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A Survey on GasBo for LPG Gas Detection using Mobile

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ABSTRACT: Ideal gas sensor is used to detect the presence of a dangerous LPG leak in your car or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor has excellent sensitivity combined with a quick response time. The sensor can also sense iso-butane, propane, LNG and cigarette smoke. If the LPG sensor senses any gas leakage from storage the output of this sensor goes low. This low signal is monitored by the microcontroller and it will identify the gas leakage. Now the microcontroller is turn on LED and Buzzer. After few milliseconds delay, it also turn on exhaust fan for throwing gas out and continue send messages as „GAS LEAKAGE“ to a mobile no. , written in c-code.

KEYWORDS: GSM(Global system for mobile communication),LED(Light Emitting Diode),LCD(Liquid Crystal Display) ,LPG(Liquefied Petroleum Gas),Gas sensor MQ5

I. INTRODUCTION

MQ-5 Semiconductor Sensor for Combustible Gas Sensitive material of MQ-5 gas sensor is SnO_2 , which with lower conductivity in clean air. When the target combustible gas exist, the sensors conductivity is higher along with the gas concentration rising. We use simple electro-circuit, convert change of conductivity to correspond output signal of gas concentration. MQ-5 gas sensor has high sensitivity to Methane, Propane and Butane and could be used to detect both Methane and Propane. The sensor could be used to detect different combustible gas especially Methane, it is with low cost and suitable for different application

II. LITRATURE SURVEY

Various research groups are working all over the world for the development of Microcontroller based LPG Gas Leakage Detectors using GSM Module. LPG, first produced in 1910 by Dr. Walter Snelling is a mixture of Commercial Propane and Commercial Butane having saturated as well as unsaturated hydrocarbons. Before the development of electronic household gas detectors in the 1980s and 90s, gas presence was detected with a chemically infused paper that changed its colour when exposed to the gas. Since then, many technologies and devices have been developed to detect, monitor, and alert the leakage of a wide array of gases.

The main applications of a LPG Gas Leakage Detector would be :

- 1.To protect ourselves from any gas leakage in cars, industries, homes, hospitals etc.
- 2.To safeguard ourselves from gas leakage in heating gas fired appliances like boilers, domestic water heaters.
- 3.To be used in large industries which use gas as their production.
- 4.To provide safety from gas leakage in cooking gas fired appliances like ovens, stoves etc.

This project has many advantages which are as follows:

- 5.The Project is easy to use and it gives remote indication to the user.
- 6.The Sensor used in this Project has excellent sensitivity combined with a quick fast response time.



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- 7.The system is highly reliable, tamper-proof and secure.
- 8.In the long run the maintenance cost is very less when compared to the present systems.
- 9.It is possible to get instantaneous results and with high accuracy.

This Project has a lot of Future Scope in the sense that using this project we can provide a voice feedback system in the future. With recent development in technology, Temperature display during periods wherein no message buffers are empty is one such theoretical improvement that is well possible. Another very interesting and significant improvement would be to accommodate multiple receiver MODEMS at different positions in the geographical area carrying duplicate SIM cards. Multilingual display can be another added variation in the project. Audio output can be introduced to make it

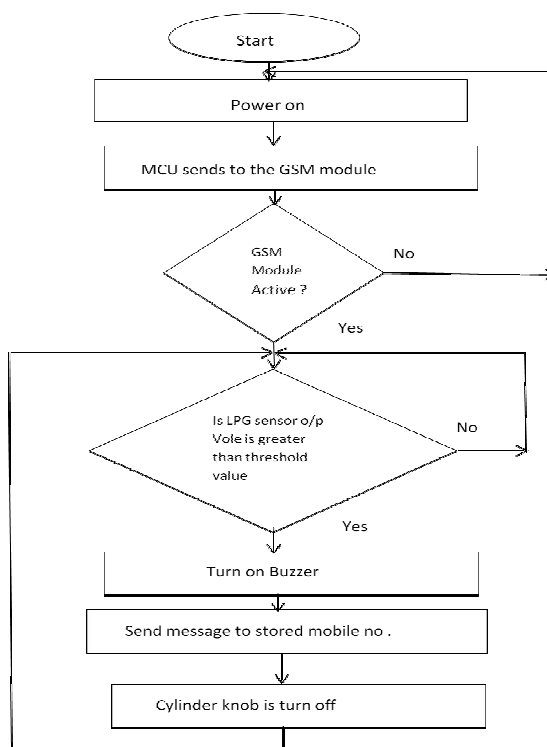
III. EXISTING SYSTEM

In the existing system different gas sensing technologies is used to sense the leakage of LPG gas.LPG gas leakage is detected using semiconductor gas sensor.Nowadays gas accident occur very commonly.Reason behind such type of accident is we forget to close the regulator valve.There are some remedial measure like after LPG gas detection messages are send to owner and security and second is exhaust fan is switched on.But it has some disadvantages firstly there is no control action taken which puts human into risk and secondly if wiring of exhaust fan is not proper it may cause explosion.

IV. PROPOSED SYSTEM

Proposed system takes automatic action on detection of LPG gas.Automatic action provides mechanical handler for closing the valve.Security is provided by means of relay which close the electric supply.Alert messages are send to owner and security.When leakage is detected buzzer blows.

V. METHODOLOGY





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Vol. 4, Issue 10, October 2016

VI. WORKING

The sensing material in TGS gas sensors is metal oxide, most typically SnO₂. When a metal oxide crystal such as SnO₂ is heated at a certain high temperature in air, oxygen is adsorbed on the crystal surface with a negative charge. Then donor electrons in the crystal surface are transferred to the adsorbed oxygen, resulting in leaving positive charges in a space charge layer. Thus, surface potential is formed to serve as a potential barrier against electron flow.

Inside the sensor, electric current flows through the conjunction parts (grain boundary) of SnO₂ micro crystals. At grain boundaries, adsorbed oxygen forms a potential barrier which prevents carriers from moving freely. The electrical resistance of the sensor is attributed to this potential barrier. In the presence of a deoxidizing gas, the surface density of the negatively charged oxygen decreases, so the barrier height in the grain boundary is reduced. The reduced barrier height decreases sensor resistance.

A. GAS SENSOR

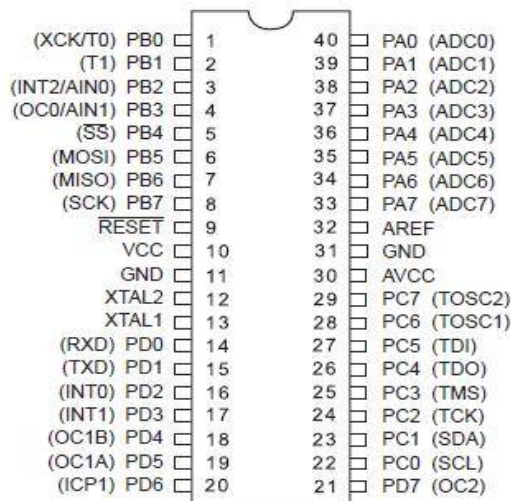
Generally semiconductor is used to detect gas leakage. MQ-5 gas sensor is used to detect gas leakage in this project. Sensitive material of MQ-5 gas sensor is SnO₂, which with lower conductivity in clean air. When the target combustible gas exist. The sensor conductivity increases along with the rising gas concentration. MQ-5 gas sensor has high sensitivity to Propane, Butane and LPG, also response to Natural gas. The sensor could be used to detect different combustible gas, especially Methane; it is with low cost and suitable for different application. The MQ-5 can detect gas concentrations anywhere from 200 to 10000 ppm. The sensor's output is an analog resistance.

B. MICROCONTROLLER

The AT89S52 is a Low-power, high-performance CMOS 8-bit microcontroller with 8KB of ISP flash memory. The device uses Atmel high-density, nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. On-chip flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. This powerful microcontroller is suitable for many embedded control applications.

The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

PIN DIAGRAM





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Vol. 4, Issue 10, October 2016

Features

- 1.Flash(kbytes)-8kbytes
- 2.Pin count-44
- 3.Max operating frequency(MHz)-24MHz
- 4.Min I\O pin-32
- 5.CPU-8051-12C
- 6.URAT-1
- 7.Operating Voltage(vcc)-4.0-5.5
- 8.SRAM(bytes)-0.25

C.GSM MODULE:

For sending message, I am using a GSM Module named SIMCOM_300. GSM Module SIM300 with sim- card holder, RS232 interface, power supply, buzzer and audio interface. You can connect this to PC using a [USB to Serial Adaptor](#) and use terminal programs such as Real term to send & receive data. We can also interface GSM Module with microcontroller directly through wires.

GSM Module works with AT COMMANDS. **AT commands** are used to control MODEMs. AT is the abbreviation for Attention.

AT commands with a GSM/GPRS MODEM or mobile phone can be used to access following information and services:

- 1.Information and configuration pertaining to mobile device or MODEM and SIM card.
- 2.SMS services.
- 3.MMS services.
- 4.Call services.
- 5.Data and Voice link over mobile network.

D. BUZZER

A **buzzer** or **beeper** is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows .

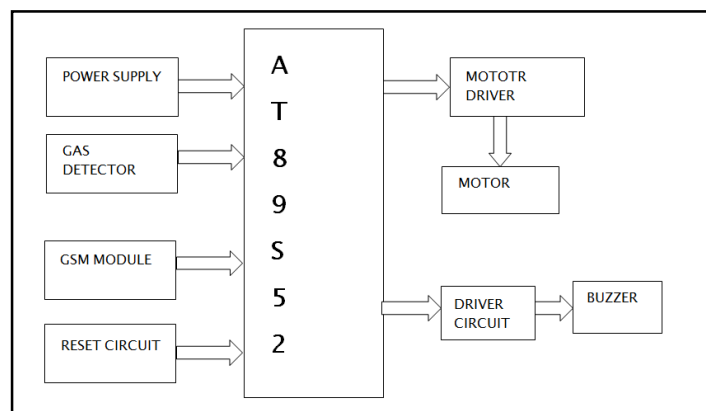


Fig.Block Daigram



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VII. ADVANTAGES

- 1.It is used in house as LPG leakage detection.
- 2.It also detects alcohol so it is used as liquor tester
- 3.The sensor has excellent sensitivity combined with quick fast response time.
- 4.The system is highly reliable,tamper-proof and secure.
- 5.In the long run the maintenance cost is very less when compared to present system.
- 6.It is possible to get instantaneous result and with high accuracy.

VIII. LIMITATION AND ASSUMPTION

- 1.It work only when at 5V power supply is given.
- 2.Its sensitivity depends on Humidity and temperature.
- 4.Assuming a faithful person so that he could go and switch off the regulator or take necessary action on particular situation.
- 5.Motor will continually rotate around the cylinder to detect the gas leakage.
- 6.Alert message will be send to the people those who have registered in the gas App. So if they are near-by could take necessary action to prevent explosion.

IX. CONCLUSION

This project is embedded based project. A Gas sensor is used to detect gas leaks in the kitchen or near the gas heater. Ideal to detect gas leaks in the kitchen. The sensor can also sense LPG and Coal Gas as well as Ideal sensor for use to detect the presence of a LPG leak in your car or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor has excellent sensitivity combined with a quick response time.

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