

Water Pump Controller using Arduino UNO

Mr. Khapre Viraj¹, Mr. Ankit Fabian², Mr. Inamulhaq Inamdar³, Mr. Vishal Mohite⁴

^{1,2,3,4}Student, TYCO AISSMS's Polytechnic, Pune.

⁵Dept. of Computer Engineering, AISSMS's Polytechnic, Pune, Maharashtra, India

Abstract – People face a problem of water shortage cause of very low temperature in the high altitude areas resulting in freezing of water pipes. So, they either have to change the water pipes or remove the blockage. As the diameter of water pipe is small so water easily gets frozen, as in other case it takes a lot of time for large amount of water to get frozen like water tank, etc. By using this Arduino water pump controller it will make it very easy for the people to get access to water for their daily use.

1. INTRODUCTION

As people cannot get easy access to water in the high altitude areas where the temperature is very low because of which the water gets frozen in the pipelines because the water gets frozen easily if it is completely filled in the pipe. This is a very big problem in areas with low temperature. Giving a solution to this problem the water pump controller will be in which there is a temperature sensor which will sense the temperature in the environment and if the temperature is below freezing point the water will be sent in small gaps through the pipeline because of which the pipe won't be full of water and the water won't turn into ice. And when the temperature is above freezing point the water will flow through the pipes continuously without any gaps.

1.1 DIFFERENT TYPES OF ARDUINO BOARD

Arduino is a software and hardware company that manufacturers and designs many microcontrollers and single board microcontrollers that are used for different applications and projects. Types of Arduino boards are:

- Lily pad Arduino.
- Arduino mega.
- Arduino Leonardo.
- Red board.
- Arduino UNO.

The arduino board used in this project is Arduino UNO

1.2 Arduino UNO:-

Arduino is a open source platform used for building electronic projects. Arduino consists of both software or IDE (Integrated Development Environment) and microcontroller that runs on the computer, which is used to write the code

and upload the code to the physical board. It has become very popular among he people who are just starting out with electronics. The Arduino board does not need a separate piece of hardware to load the code. The code can be loaded simply using a USB cable.



Fig -1: Arduino UNO board

2.1 LCD:-

LCD is a type of display which is used in digital watches, TVs and many portable computers. The LCD display uses sheets of polarizing material with a liquid crystal solution between them. An electric current passes through the liquid which causes the crystals to align so that the light cannot pass through them. The technology of the LCD has advanced very fast since its first inception which was launched over a decade ago. The up gradations have resulted in brighter displace, higher resolutions, reduce response time and lower cost for manufacturing process.



Fig -2: LCD Display (2 x 16)

optocoupler is possible because LEDs can sense light in addition to emitting it. An optocoupled relay contains a photodiode optocoupler which drives a complementary pair of MOSFETs. A slotted optical switch contains a sensor and a source of light, its optical channel is open which allows the modulation of light by the external objects which obstruct the path of light or the reflecting light into the sensor.

5. 5 PIN MINI SPDT 12V RELAY:-

A relay is a switch which is electrically operated there are many relays which use an electromagnet to operate the switch mechanically, other operating principles are also used such as a solid state relay. Whenever there is a need to control the circuit by a separate low power signal or several circuits are to be controlled by one signal a relay is used. The first relays were used in circuits as amplifiers. The incoming signal from one circuit is re-transmitted to another circuit by repeating the signal. To perform logical operations in the early computers and telephone exchanges relays were used.

To handle the high power which is required to directly control an electric motor or other loads is a type of relay called a contactor. Instead of using a semiconductor to perform switching the solid state relay control power circuits with no moving parts. To protect electrical circuits from overload and faults relays with multiple operating coils are used in modern electric systems the functions are performed by a digital instrument called as 'protective relays'.

Magnetic latching relay consist of either one or two coils. It requires one pulse of coil power to move their contacts in one direction and another redirected pulse to move them back. If the pulse is repeated it will have no effect. Applications where interrupted power should not be able to transition the contacts, magnetic latching relays are useful.

In magnetic latching relays on a single coil device, the relay will operate in one direction when power is applied with one polarity and the polarity will be reversed when it is reset. On a dual coil device the coil is reset when polarized voltage is applied. To differentiate between operate reset commands an AC controlled magnetic latch relay is used which has a single coil that employs steering in diodes.



Fig -5: PIN MINI SPDT 12V RELAY

6. Benefits of water pump controller:-

People can get easy access to water for their daily needs like cooking, washing, etc. it saves a lot of effort because when the water gets frozen in the pipes to again start the normal flow of water through the pipes, the pipes have to be removed and clean. It saves a lot of energy because the motor switches on and off according to the temperature in the environment automatically.

7. Convenient:-

It is very convenient as the motor switches on and off according to the temperature in the environment. There is no need to manually switch it on/off whenever it is to be needed.

8. Profitable:-

It is profitable to the user as it is cheap. It saves a lot of time as there is need to change the pipeline when the water gets frozen in the pipes in the high altitude areas, as it avoids the water to get freezed in the pipelines.

It requires less voltage to operate the Arduino UNO board as it takes 12V DC supply. This water pump controller can work for 5 years or more. There is no need to manually switch it on/off whenever it is to be needed, as the motor switches on whenever the temperature is below freezing point and it switches it off when the temperature is above freezing point this helps in saving energy.

9. CONCLUSION

This paper summarizes representation and brief information about the water pump controller used for the flow of the water in the pipelines without freezing.

References:

- [1]. Remote Temperature Monitoring System Using ARM, Arduino and ZigBee Vijay S. Kale¹, Madan B. Matsagar², Avinash D. Sonawane³, Chandrakant L. Ambekar⁴ Associate professor, Department of Electronic Science, KTHM College, Nashik, Maharashtra, India^{1, 2} M.Sc. student, Department of Electronic Science, KTHM College, Nashik, Maharashtra, India^{3, 4}
- [2]. Review on Arduino Based Smart Irrigation System Gulnaj Khan¹, Kanchan Dhakate¹, Shivani Kambe¹, Shraddha Meshram¹, Prof. Akhilesh Lunge² 1BE Students, Department Computer Science and Engineering, J. D. College of Engineering and Management, Nagpur, Maharashtra, India 2Assistant Professor, Department Computer Science and Engineering, J. D. College of Engineering and Management, Nagpur, Maharashtra, India.