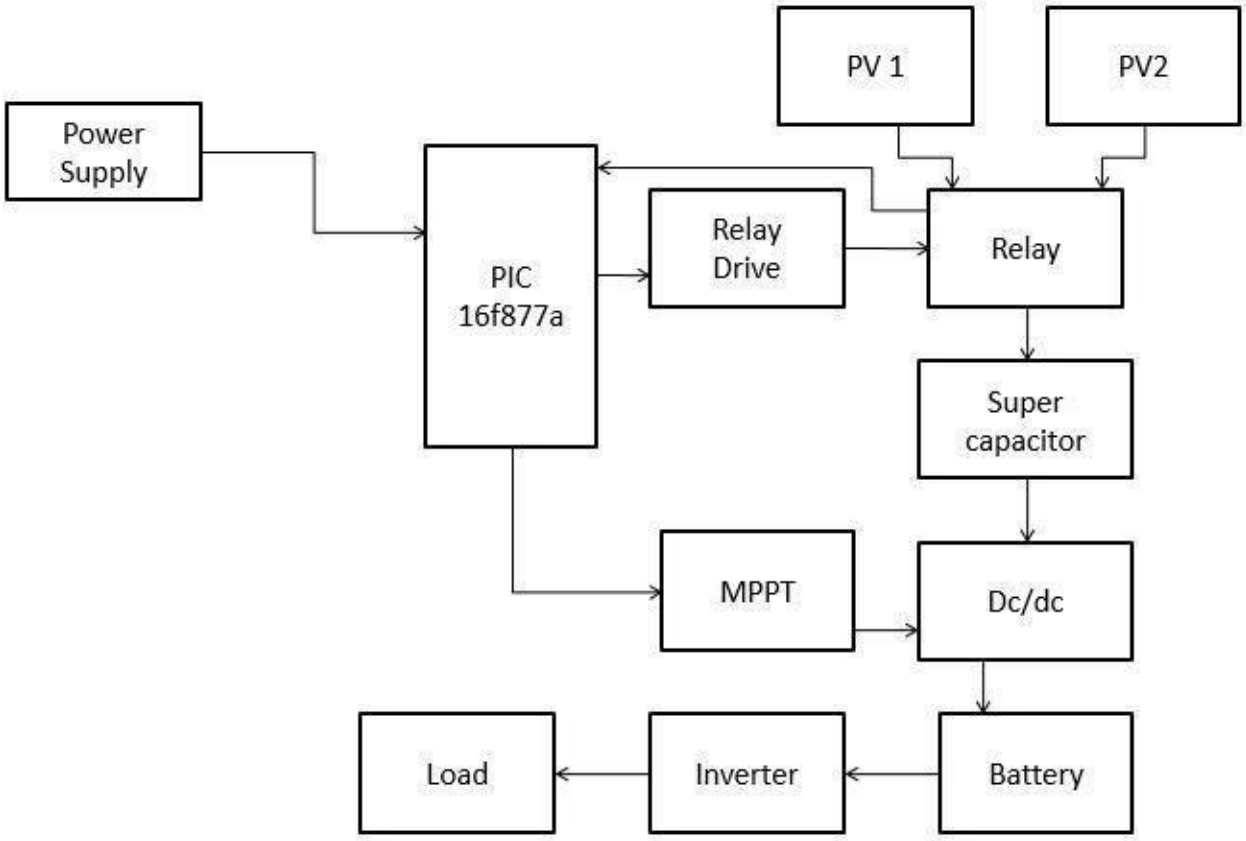


Fig:1. Block diagram of proposed system

PIC MICROCONTROLLER

PIC is a family of modified Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Peripheral Interface Controller". PICs are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability.

PIC has only 35 single word instructions. All are single cycle instructions except for program branches, which uses two-cycle. The Operating speed of PIC in DC is 20 MHz and clock input in DC is 200 ns instruction cycle. The PIC has 8K x 14 words of flash Program Memory, 368 x 8 bytes of Data Memory (RAM) [8].

PIC has a Low power, high speed CMOS FLASH technology with a fully static design. It provides a wide operating voltage range of 2.0V to 5.5V.It has Low power consumption and used in commercial and industrial temperature ranges.

There are three memory blocks in the PIC16F87XA device. The program memory and the data memory have separate buses so that concurrent access can occur. The PIC16F87XA devices have 13 bit program counter capable of addressing an 8K x 14 bit program memory space. The data memory is partitioned into multiple banks which contain the general purpose registers and the Special Function Registers (SFRs). Bits RP1 and RP0 are the bank select bits.

Movement of the module with the movement of the sun, which allows the panel to stay at an angle such that it receives major chunk of the sunlight at all times. However, the two concepts can be used together to achieve even better results [9].

To enable the module to deliver maximum power as per its capabilities, the charge controller compares the output from the solar panel with the battery voltages and then selects the best possible power out of the two, to charge the battery.The functioning of the MPPT algorithm can further be explained as that of a DC to DC converter which converts the high voltages generated from the solar panel into low voltages required to charge the batteries through which our daily appliances can be operated. A 'Non MPPT' battery charging would simply mean connecting the solar panel directly to the terminals of battery without any additional circuitry in between. This would only permit the solar panel to operate on battery voltages, thereby totally rejecting the chance of allowing the panel to deliver the maximum power that it is capable of. photovoltaic devices (PV modules) such as a solar panel. The word 'tracking' must not be confused with the mechanical

RELAY

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized.

MPPT

MPPT stands for MAXIMUM POWER POINT TRACKING (MPPT)**.** Maximum power point tracking, usually referred to as MPPT is an electronic architecture that is used by inverters, battery chargers or other solar operated equipment to extract maximum vailable power out of

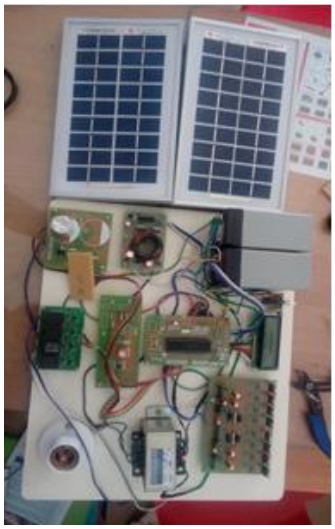
Fig 3.MPPT

DC TO DC CONVERTER

A **DC-DC converter** is an electronic circuit that is used to convert a source of direct current (**DC**) from one voltage level to another. These offer a method to increase voltage from a partially lowered battery voltage saving space. **DC** to **DC converters**also regulate the output voltage

RESULT

To achieve the constant supply voltage from PV (Photovoltaic) using MPPT (Maximum Power Point Tracker). To achieve high efficiency 7.4%. The PV panel is connected series and parallel to increase our battery life. The developed approach is broadly applicable, but is perhaps most valuable in PV systems having high single-cell voltages where direct input to a high efficiency converter is most practical.



Automation

CONCLUSION

This paper has described the configuration of a portable PV power system that produced maximum power under rapidly changing partial shading conditions such as would be encountered in portable applications. Under complex irradiance conditions, the power generating capability of the proposed PV system was approximately twice that of a conventionally configured series system. The developed approach is broadly applicable, but is perhaps most valuable in PV systems having high single-cell voltages where direct input to a high efficiency converter is most practical.

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