

# Machine Overheat Detection with Alert

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**Abstract** - This proposed system is used to detect temperature of devices that are overheated. This project is very beneficial, especially in places like factories or industries consisting of big machines where it is very necessary to take some action in case the machine is overheated. The system uses a digital temperature sensor in order to detect temperature and pass on the data to the microcontroller. The Atmega328 microcontroller processes data and sends the temperature to be displayed on an LCD screen. The system uses a 12VDC adaptor to supply power to the system.

## 1. INTRODUCTION

Machine generally converts energy from one form to another, heat are generated during energy conversion process. Failure of machine sometimes occurs due to the machine generates more heat. This leads to heat building up in the machine which may be catastrophic to the safety of the machine. Thus machine overheat detection with alert helps to give alert when excessive temperature is detected. This project is very beneficial especially in places like factories or industries consisting of big machines where it is very necessary to take some action in case the machine is overheated.

## 2. LITERATURE REVIEW

### 2.1 Effects of overheating

Maintaining an optimum temperature allows the life of electrical equipment to be extended, it reduces premature failures and acts to prevent an unforeseen electrical stress situation. Overheat in electrical and electronic circuit component leads to burning and subsequently failure which reduces the life span of the components. Overheating in some electrical equipment result in rapid ageing of some electrical insulation such as increased heat on particular components.

### 2.2 Prevention of overheating

In industrial machines, cooling are provided according to equipment's size and types. Environmental elements such as dust, vibration and corrosion have impact on the machine temperature. Since overheating in electrical and mechanical machines is undesirable for any reason because it compromises system performance, safety, and security, controlling and minimizing is not enough to prevent overheating; other symmetric factors also need to be taken into accounts. Overheating signal and alarm system has proven helpful for industrial, automotive, power plants and medical electronics

## 3. COMPONENTS USED

List of the components that are used in this system are as follows: "Temperature sensor, Microcontroller, LCD 16\*2, Arduino NANO board I2C converter, Adapter, Transistor, Push Button, and Buzzer.

## 4. METHODOLOGY

Working of the components is given as follows:

- 1) Atmega328p microcontroller: The atmega328p is an 8 bit microcontroller from microchip atmel, widely used in embedded system and arduino boards.



Figure1: ATmega328p microcontroller

- 2) Arduino nano board: arduino nano is a small microcontroller board based on atmega328p. it is commonly used for building concept, low power electronic project.



Figure2: arduino nano board

- 3) LCD Display: liquid crystal display is a 16\*2 display module. it is typically used to display text in microcontroller based projects ,or electronic devices



Figure3 : 16\*2 LCD Display

- 4) Adapter : adapter helps to provide necessary voltage and current to run the circuit. in this project we have used a 12v transformer to supply power to the system.



Figure4: Adapter (12v )

- 5) LM 35 sensor : it measures the temperature of machine surface and its environment. maximum limits of this sensor is 120v.

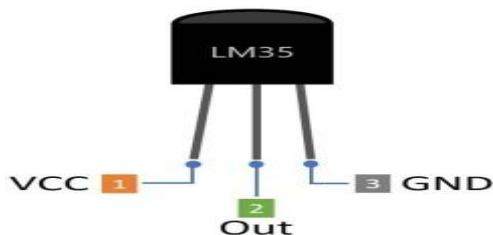


Figure5: LM35 Temperature Sensor

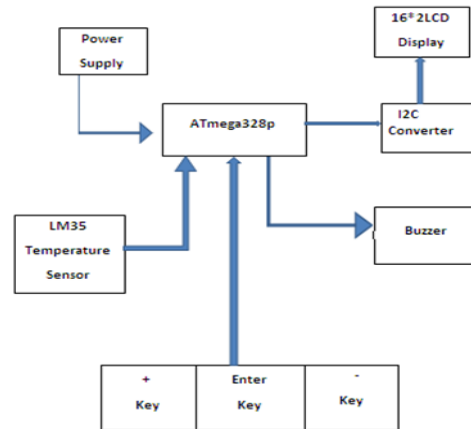
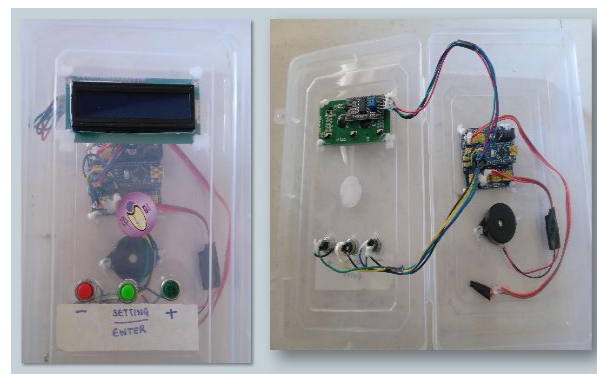


Figure6 : Block Diagram of system

System is operating on 5v power supply but the incoming input voltage is of 12v which is provided bthrough a 12v adapter. This 12v supply is converted into 5v supply by a voltage regulator IC already mounted on board. This system uses an analog temperature sensor namely LM35 temperature sensor, operate on 5v supply.

If this sensor detects higher temperature than the reference temperature then the microcontroller process this signal pass on the buzzer. The buzzer which is used in this system gives a alert of higher temperature. This buzzer operates on 12v but the whole system works on 5v so by using transistor in between board and buzzer we can easily convert 5v supply into 12v supply. We have used three push buttons (enter, positive, negative) by pressing enter button we can change the settings of the temperature and by using positive and negative button we can easily increase and decrease reference temperature.

## 5.HARDWARE MODEL



## 6. RESULT

The temperature of different system can be measure by this project. On the LCD panel, current temperature of machine is shown. When temperature of the machine extends the pre-determine value, operator will receive a warning signal continuously. The system will shutdown when temperature hit or surpass the threshold setting. Operator should be aware throughout the alert period and take the required steps to cool the system.

## 7.0 ADVANTAGES

**Preventive Maintenance:** Proactive measures can be taken before the machine fails due to overheating.

**Increased Equipment Lifespan:** Regular monitoring and alerting can extend the life of the machine by preventing it from running in extreme temperatures, which can cause wear and tear.

**Improved Safety:** Alerts allow operators to take action before any hazardous situations occur.

## 8. CONCLUSION

The future of machine overheat detection with alert systems is tightly linked to the ongoing digital transformation in industries. With AI, and automation taking center stage, these systems will become more intelligent, autonomous, and predictive, moving beyond simple detection to offer preventative solutions. With the help of Thermal imaging and AI diagnosis we can modify this system.

## REFERENCE

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