

LPG Leakage Detection System

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Abstract: *The explosion due to gas leakage has become a serious problem in our country's daily activities. Now the world is evolving with technology, so it is necessary to use technology if possible in every case. LPG gas to resolve the accident occurred we can prevent it through technology. The system is based on a microcontroller, which uses gas sensors as well as GSM, display and buzzer. It is designed for LPG Gas Leakage Monitoring and Alert System using MQ6 sensor. This circuit contains MQ6 gas sensor, microcontroller, buzzer, display and GSM. The sensor will detect the gas leakage and transmit the information to the microcontroller. On the basis of those information, the microcontroller makes a decision and then displays a warning message on the display and the message will be sent to the user via GSM. The uses of the microcontroller provide a suitable platform for implementing an embedded control system and it is possible to modify it to meet our future requirements easily and quickly.*

Keywords: LPG, MQ6 Sensor, Microcontroller, Buzzer

I. INTRODUCTION

This Introduction LPG Gas leaks have been increased from 0.72% of all kitchen accidents to 10.74% of all the kitchen accidents. The small LPG cylinder of weight 5kg in which the burner is located immediately over the cylinder without using a rubber tube is seen to be safer than the one which uses a rubber pipe as this subway has the hazards of getting cracked which in turn can make way to leakage. A Simple Gas leak detector is a simple device which is used to detect the leakage of gas and if the gas leak occurs, an equivalent message is conveyed by the means of an LCD screen and a buzzer and with the help of the GSM module it is capable to broadcast messages to the stakeholders about the LPG leak.

This device is at its initial level of development and with modification in future this device will also ensure better safety and surety. The gas leak detector device can find application not only at residential homes but also it is applicable to hotels, restaurants and even in industries where LPG gas is used for some other purposes.

II. LITERATURE REVIEW

In this paper presentation we have studied, Gas leakage is a major problem with industrial sector, residential premises and gas powered vehicles like CNG (compressed natural gas) buses, cars. One of the preventive methods to stop accident associated with the gas leakage is to install gas leakage detection kit at vulnerable places. The aim of this paper is to present such a design that can automatically detect and stop gas leakage in vulnerable premises. In particular gas sensor has been used which has high sensitivity for propane (C₃H₈) and butane (C₄H₁₀). Gas leakage system consists of GSM module, which warns by sending SMS. This paper provides the design approach on both software and hardware. [Ref.1]

The objective of this work is to present the design automatic alarming system, which can detect liquefied petroleum gas leakage in various premises. In particular, the alarming system designed has a high sensitivity for primarily butane, which is also individually sold bottled as a fuel for cooking and camping. The proposed system is designed to meet UK occupational health and safety standards. Test results are demonstrated for an USB powered gas leakage detection system and it gives early warning signals under less severe conditions and activates a high pitched alarm in case of emergency situations to safeguard the users. [Ref.2]

Liquefied Petroleum Gas (LPG) is a main source of fuel, especially in urban areas because it is clean compared to firewood and charcoal. Gas leakage is a major problem in the industrial sector, residential premises, etc. Nowadays, home security has become a major issue because of increasing gas leakage. Gas leakage is a source of great anxiety with ateliers, residential areas and vehicles like Compressed Natural Gas (CNG), buses, and cars which are run on gas power. One of the preventive methods to stop accidents associated with the gas leakage is to install a gas leakage detection kit at vulnerable places. The

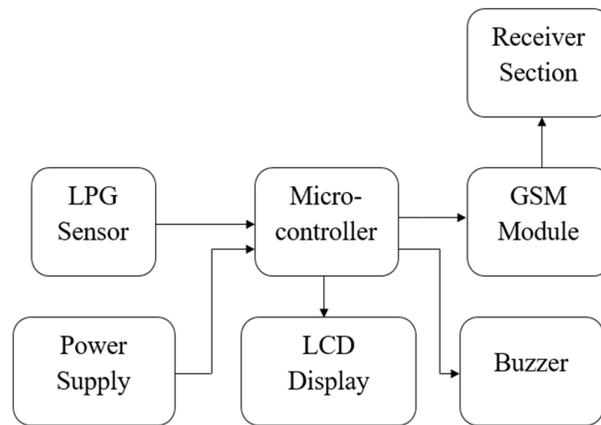


aim of this paper is to propose and discuss a design of a gas leakage detection system that can automatically detect, alert and control gas leakage. This proposed system also includes an alerting system for the users. The system is based on a sensor that easily detects a gas leakage. [Ref.3]

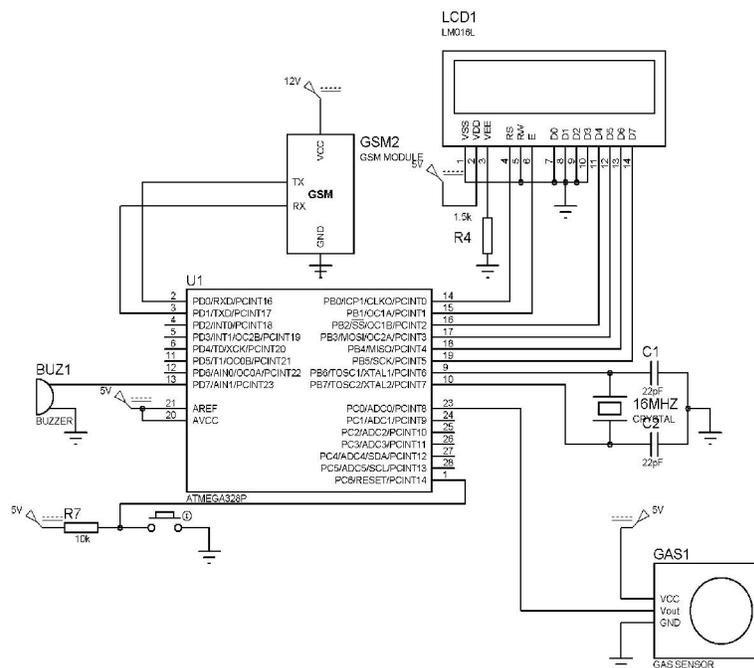
III. PROPOSED METHODOLOGY

1. Controller is used to control all the process of system
2. LPG sensor used to sense the leakage of LPG gas and give indication to controller
3. LCD is used to display the percentage of LPG gas
4. GSM is used to send the Leakage message and alert SMS to user
5. Buzzer is used to give audio signal to user in case of leakage

IV. PROPOSED BLOCK DIAGRAM

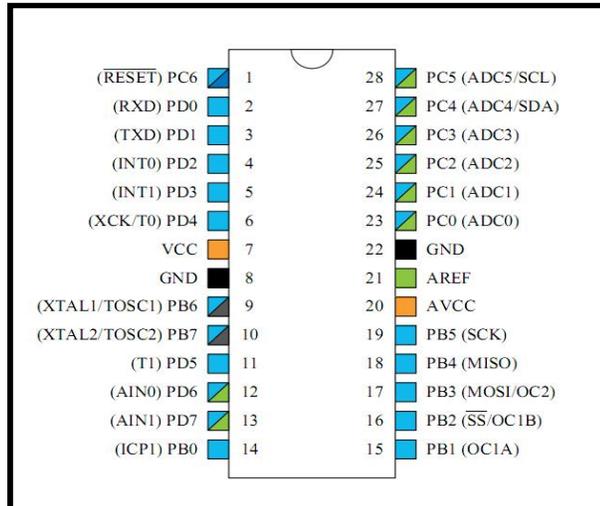


VI. DESIGN AND CIRCUIT DIAGRAM



VII. COMPONENTS REQUIRED

7.1 ATmega328



The Atmel ATmega328 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8A achieves throughputs close to 1MIPS per MHz. This empowers system designer to optimize the device for power consumption versus processing speed.

7.2 MQ6 Sensor



This is a simple-to-use MQ-6 Liquefied Petroleum, iso-butane, propane gas Sensor module, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm. This sensor has a high sensitivity and fast response time.

7.3 GSM SIM 800A



The SIM800A Quad-Band GSM/GPRS Module with RS232 Interface is a complete Quad-band GSM/GPRS solution in an LGA (Land grid array) type which can be embedded in the customer applications. SIM800A support Quad-band 850/900/1800/1900 MHz, it can transmit Voice, SMS and data information with low power consumption.

VIII. ADVANTAGE

1. It is used in house as LPG leakage detection
2. The sensor has excellent sensitivity combined with a quick fast response time.
3. The system is highly reliable, tamper-proof and secure.
4. In the long run the maintenance cost is very less when Compared to the present systems.
5. It is possible to get instantaneous results and with high accuracy.

IX. APPLICATION

1. Protection from any gas leakage in cars
2. For safety from gas leakage in heating gas fired appliances like boilers, domestic water heaters
3. Large industries which uses gas as their production
4. For safety from gas leakage in cooking gas fired appliances like ovens, stoves etc.

X. CONCLUSION

Its ability to warn its stakeholders about the leakage of the LPG gas. The future aspects of this detector include the GSM module and a tripper circuit which increases the efficiency of the system and provides more safety to the users. This detector is implemented successfully and is easy to use and also a low cost product. Another advantage of this device is that even though if no one is there in the house and then gas leaks occurs, GSM module is there to send immediate messages to the stakeholders regarding the gas leak and thus it lowers the intensity of accidents. GSM module in this device ensures better safety regarding the gas leaks.

After all the data had been gathered, analysed and processed, the proponents arrived at the succeeding conclusion Therefore, the researchers concluded that the "LPG Leakage Detector Using Arduino with SMS Alert and Sound Alarm" will help a lot in terms of preventing any danger caused by gas leakage and useful as part of safety to avoid the gas leak that can cause harmful result. It will also improve the safety of all users of Liquefied Petroleum Gas.

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