

Lpg Leakage Detection and Alarming System

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Abstract – Home fires have been taken place frequently and the threat to human lives and properties is growing in recent years. Liquid petroleum gas (LPG) is very inflammable and may burn even at a long way from the source of leakage. Most fire accident are caused due to poor quality rubber tube or the regulator isn't turned off when not in use. Therefore, developing the gas leakage alert system is extremely essential. Hence, this system presents gas leakage alert system to detect gas leakage and to alarm the people onboard.

Keywords– Gas sensor, Leakage, Liquid petroleum gas.

I. INTRODUCTION

LPG is that the abbreviation or short form for liquefied petroleum gas. Like all fossil fuels, it's a non-renewable source of energy. It is extracted from petroleum and gas. The main compositions of LPG are hydrocarbons containing three or four carbon atoms. The normal components of LPG thus, are propane (C₃H₈) and butane (C₄H₁₀). Small concentrations of other hydrocarbons can also be present. Depending on the source of the LPG and the way it's been produced, components aside from hydrocarbons can also be present. LPG is very inflammable and must therefore be stored faraway from sources of ignition and during a well-ventilated area, in order that any leakage can disperse safely. LPG vapours is heavier than air so care should be taken during storage so that any leakage will not sink to the ground and get accumulated in an area which is low lying and difficult to disperse. LPG gas is essentially propane and butane and it's odourless in its wild. The smell that we notice when there's a leakage is really of a completely different agent, called Ethyl Mercaptan. This substance is added to the gas when it leaves the most storage terminals.

II. PROBLEM STATEMENT

Gas leakage results in various causality resulting into both loss also as human life. The main reason for such explosion is thanks to sub-standard cylinders, wiped out regulators, old valves and lack of awareness, using gas cylinders increase risks. Most fire accident are caused due to poor quality rubber tube or the regulator isn't close up when not in use therefore developing the gas leakage alarming system is very essential. In order to attenuate eliminant the hazard of gas leakage there's need for system to detect and alert on such incidence resulting in the event of this project.

III. PROJECT METHODOLOGY

In the initial step, the gas leakage will detect by the gas sensor MQ-5. It will detect the gas leakage and will give the signal to the microcontroller with the help of Arduino. After that in second step the microcontroller will receive the signal, send by gas sensor. It will send activation signal to other external devices attached with it. In the last step, many tasks will be performed like buzzer activates simultaneously message display on screen, GSM module activated, which send warning SMS to the user. GSM module consists no of contacts from that it will send a message through GSM. When the gas leakage is successfully stopped then with the assistance of push button the entire system reached to the initial stage.

This system will have been tested by taking a small amount of LPG gas near to the sensor. MQ-5 gas sensor will detect the LPG gas and will send a signal to the microcontroller. After that microcontroller will send an active signal to other externally connected devices. As a result a buzzer rings and a message will display on screen. Simultaneously main power and gas supply turns off and GSM module send an SMS. The system design is achieved by using top-down approach. The hardware module is meant first as indicated within the diagram. The software module is developed using C- language. The design focuses mainly on module integration and interface of the system. The system architecture has different five functional units and every unit requires input to generate desired output.

Following are the Important Components which are used in LPG leakage detection and alarming system :-

- ARDUINO UNO
- MQ-5 SENSOR
- BUZZER
- JUMPER WIRE
- GSM MODULE

V. OUTPUT

1. ARDUINO UNO :

Arduino is an open source electronics supported easy to use hardware and software. Arduino board are ready to read inputs- light on a sensors, a finger ,on a button, messages and switch it into an output. It require 5 volt power supply. Arduino uno board are often powered by a USB connection or with an external power supply.

2. MQ-5 SENSOR :

The sensor is capable of detecting differing types of flammable gases on calibrated sensitivity. The Gas sensor(MQ-5) module is beneficial for gas leakage detection (in home and industry).It is suitable for detecting H₂,LPG,CH₄,CO,Alcohol.

3. BUZZER:

A buzzer or beeper is an audio singling device which can be mechanical, electrical, Opiezolectrical. A typically uses of buzzer and beepers includes alarm device, timers and confirmation of user input like click or keystrokes. Such a buzzer is use in alarm.

4. JUMPER WIRE :

Jumper wire is simply wires that have connector pins at each end, allowing them to be wont to connect two points to every other without soldering. Jumper wire a typically used with breadboards and other prototyping tools so as to form it easy to vary a circuit as required.

5. GSM MODULE :

This GSM module can accept any GSM network operator SIM card and act a bit like a mobile with its own unique telephone number . Advantage of using this modem is going to be that you simply can use its RS232 port to speak and develop embedded applications. The MODEM needs AT commands, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command It requires supply voltage within the range 3.4~ 4.4V.The functionality of system is split into three main steps. Within the initial step, the gas leakage is detected by the gas sensor. This detects the gas leakage and provides the signal to the microcontroller. Then in second step the microcontroller receives the signal, which sends by gas sensor. It sends activation signal to other external devices attached like LCD display .The LCD display will show which gas is really detect.

IV. DATA FLOW DIAGRAM



Fig.1. Block diagram for gas detection.

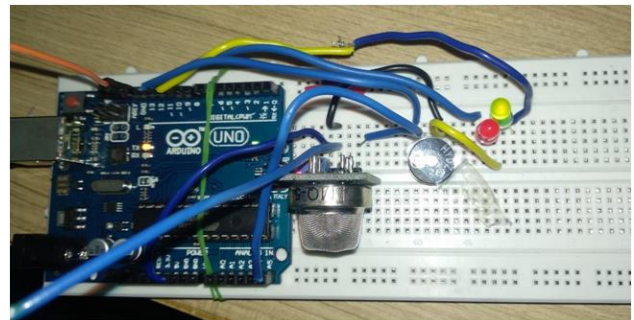


Fig .1 System is ON.

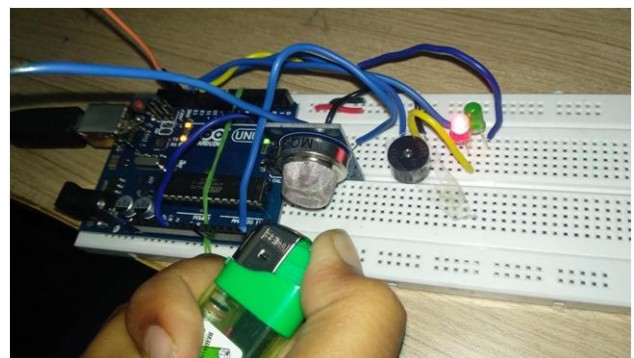


Fig .2 System Alert.

VI. FUTURE SCOPE

It leaves us with the further scope of improvement. Battery utilized in this technique is of 5V which isn't that much sufferable, in future improvement, it can use a much bigger, rechargeable one, which may sustain the gas detection module for an extended period of your time , with alarm whenever battery runs out' In further modification, additionally to only leakage detection it can determine the concentration of the gas too. The project features a good viability to be launched in commercial market, small scale industries having multiple cylinders stored. With further improvement in design the system are often made handier and price effective for the users. In future this technique is going to be supported mobile application also.

VII. CONCLUSION

Gas leakage results in severe accidents leading to material losses and human injuries. Gas leakage occurs mainly thanks to poor maintenance of kit and inadequate awareness of the people. Hence, LPG leakage detection is essential to prevent accidents and to save lots of human lives. this technique will detect LPG leakage and alert the users by buzzer. this may be very simple yet reliable system.

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