Juni Khyat ISSN: 2278-4632 (UGC Care Group I Listed Journal) Vol-13, Issue-05, No.01, May: 2023 FABRICATION OF WATER COOLER CUM AIR CONDITIONER

 Shaik Sandhani PG research scholar, Refrigeration and Air-Conditioning, Dept of Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, A.P, India
Dr. D.R Srinivasan Asst. Professor, Dept of Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, A.P, India

Abstract

The main aim of this project is to design a multifunctional device which can provide cold water along with regular air conditioning cycle and which can works as a water cooler along with air conditioning. In this to measure the water temperature using DS18B20 temperature sensor and will be display on LCD. In this measure thetemperature and humidity of air conditionerchamber using DHT11 sensor and will be display on LCD module. By using POT (potentiometer) user can set the temperature value and based on that microcontroller willswitch ON/OFF the relay for circulating thewater. When the water goes though the copper pipe. This cool water is pump into the water tank which uses to run the Air cooler. And also, we can attach the exhaustfan at surface of the copper coil. By using fan, we can spread the cool air in the room which will act as an air conditioner. This airconditioner system consists of filters to filter the air.

Keywords: Power supply, PIC Microcontroller, DHT11 (Temperature and humidity sensor), Exhaust Fan, Room(Chamber), Water tank, Copper Pipe, DS18b20 temperature sensor. LCD display.

1. Introduction.

In India, during summer season the temperature increases up to about range of 45°c to 50°c. During this season there is increase in demand of cooling equipment' ssuch as air coolers, air conditioner etc. If we talk about traditional air coolers, these coolers have very high demand in India because they are cheap and affordable in every aspect and most of the Indian population is belongs to the middle class and thus they can afford these traditional coolers. But these coolers too have disadvantages such as they consume large amount of water i.e. about 45 to 50 liters of water every day. And also, we know that middle class population of India is about 267 million. Although if we consider 250 million of population uses about 50 liters of water every day in their cooler, they consume 12500 million liters of water only in summer season which is very high amount. Also, these coolers consume large amount of wood wool, which is obtained bycutting large number of trees and trees are the essential parameter which is used for reducing global warming. In over span of three decades, there is continuously increase in energy demand due to everlasting population increases in India. This has led to increase in pollution and power cost that cannot be afforded by normal person. The continuous cycling observed in those equipment's reduces their lifetime and increases power requirement. Worldwide acknowledge and said that refrigeration and air conditioning systems are responsible for roughly 30% of total energy consumption, therefore unquestionably with a major impact on energy demand. Researchers in many countries have been involved in developing person. The continuous cycling observed in those equipment's reduces their lifetime and increases power requirement.Worldwide acknowledge and said that refrigeration and air conditioning systems are responsible for roughly 30% of total energy consumption, therefore unquestionably with a major impact on energy demand. Researchers in many countries have been involved in developing refrigeration and air conditioning systems that deal with the drawbacks of conventional systems. Water Cooler and air conditioning systems that deal with the drawbacks of conventional systems.

2. LITERATURE SURVEY

In a paper published by Mr. V.D.Navle, Prof.J.N.Yadav titled as "Design, Construction of Combined Airconditioning and Refrigeration Unit" in which by recovering part of energy for air conditioning effect energy can be saved. Since variation of outdoor air temperature is small in tropical countries, cooling isneeded year around. This is the best condition to perform combined effect of refrigerator and air conditioners for energy saving. A prototype combined air conditioning and

Juni Khyat

(UGC Care Group I Listed Journal)

ISSN: 2278-4632 Vol-13, Issue-05, No.01, May: 2023

refrigeration is designed and built. Refrigeration systemusing CO2 was commonly applied in marine sector. At that time, this machine was operated as subcritical cycle. There had been operating problem with this system when the ship was passing through hot water temperaturewhere its cooling capacity drops rapidly(Lorentzen, 1995). To increase the cooling capacity, some additional CO2 had to be charged into the system and then discharged when air temperature has decreased, which of coursewas not a good practice from operational practice point of view. This problem has been solved by the invention of Prof. Gustav Lorentzen who suggest transcritical cycle in place of subcritical cycle which make possible to operate the transcritical cycle like subcritical cycle without a need of charging and discharging CO2 manually.

3. Implementation:

Block diagram of the project



The project **"Fabrication of Water Cooler cum Air Conditioner"** was designed a multifunctional unit which can providewater cooler along with air conditioning such that the running cost should be reduced. This is how we are trying to make the environment and a common person comfortable. By this product a normal person could have a sound sleep so that his productivity for the next day increases.

4. Related Work:

The brief introduction of different modules used in this project is discussed below:

PIC 16f73 Microcontroller:

A PIC's instructions vary from about 35 instructions for the low-end PICs to over 80 instructions for the high-end PICs. The instruction set includes instructions to perform a variety of operations on registers directly, the accumulator and a literal constant or the accumulator and a register,

as well as for conditional execution, and program branching.

RAM	102
Memory Type	Flinh
Program Memory K Bytes	7
DO Pine	22
Pin rout	28
Max. CPU Speed MHz	20
Timera	2 - 8-bit & 1 - 16-bit
Temperature Range	-40 to 125

Juni Khyat (UGC Care Group I Listed Journal) Copper tube:



Copper tube is one of the components that is needed in air conditioning and refrigerantsystem. The tube is used as a path for the refrigerant to flow between system components and to contain it from escaping to the atmosphere. Sizing, installation layout and fittings must be done properly toensure that the system runs efficiently.

Exhaust fan:



Exhaust fans work by sucking hot or humid air out of a small, localised area, allowing fresh air to enter from elsewhere (perhaps a doorway or vent) in order to replace it. The warm air that's drawn out using an **exhaust fan** is then pulled through a ducting system and expelled outside.

Air conditioner Chamber:



Fig: Air conditioner chamber

Ds18b20 temperature sensor:

The DS18B20 is a small temperature sensor with a built in 12bit ADC. It can be easily connected to an Arduino digital input. The sensor communicates over a one-wire bus and requires little in the way of additional components. The sensors have a quoted accuracy of \pm -0.5 deg C in the range -10 deg C to \pm 85 deg C.



Fig: DS18B20

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DHT11 sensor:

The DHT-11 Digital Temperature and Humidity Sensor is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin (no analog input pins needed).



Fig: DHT11

Relay: The LCD requires 3 control lines as well as either4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus. If a 4-bit data bus is used the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus the 8 Relay is an electromagnetic switch. It consists of a coil of wire surrounding a softiron core, an iron yoke, which provides a low reluctance path for magnetic flux, a movable iron armature, and a set, or sets, of contacts; two in the relay pictured. The armature is hinged to the yoke and mechanically linked to a moving contact or contacts. When an electric current is passed through the coil, the resulting magnetic field attractsthe armature and the consequent movement of the movable contact or contacts either makes or breaks a connection with a fixed contact.



LCD display:

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines respectively.

Fig: Relay





Fig: pot

A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. If only two terminals are used, one end and the wiper, it acts as a variable resistor or rheostat.

The measuring instrument called potentiometer is essentially a voltage divider used for measuring electric potential (voltage); the component is an implementation of the same principle, hence its name. In this project to set the temperature we are using pot.

ACKNOWLEDGEMENT

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for thefurther research to be done in future.

Conclusion:

A portable air conditioner & Cooler systemcan be fabricated by using thermoelectric module & electric control unit for air conditioner & Cooler purpose. The system is self-powers & can be used in isolated & a remote part of the country where load- shading is a major problem. Thus, project can be concluded that solar energy systemsmust be implemented to overcome increasing electricity Crisis. In order to utilize renewable energy, solar energy is integrated to the battery is used to run the air conditioner. It's an ecofriendly initiative, thus it promotes green technology for the future. This technology has not been widely accepted due to its initial cost, but by using the waste heat, thesystem becomes very efficient compared toits traditional counterpart.

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