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DUST AND OVER HEAT DETECTION SYSTEM OF PV MODULE

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Abstract:

solar energy gained the most demand as it represents a green and sustainable source of energy. One of the most important obstacles for solar energy production in Iraq is the dirtiness of the panel surface as it causes a shadow that reduces its performance. From other hand, Iraq location has a large frequency of sand dust storms. This research proposed a method to eliminate the impact of dust and dirtiness on the performance of the solar panel in power production. 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. The cleaning system has been designed which cleans the module by the help of microcontroller.

Introduction

Economically effective maintenance and monitoring of power systems to ensure high quality and reliability of electric power supplied to customers is becoming one of the most significant tasks of today's power industry. As with any preventive maintenance technology, the efforts spent on the status monitoring are justified by the reduction of the fault occurrence and elimination of consequent losses due to disruption of electric power, damage to equipment, and emergency equipment replacement costs. There have been several significant developments on monitoring technologies for distribution power cables.

1. Working Principle

In the present project a microcontroller is used as a control unit which gets inputs (instructions, commands) from a mobile connected through gsm. To switch on/off any appliance positioned at controller's part, the cellular phones are connected, the appropriate tone and password are entered. The tone entered is decoded via the DTMF decoder which further translates it into binary values. Binary values are the input to the microcontroller which verifies each one individually. Thus, when the relay drive is activated by the microcontroller, the device either gets on or is switched off as per the requirement.

When power supply given to the unit. The voltage regulator 5V is Converted into 3.3V with resistance. The microcontroller operating voltage is 3.3 voltage. Micro controller is control unit. [2] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. [4] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management.

2. Block Diagram

The command is executed using command is sent to a microcontroller where the ATMega328p controller will issue a command. After performing, the controller sends a command to the driver of a relay circuit.

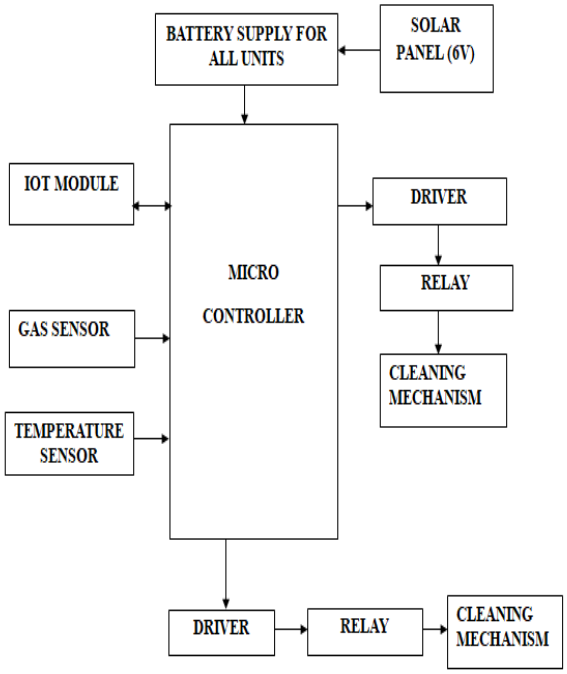


Fig.1: Block diagram of dust and over heat detection system

LM35 Sensor

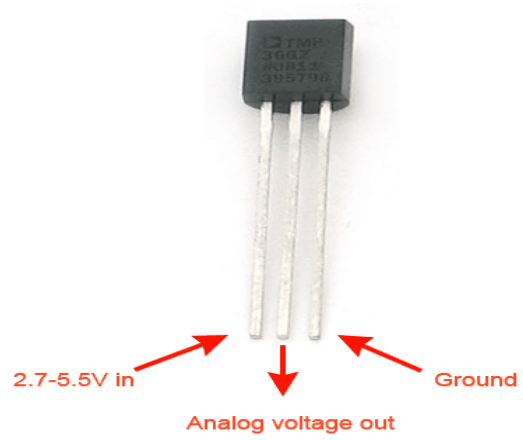


Fig.2 LM35 Sensor

A more complex temperature sensor will generally be computerized for more accurate results. These are sometimes used in homes for nonscientific purposes.

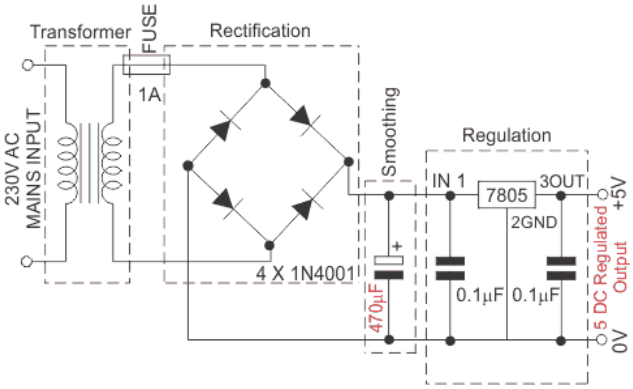


Fig.3 Power supply circuit diagram

A Regulated power supply is the main component of electrical, electronics and as well as automation equipment. Mobile phone charger, oscillator, amplifier are needed the regulated power supply.

Gsm oparetion

Using TDMA, a **narrow band** that is 30 kHz wide and 6.7 milliseconds long is split time-wise into three time slots. Narrow band means channels in the traditional sense. Each conversation gets the radio for one-third of the time. This is possible because voice data that has been converted to digital information is compressed so that it takes up significantly less transmission space. Therefore, TDMA has three times the **capacity** of an analog system using the same number of channels.

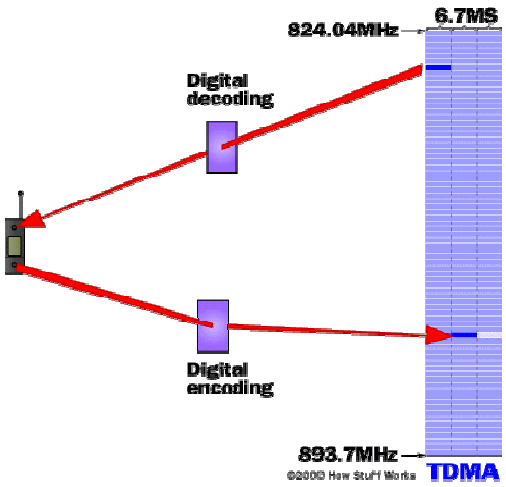


Fig.4 Operation of gsm

Relay circuit

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal, or where several circuits must be controlled by one signal. One of the most control higher voltage (120-240V) devices like fans, lights, heaters, and other household appliances.

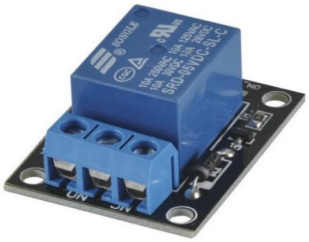


Fig5 Relay circuit

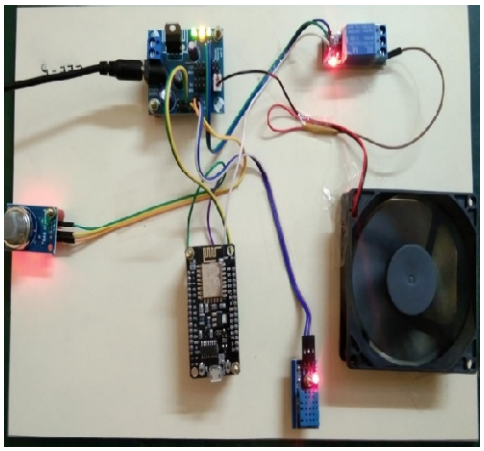
3. Discussion

All dust detector can be controlled by a proposed work. One thing that should be required is the gsm module. A limited dust detector will suffice for this work but a dust free environment will be required.

4. Conclusion

The dust shadowing effects on the solar panel passively. It is considerable due to the fact that the output power is a complex parameter that is influenced by different environmental and weather conditions. The fixed and reliable solar panel power generation always requires clean PV panel. This research designed and implemented a mechanism that enables solar panel from cleaning itself when its performance getting less 50% its average generation rate.

Model Figure



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