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 ijircce@gmail.com

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Low Cost and Smart Cooling System for Tractor Cabin

B.Ananthi , S. Praganayagi, S. Muskanfathima, M.Ragavi

Assistant Professor, Department of Computer Science and Engineering, Vivekanandha College of Engineering for Women, Namakal, India

B.E(CSE) Student, Vivekananda College of Engineering for Women, Namakal, India

B.E(CSE) Student, Vivekananda College of Engineering for Women, Namakal, India

B.E(CSE) Student, Vivekananda College of Engineering for Women, Namakal, India

ABSTRACT: The Tractor is one of the friendly automobile in agriculture field. It is Being used for various purpose of Agriculture. Since, It is Designed to operate maximum condition only in Off-roads such as agricultural lands, the Driver Doesn't feel Comfort in the Tractor & Also the heat from the Engine cause change in body temperature and the coolant gases used can Cause Several Throat diseases. In Present Cooling Systems, It uses "Condenser Coil Cooling", The cost Spend on this cooling system is too high. To Overcome this, We developed a low cost cooling system using "Peltier Module". This type of Cooling requires low power of 12V battery source. The power is taken only from engine. The Whole System is Controlled by means of pic microcontroller peltier. The Temperature Raised is being detected and signaled via pic microcontroller peltier, It turns on the cooling system and cooling gets distributed all over the cabin.

I.INTRODUCTION

In thermoelectric materials, electrical energy can be directly converted into thermal energy and thermal energy into electrical energy. Direct conversion between electrical and thermal energy is possible because of two important Thermoelectric effects: the Seebeck effect and the Peltier effect. The Seebeck effect refers to the existence of an electric potential across a thermoelectric material subject to a temperature gradient. The Peltier effect refers to the absorption of heat into one end of a thermoelectric material and the release of heat from the opposite end due to a current flow through the material. Smart cooling technology increases the efficiency of air conditioning and cooling units by lowering lowering the temperature of inlet air. As the smart cooling system reduces air temperature before it enters the condensers of the air conditioning or cooling unit, technical processes remain unaffected.

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II.LITERATURE SURVEY

A compact Darlington low noise amplifier ranging from 0.5 GHz up to 4.0 GHz is proposed in 2 μ m In GaP/GaAs HBT technology offering f_T of 30GHz. This Darlington topology is composed of two common emitter amplifiers, which is used to achieve both advantageous high gain capacity and broad operation bandwidth for multi-system application.[1] Active magnetic bearings (AMB) are used in much high-speed application nowadays. Early development usually requires to measure AMB properties outside its application to adjust and optimize control loops and warm-up/lift-down logic. Many laboratories developed their own, more or less complex test-stands.[2]

In applications where firmware updates are frequent, such as edge devices in the Internet of Things (IOT) networks with embedded systems, the update process is considered a significant role in improving device performance.[3]

There has been an increasing trend of using solar and other renewable sources of energy for generating electrical power for domestic and industrial applications. With regards to solar energy harvesting, research shows that high temperature of the solar panel surface and presence of dust on it decreases the power output, and reduces its efficiency.[4]

The power consumption for building cooling continues to increase due to higher indoor microclimate requirements and

rising outdoor temperatures in summer period. However, the information on real room cooling requirements in Latvia is not currently listed and it is a blind spot when planning solutions for energy efficient cooling system.[5]

Drive systems with fluid links require the implementation of working fluid cooling. General trends in aerospace and automotive industry are the weight and size reduction of drive systems; this is also true for the improvement of cooling systems design.[6]

A grapheme assembled film integrated heat sink and water cooling technology was used to build an experimental set-up of a thermal management system to demonstrate the possibility to achieve efficient cooling of the propulsion battery in electric vehicles.[7]

A focal brain cooling system for treatment of refractory epilepsy that is implantable and wearable may permit patients with this condition to lead normal daily lives. We have developed such a system for cooling of the epileptic focus by delivery of cold saline to a cooling device that is implanted cranially.[8]

Formulate a modeling and control method aimed at direct liquid cooling of data servers. In our application scenario, the server's heat load is rejected into a liquid cooling circuit that extends to individual chips.[9]

High-power STATCOM has been widely used in the power grid, and its rating can reach 100 MVA. Owing to the switching loss and conduction loss caused by the inherent characteristics of the power device, it generates MW-class heat during operation.[10]

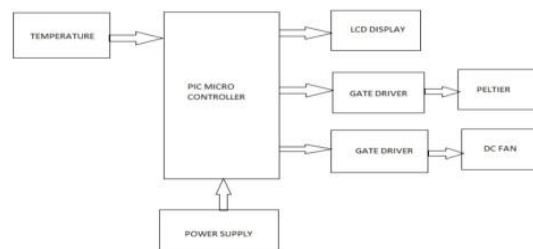
III.MATERIALS AND METHODS

The seeback effect refers to the existence of an electric of an electric potential across a thermoelectric material subject to a temperature gradient.The Peltier effects purpose to the release of heat from the opposite end due to current through the material.

IV.PROPOSED SYSTEM

The type of air conditioners have wide range of application. An air conditioner is the major home appliances system or mechanism design to change the air temperature and humidity within an area. The cooling is typically done using a simple refrigeration cycle, but sometimes evaporation is used commonly for comfort cooling in building and motor vehicle. It is flexible and can be used in areas where microcontrollers have never been used before as in microprocessor applications and timer functions etc. The operating voltage is between 4.2 volts to 5.5 volts, it may get damaged permanently. Thermoelectric cooling uses the peltier effect to create a heat flux at the junction of two different types of materials. The direct current fans, or DC fans, are powered with a potential with a potential of fixed value such as the voltage a battery. This magnetic field then creates a torque that causes the motor to rotate.

BLOCK DIAGRAM



PIC Microcontroller

The pic microcontroller PIC16F877A is one of the most renowned microcontrollers in the industry.

Temperature sensor

A temperature sensor is an electronic device that measure the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes.

Power Supply

5V power supplies (or 5VDC power supplies) are one of the most common power supplies in use today. In general, a 5VDC output is obtained from a 50VAC or 240VAC input using a combination of transformers, diodes and transistors.

LCD Display

LCD(Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of uses cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels.

Gate Driver

A gate driver is a power amplifier that accepts a low-power input from a controller IC and produces a high-current input for the gate of a high-power transistor such as an IGBT or power MOSFET.

Peltier

Thermoelectric cooling uses the peltier effect to create a heat flux at the junction of two different types of materials .A peltier cooler, heater, or thermoelectric heat pump is a solid-state active heat pump which transfers heat from one side of the device.

Dc Fan

The direct current fans,or DC fans, are powered with a potential of fixed value such as the voltage of a battery.In contrast,the alternating current fans,or AC fans,are powered with a changing voltage of positive and of equal negative value.

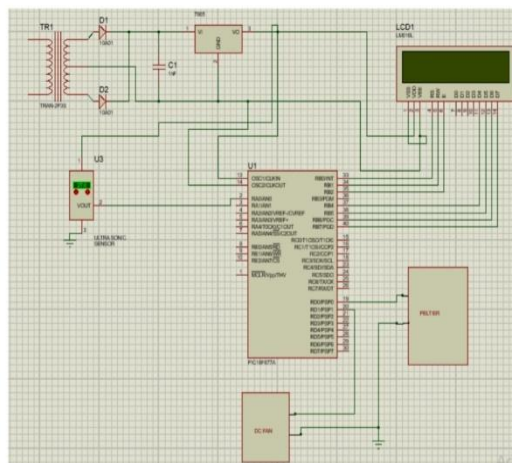
ADVANTAGES

- Thermoelectric cooling commonly refers to as cooling technology using thermoelectric coolers.
- Highly reliability.

DISADVANTAGES

- It gives maximum output but it is producing harmful gases to the atmosphere.
- The harmful gases are chlorofluoro carbon some other gases are present.

IV.RESULT AND DISCUSSION



V.CONCLUSION

Considering , the Driver's Comfortness this project get its design. A thermoelectric cooling system coupled with a gravity assistant heat pipe was designed and developed based on a theoretical model to enhance the heat dissipation from hot side of thermoelectric module. To figure out the performance of this proposed TEC system, an experimental apparatus was built in a climatic chamber. The cooling capacity, inlet and outlet air temperature through the thermoelectric module, and the temperature within the test box were measured, compared with a TEC system with heat sink.

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