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Thermoelectric Multiutility Refrigerator Cum Heater

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Abstract: In this paper, an thermoelectric multiutility refrigerator cum heater using peltier and pic controller is been focused. This proposed system consists of peltier crystal which is used to produce both refrigeration and heatness. Thereby providing simultaneous heating and cooling. The proposed system provides refrigeration as primary utility with bonus utility using TEC12706. This technique is primarily concentrated in medical arena. This setup concentrates on solar energy inorder to avert the environmental contamination.The minimum temperature of 25 degree for cooling and the maximum temperature of 60 degree for heating can be achieved. The overall setup is cost effective because solar always a onetime investment for long duration.

Keywords:Solar panel, TEC crystal and dual utility.

I.INTRODUCTION:

The world is now fast developing and in this type of generation the multi or dual utility has started attracting the people than the single utility. nowadays energy generation and distribution has become a tough fight for the engineers. The carbon contentare been hugely increased when compared with the carbon limit table.

So in this paper by convincing all the above issues we have proposed a paper by which we have included the dual utility and the clean energy generation i.e.(renewable energy) using solar panel. From the solar panel we can reach the demand for the full setup and by employing a battery for the storage of the energy from the solar panel.

This proposal is mainly done keeping in mind the challenges faced byarmy soldiers, because they need to travel in different sectors and so carrying essential medicines and which may contaminate at different temperature and weather conditions and in order to serve them the from contamination of medicines and help to store them for further uses this system will be useful.This proposed system also has the temperature sensors and LCD display in which the proposed is been divided or been formed into 3 main divisions.

II.NEED OF PIC CONTROLLER AND CHAMBER

In general, the energy is the ability to do a work. The pic microcontroller used is 16F877A.This controller gets the supply of 5v from the batteries. This microcontroller consists of 40 pins in which we use pins which are necessary for this proposal.The microcontroller has 2 temperature sensor which are used to sense the temperature inside the chamber and send the analog signal and then by using the ADC the analog is been converted into digital and then the data is been displayed in the LCD display. The pic controller

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act as the heart of the system and it is also considered as the signal sender for the all equipment.

The chamber is the energy storage place which is made of semiconducting and insulating material. The chamber is designed in a way that the energy flow from the chamber to the atmosphere is restricted. The chamber consist of two important element of this system. 1.TEC crystal 12706 2.Temp sensor.

The TEC crystal is the one which produces both heat and cold inside the chamber. The chamber is designed in a way to bear high temperature without any leak or damage to the chamber. Then temperature sensor is also fitted in the chamber and so it can sense and send it to the LCD display.

III.NEED FOR SOLAR PANEL SETUP AND ALTERNATE SETUP.

The Demand of energy in the world is been increasing day by day and so to overcome them this proposal has renewable source by harvesting energy from solar panel. The solar panel can be used for the supply of the equipment. When the energy from the solar panel doesn't reach the demand the dc-dc booster can be used and in this generation the carbon content is ejected in large amount for example when we take nuclear and the thermal power plant,they are non- renewable and they aren't ecofriendly and so to produce a clean and quality energy we have included solar panel in this setup.

The alternate is power system is nothing but when there is no chance of solar power. The setup for charging the batteries with ac supply is also included i.e., the ac supply of 230v is been step down using transformer and by using rectifier another circuit is also made as a backup.

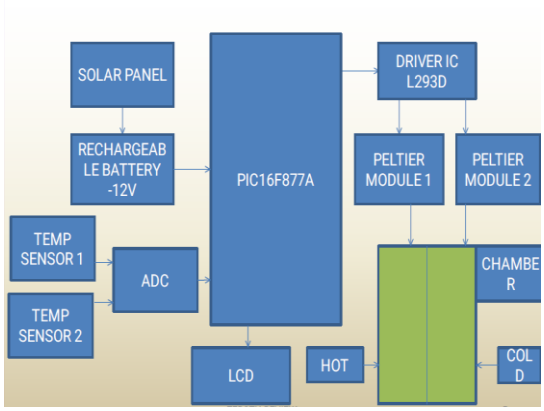
IV.PROPOSED SYSTEM INTRODUCTION

In this,proposal we have solar panel for the energy supply and the generated energy is given to the batteries to store. The stored energy from the battery is been supplied to the turning on of pic microcontroller 16f887a, the microcontroller is been coded according to the demand and the microcontroller supplies the energy to the temperature sensor and buzzer is been connected with pic controller for emergency beeping and then the voltage of 5v is been supplied to the motor driver. The motor driver l293d is used step up the voltage and current from 5v to upto 36v and current upto 3a maximum which can tackle both the peltier and the peltiers are been fitted into the chambers.

The chamber is made of insulating material and the chamber has peltier and temperature sensor lm35, then when the required power is been given to the peltiers and the coolness and the heatness are been spread in the chamber they take atleast 15 minutes to reach the presetted value.

V.BLOCK DIAGRAM

A.BLOCK DIAGRAM



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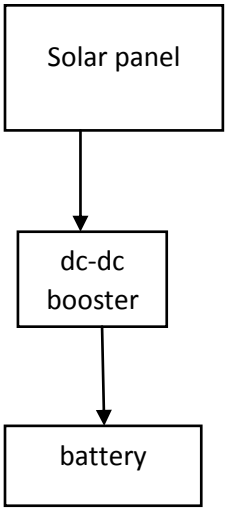
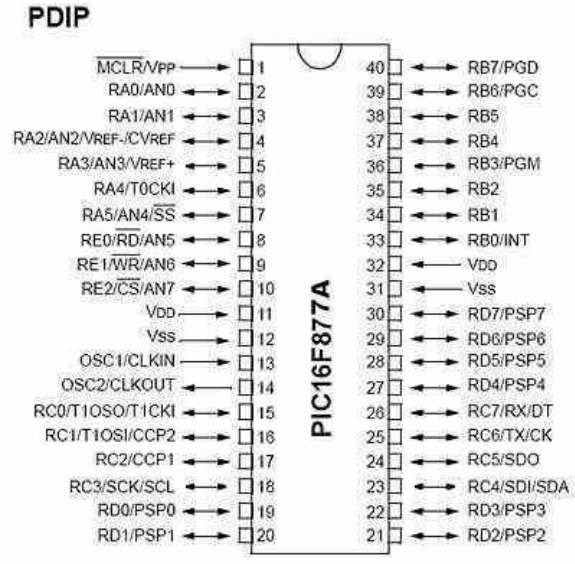
B. Generation:



C. Pin diagram:



Pin1-reset

Pin2-temp sensor 1

Pin2-temp sensor 2

Pin 8-RE0 to LCD display

Pin 9-RE1 to LCD display

Pin 10-RE2 to LCD display

Pin 15-RC0 to motor driver(l293d)

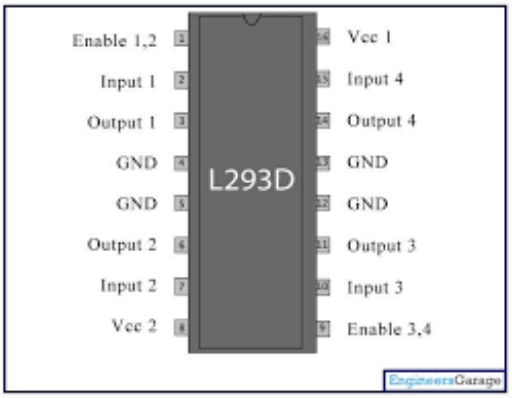
Pin 16-RC1 to motor driver

Pin 17-RC2 to motor driver

Pin 18-RC3 to motor driver

Port D pins to LCD display

D. Pin diagram of L293D:



Vcc 1= +12v

RC0 ,RC1-INPUT

PIN 3,6 –OUTPUT TO PELTIER

4 and 5-GROUND

Simultaneously on the other side.

VI. Table 1:

Performance Specifications

Hot Side Temperature (°C)	25°C	50°C
Qmax (Watts)	43	49
Delta Tmax (°C)	66	75
Imax (Amps)	5.3	5.3
Vmax (Volts)	14.2	16.2
Module Resistance (Ohms)	2.40	2.75

VII.BENEFITS OF THIS SYSTEM:

- This system can be used in medicine storage.
- This decreases the loos and makes the loss useful.
- Risk to life from electric shock is lessened.
- Very useful in places where natural calamity occurs.
- Economically low in cost.
- When travelling large distance it is very Beneficial.

VIII. CONCLUSION:

The thermoelectric mutliutility refrigerator cum heater is very economical and power efficient. It reduces the carry of both heater and refrigerator instead a single system can be carried, this can be carried whenever needed and can be turned ON at any place and any time and this helps in managing the temperature to any degree and at now the temperature cannot be changed i.e., the standard temperature of 25 to 60 can be achieved by only programming in the pic controller.

In future the manual lever for changing the set temperature or the HMI human machine interface can be included to make the more compact and easy to use. By using solar panel it is very ecofriendly and it also helps in saving time and energy.

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