

# Deep Fridger Fault Detection by using Arduino and GSM

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**ABSTRACT** - The proposed system in improving the overall operation and longevity of deep freeze refrigerators in various environments. This paper presents a comprehensive system for deep freeze refrigerator fault detection and voltage control. The system integrates sensors, microcontroller units, and voltage regulation mechanisms to enhance the reliability, energy efficiency, and performance of deep freeze refrigerators. By continuously monitoring temperature, compressor operation, and coolant levels, the fault detection system can identify abnormalities and potential malfunctions early, minimizing downtime and maintenance costs. Additionally, the voltage controller regulates the input voltage supplied to the refrigerator, ensuring stable operating conditions and protecting the appliance from damage caused by voltage fluctuations. The user interface provides real-time feedback to users and allows for remote monitoring and control, enhancing convenience and accessibility.

**INDEX TERMS** – Arduino, LCD Display, Voltage sensor, Relay, Adapter, Adder pin etc.

## I. INTRODUCTION

Deep-fridge is a special type of fridge used to store Ice-cream and Kulfi at a temperature up to  $-20^{\circ}$ .

The main components of deep fridger are

- 1) Compressor.
- 2) Pipelines.
- 3) Gas 134a.

The property of this gas is it gets cooled when compressed at high pressure. There must be some system which detects these faults

## II. PROBLEM STATEMENT

There are three different problems that might occur in deep fridger.

- 1) Compressor Faulty.
- 2) Gas leakage due to fault in pipeline.
- 3) Over Voltage, Under Voltage fault.

These faults are needed to be detected at the earliest i.e. within first 15-20 minutes which is not possible with the help of temperature sensor because temperature sensor detects it after 3-4 hours.

## III. LITERATURE SURVEY

**Introduction to Deep Freeze Refrigerators:** Overview of deep freeze refrigerators, their importance in various industries (e.g., food storage, pharmaceuticals), and the need for efficient operation and fault detection.

**Refrigeration System Components and Operation:** Explanation of the key components of a deep freeze refrigerator system, including the compressor, condenser, evaporator, and expansion valve, and how they work together to maintain low temperature.

**Design and Implementation of Smart Refrigerator Using Arduino and GSM** (International Journal of Science and Research, 2018): This paper presents a smart refrigerator system using Arduino and GSM technology for remote monitoring of temperature and fault detection.

It discusses the hardware setup, including temperature sensors and GSM module, and the software implementation for fault detection and notification. **"Wireless Sensor Network-Based Monitoring System for Cold Chain Logistics Using Arduino and GSM"** (2017 IEEE International Conference on Industrial Engineering and Engineering Management): This paper focuses on cold chain logistics monitoring using Arduino and GSM. It discusses the design of the monitoring system, including temperature sensors, Arduino.

## III. BLOCK DIAGRAM

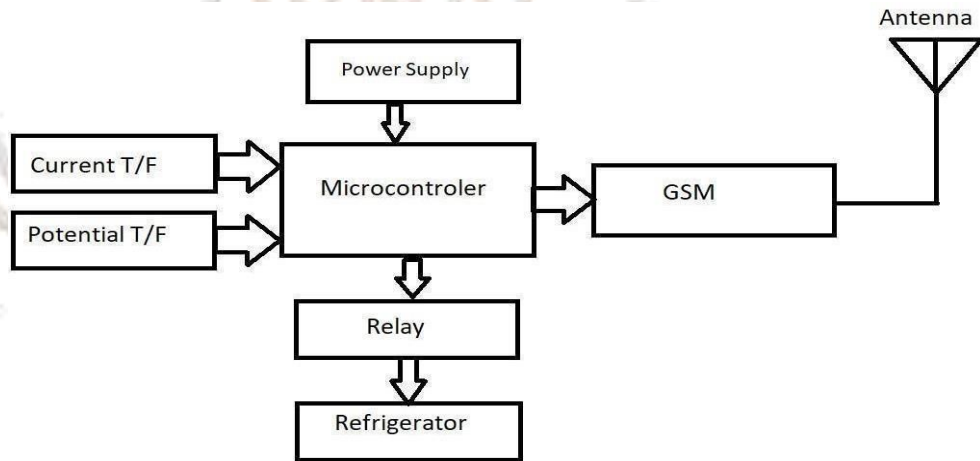
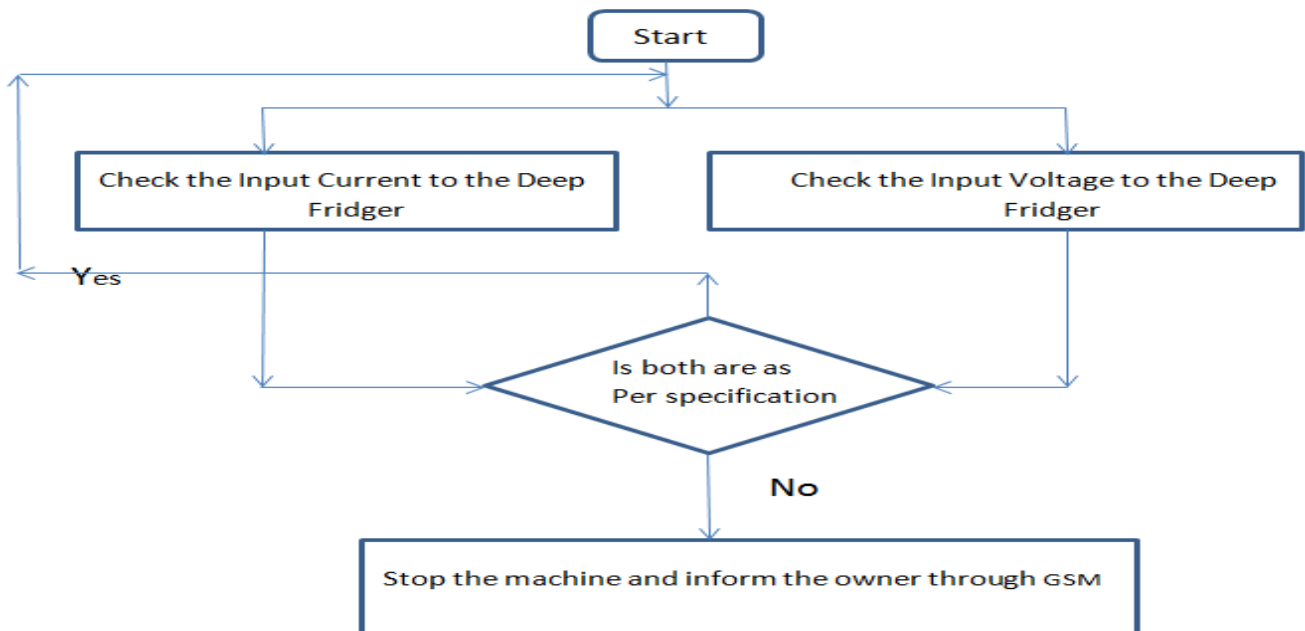


Fig:-Block Diagram Of Fridge Fault Detection And Voltage Controller In Using Arduino And GSM

## IV. WORKING PRINCIPLE

Detecting faults in a deep fridge using Arduino and GSM involves monitoring various parameters like temperature, voltage, current and door status. Arduino collects data from sensors and analyzes it to detect anomalies. If a fault is detected, Arduino sends an alert via GSM module to a designated number or server. The GSM module utilizes cellular networks to transmit messages, enabling remote monitoring and management of the fridge.

**V. IMPLEMENTATION**



**VI. CONCLUSIONS**

By With very cost effective technique we detect the possible faults in the deep-fridge and rectified it. This system will minimize the damage of Ice-cream and loss of the owner

**VII. REFERENCES**

1. N. A. R. Begum, M. N. H. Siddiquee, and M. R. A. Beg, "Smart Fridge Monitoring System Based on Arduino and GSM Technology," 2018 International Conference on Electrical, Computer and Communication Engineering (ECCE), Cox's Bazar, 2018, pp.403-407.
2. S. Sujatha, P. L. Maheswari, and S. Sivaranjani, "Design and Implementation of Remote Monitoring System for Refrigeration Using GSM Technology," 2018 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2018, pp. 1-5.

**VIII. ADVANTAGES**

1. Early identification of issues such as compressor failures, refrigerant leaks, or temperature
2. Enhances reliability and longevity of the refrigerator.
3. Regulates power supply to maintain safe voltage levels for the equipment.
4. Protects components from damage due to voltage spikes or drops.
5. Prolongs the lifespan of the refrigerator and reduces maintenance costs.