

Gas Leakage Detector With Trip Circuit And Preventive Measures

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Abstract- It is known that LPG gas is very combustible in nature and leakage of these may is very harmful in nature. In our house there are electrical equipment which are very prone to electric spark. While switching of these devices there are electric spark and during leakage of these combustible. If spark occurs then there will be major blast will occur and there will be loss of life and poverty. And our idea is to design a security system or a protective system to avoid such incident. By using preventive measures like disconnecting home appliances by tripping main circuit breaker of home and others preventive measures.

Keywords- LPG leakages gas sensor, buzzer, exhaust fan, solenoid valve.

I. INTRODUCTION

LPG is essential part of our life to various purpose like gas welding, cooking in household applications. And liquefied petroleum gas is in pressurized form is in cylinder. There are huge chances of leakage of these gas from cylinder as it is in pressurized form. As our country is developing in very fast so these LPG gas usages are increasing in these devices from leakage. so, our motive that reduce the number of accident and a reliability system.

II. IMPLEMENTATION

The above-mentioned gas leakage system is composed of major modules the gas detector, Arduino UNO, buzzer, GSM module, exhaust fan. The gas detector detects any change or exceed a certain threshold, then it actuates an audio-visual alarm further it sends signal to Arduino UNI and Arduino send signal to GSM module, exhaust fan, relay, solenoid valve relay.

III. GAS LEAKAGE DETECTOR

The function of the component or module are to detect any change in gas concentration and it transmits a signal to the Arduino UN0. The gas sensor (MQ3) module is

useful for gas leakage detection are used in home and industry. The MQ3 are used to detect the alcohol, benzene, hexane, LPG, co, and the sensitivity of this sensor can be adjusted potentiometer. The sensor are very low in cost which detect the presence of gas concentration from 0.05mg/L to 10mg/L the sensitive material in the MQ3 gas sensor is SnO₂ and it has lower conductivity in clean air whenever a fixed gas concentration appear across these MQ3 sensor the conductivity increases.

IV. ARDUINO UNO

Arduino uno device is an open source an electronic device which are used because of easy platform for the beginners. This device is based on an ATmega328p microcontroller and these are equipped with a different digital and analog pins and are used to interface to various board of other devices.

V. BUZZER

We are using HYDZ which is a beeper audio signalling device. They are of different types mechanical, electromechanical or piezoelectric but we are using piezoelectric type.

VI. GSM MODULE

We are using GSM module SIM800 which is designed to operate at 850MHz or 900MHz of frequency. These are used to send alert message to the owner of house as there is gas leakage detected.

VII. SOLENOID VALVE

Solenoid valve is used in this project is to cut down the gas flow supply from the pipe through which gas is flowing. These devices are of electromechanically operated valve.

VIII. RELAY

We are using two relay in our project one is to trip the home supply and another one is to switch on the exhaust fan and solenoid valve. The signal carries/send trigger signal from Arduino to relay to activate relay coil.

IX. WORKING

The gas detection is done using a gas detector that we are using MQ3. Thus when gas is detected the analog 5v supply is given to Arduino UNI and Arduino reads a sensor voltage at fault condition and compare that voltage signal with a calibrated value of voltage that is fixed inside the Arduino storage. After the fault voltage detected Arduino send signal to relay1 which is connected to main supply of the home so relay1 open its contact which disconnect the supply to a home. Arduino UNI send signal to relay2 which is normally open(NO)and its get closed means its connected to supply and exhaust fan get started and exhaust. All the gas which is locked whereas solenoid valve is operated by disconnected the flow of gas through the pipe. Arduino UNI also send signal to GSM module which send alert SMS to the owner of a house that gas leakage has been detected.

X. BLOCK DIAGRAM

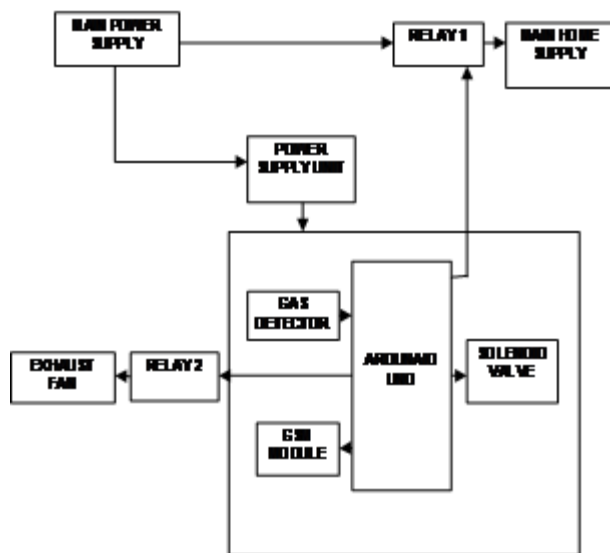


Fig. Block Diagram Of Gas Detector With Automatic Trip Circuit

XI. FUTURE SCOPE

We can also implement silicon control rectifier(SCR) instead of electromagnetic relay coil for the tripping purpose so it will provide more effective tripping and reduce spark while tripping power. Further more advanced feature can be included to more safety purpose.

XII. CONCLUSION

The main advantage of this project is that simplicity in construction and operation. Further it will be used in industrial purpose. Further it will be used in an industrial purpose also for a safety purpose and these prototypes represent that it can be used in a household safety application. It will be placed where the gas cylinder is stored. The sensitivity of leakage gas can be change by changing

REFERENCES

- [1] Mr. Akshay D. Prabhu¹ , Mr. Ashwin D. Pathak², “ Gas Leak Detector using Arduino UNO Microcontroller”, International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 5 Issue VII, July 2017.
- [2] Rati Ranjan Sabat¹ ,Subham keshari², Sai Prajna Panda³ & Sagar Suman⁴, “Wireless Auto Power Trip system for Liquefied Petroleum Gas Leakage to Improve Safety in Domestic usage”, International Research Journal of Engineering and Technology (IRJET), volume 04 issue 03, Mar-17.
- [3] V. Abishek¹ and M. Aierselvam², “Wireless Auto Power Trip during Gas Leakage”, Advance in Electronic and Electric Engineering. ISSN 2231-1297, Volume 3, Number 3 (2013), pp. 327-332.