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Smart Electric Heating Device

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Abstract: ***This proposes a Novel Automatic Timer Smart Water Heating Rod. This will be an Energy-Efficient Heating rod, which will be switched off automatically with the help of Timer (Arduino based). It will automatically cut-off supply, as soon as specified time is attained. All process show in Liquid Crystal Display, first set time value how much time you will need for boiling water after set time setting press push button to start device, start time after complete time value Relay automatic Cut-Off Secondly, it will avoid over hearting as well as burning of heating Rod (Due to Heat Losses), which sometimes leads to short-circuiting as well as unsafe for the User (operator)***

Keyword: Arduino Uno, Relay, water sensing device, Joystick, push-button, LCD

I. INTRODUCTION

Electric rod is a water heating device mainly used in home appliances with a hot spring of boiling water. It can also be used instead of a water heater, for household purposes. The electric heater which is immersed in water for heating the water is called **Immersion Heater**. Immersion Heater body is made of a metallic substance, and the heating element is made of copper which is installed inside a capillary tube. The tube is found in 'U' shape or Coil shape. The capillary tube is filled with magnesium oxide which works as an insulator important part for protection. Energy => I^2*R*t = m*C* (Tss- Tini) -: I is current, R is resistance, t is time the element is inserted, m is mass of water, C is specific heat, Tss is steady-state temperature if time is long enough or just the final temperature, Tini is initial water temperature. Both the end of the tube is sealed. The supply connection is given through three pins. It works with a continuous flow of water. In winter season all are dependent on Hot water for lots of works like Bathing and other house works, Lots of heating device but mostly use Immersion water heating Rod (IMHR) easy to use without any complicated everyone prefer IMHR, But there have lots of problems face like accident, Fire, Shock so on, The rod does not get heated but gives shock, Heating element of the immersion rod gets frequently burn, Need to solve that's type of problems helping Automatic Timer Smart Water Heating Rod

LCD

Liquid crystal Library allows you to control LCD displays usually tell by 16-pin.

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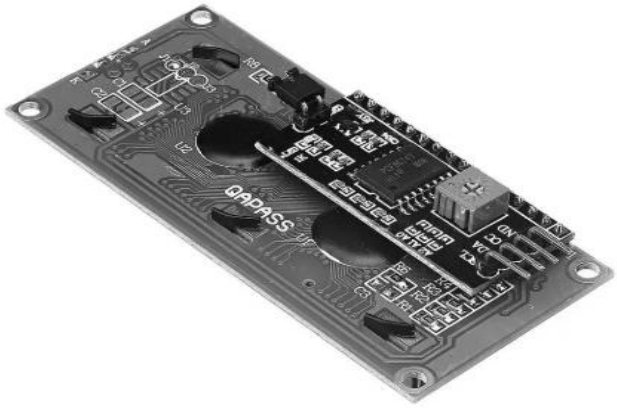
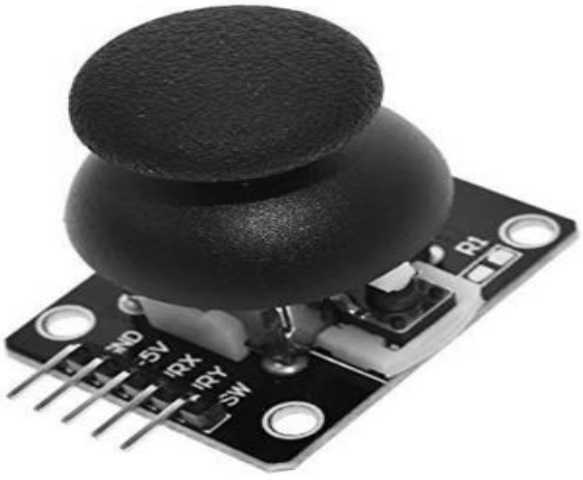
Using I2C or interface to the LCD screen, First import library to your programming software go to sketch-> include library-> add zip library, Today everyone uses I2C protocol because the help of this reduces the number of Connection and High efficiency without facing any error data.
Connection:- GND-> ground, VCC-> +5V, SDA-> A4, SCL-> A5. .



Joystick

The joystick in the two potentiometers that allow us to measure the movement of the stick in 2-D. The potentiometer is a variable resistor in a way they act as sensors providing us with variable voltage depending on the rotation of the device around its shaft (analog value). we need to monitor joystick has to make polling to two of the analog pins, we can send these values back to our monitor, DAC (digital to analog converter that's is measure the value from the potentiometer in the joystick) value between 0-1024.



Push-button

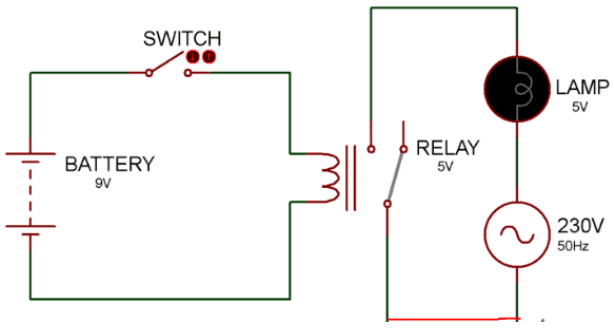
Push button switches are manually operated switches that are available in different shapes. The pushbutton switch is a switch designed so that its contacts are opened and closed by depressing and releasing a pushbutton on the switch in the direction of its axis.

Arduino Uno

Arduino Uno is a microcontroller board developed by Arduino.cc which is an open-source (OS) electronics platform mainly based on AVR microcontroller (Atmega328). First Arduino was stared in Interaction Design institute lvrea in 2003 by David Cuartielles and Massimo Banzi the intention of providing a cheap and flexible way to students and professionals for controlling a number of the device in the real world. Arduino Uno comes with a USB interface, 6 analog input pins (I/P), 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM. It allows the designer to control and sense the external electronic device in the real world.

Relay

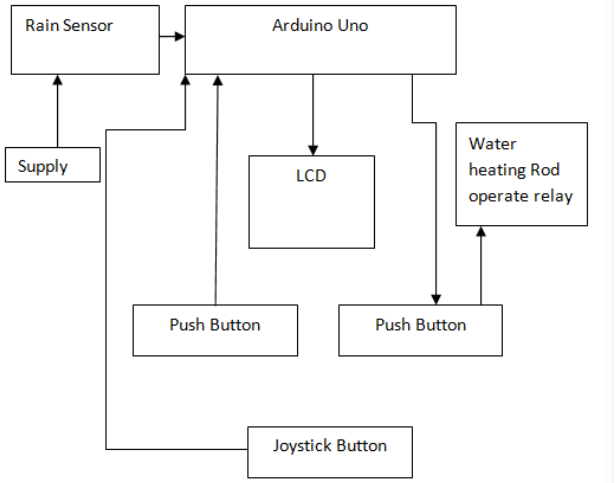
Relay is an electrically operated switch. It works like a switch NO and NC, input side needs to give a signal (DC) from any hardware or direct supply and output side control any appliances (AV).



Water heating rod

The heating element of an electric shower is immersed in the water stream using a nichrome resistance electrically isolated. Due to electrical safety standards, the modern electric shower is made of plastic, Electrical Appliance that uses more electric current than a washer or a dryer, electric shower installation requires careful planning.

BLOCK DIAGRAM



II. METHODOLOGY

Drawbacks in the existing state:-

Some person attach a Rod on a Bucket without timing, unfortunately, they busy in their works forget to off a Rod it's very dangerous because after water overheating wire is burnout catch a fire, dangerous for humans with consuming more electric power because we need a normal hot water but without automation, it's dangerous for some time or overheating without requirement more hot water, consume more electric power.

Overcome:-

First give supply to Rod with Novel Automatic Timer Water Heating Rod, after that take a bucket to attach a Novel system, for starting Rod is not working.

There have 2 states:-

State 1 is the Joystick button for Increment time (When we move on the left side) and decrement time (when we move on the Right side).
State 2 is push-button after set a time need to press a push-button for activating a system.
When supply on Automatic Timer Rod for water heating using this system first need to set a time how much time you will act like 1 minute, 2, 3 up to 30 minute (using joystick button time show in LCD) first select time let you set 5 minutes after that system say press ok button to activate (using push-button shown in LCD), If you press ok push button time start Relay on Rod start for water heating, after 5 minutes Relay automatic off.

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When sometimes people direct put water heating Rod at a Bucket with a minimum level of water, they didn't know after a few mins burn out Bucket with Heating Rod. It's very dangerous.
Solve this problem we make a Water sensing Device when water touch on 2 metallic Points after that we operate a Rod setup Timing than start……But some time Water level in Minimum didn't touch to 2_Metallic Points Rod is didn't start it's very helpful to us..

III. WATER SENSING DEVICE

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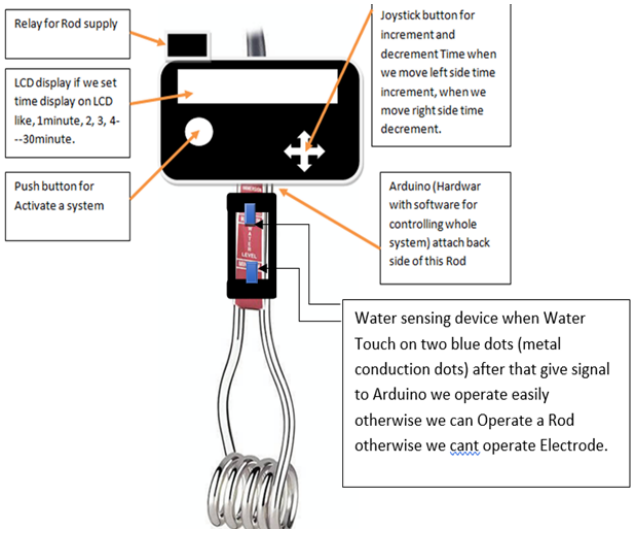
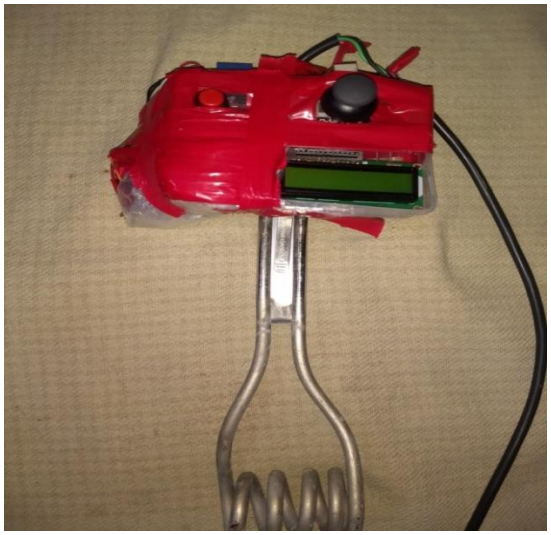
DIAGRAM



IMPLEMENT



IV. RESULT

Energy Wastage is reduced by controlling the timer or re setting it with the help of the knob. By the help of water sensor the protection of the electric rod and human beings Anyone can use this rod easily as the protection is provided and chances of short circuit is less. The Electric heating of the rod is improved as the timer is being used in this project. Project is successfully completed.

V. CONCLUSION

When determining the appropriate selection and application of water heating equipment, high efficiency equipment, the lifetime of equipment is more, No more power wastage, as per timer Project is activate after completed time Electric Rod deactivate save energy and protect from fire, The Chances from accident are negligible

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