

# LPG Gas Supervising and Automatic Gas Refill Booking With Alert System

Nithya Priya. A.P<sup>1</sup>, Nithya Lakshmi. R<sup>2</sup>, Kavitha.S<sup>3</sup>, Keerthana. A<sup>4</sup>

Assistant Professor, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India<sup>1</sup>

U.G Student, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India<sup>2,3,4</sup>

**ABSTRACT:** Leakage of Gas is one of the potential problems in industrial and residential areas where the accidents can happen. In this project, Home safety can be ensured by designing an economical LPG gas detection unit using gas sensor, which alert users to ensure safety. As in the present scenario conventional use of IVRS is in use, this would be time-consuming for busy scheduled, illiterate and dependants. LPG cylinder users are facing major problem is that they do not know exactly the status of completion of LPG gas and makes more delay in cylinder booking which is not comfortable for most of the times. To overcome this automatic booking of gas paves the way.

**KEYWORDS:** LPG, Load cell, Microcontroller, GSM.

## I. INTRODUCTION

These days the usage of the liquid petroleum gas (LPG) is widely used in many fields, especially in household purposes. When LPG usage increases, it increases the accidents occur by the LPG explosion. The leakage of the LPG leads to high explosion. So it's necessary to have a system which continuously monitor the LPG and alarming.

The aim of this proposed system is to monitor the LPG in house hold applications and leakage detection. The system shows remaining time of LPG cylinder can be used in full flame. The gas sensor is used to detect the amount of LPG and warns the consumer about the gas leakage if any by sending SMS to a specific mobile number. Nowadays the booking of the LPG cylinders is by sending SMS to the booking agent. In this system the GSM module which automatically books the cylinder by SMS to the agent booking number. This will help the owner to get the new cylinders in time without any fail.

## II. EXISTING SYSTEM

[1] The LPG gas leakage detection is done by gas sensor which is interfaced with ARM. If there is any presence of gas, motor will be turn on and it immediately turn off the gas regulator and turning on the buzzer and also message displaying on LCD. In auto gas booking, we continuously detects the amount of gas which is present in the cylinder. When gas level goes below the set level then message will be send to the gas agency through GSM and confirmation message received by the user from gas agency. So user get cylinder within time.

[2] The sensor unit includes both MQ5 leakage detector and the load cell weight detector which frequently measures the level of the gas. The microcontroller unit includes Arduino and raspberry pi which collects the data related to the sensor unit, As the end of this process, the GSM is used to notify the user that the gas is leaking and alerts the user to take necessary precautions, if there is no quick response the power supply will be turned off automatically and additionally the notifications are sent to the emergency services this paper provides a higher home safety.

[3] The system consists of LPG gas leakage detection system, Microcontroller with GSM module and protection circuit. The function of this module consists of gas sensor used to detect the gas leakage in the air. Gas sensor MQ5 is used to detect gas leakage. This sensor offers many advantages like long lifetime, low cost, reliable and high sensitive to LPG gas.

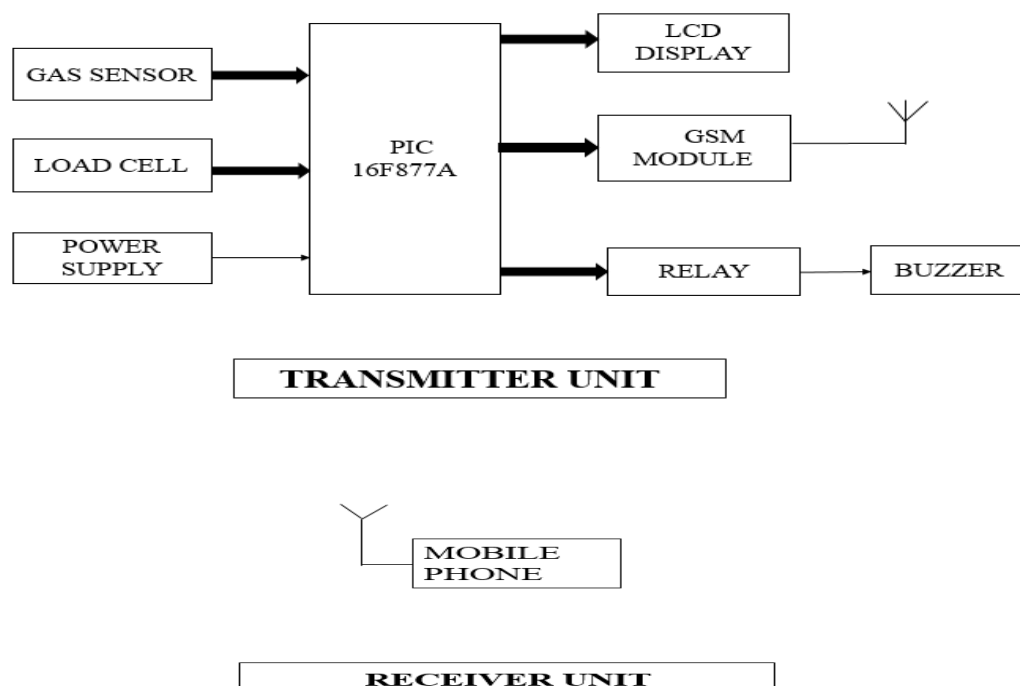
### III. PROPOSED SYSTEM

In the leakage system the sensor used will detect the gas sensible to combustible gas and notify the user if leakage occurs. While monitoring level of gas, the system is designed in way that if the threshold being set reaches nearly 20% an alert is send to the exploiter so that he gets notified earlier and be prepared economically to buy the fuel for house. Ultimately the SMS is levied to the distributor when threshold approaches 10% for effective booking.

#### ADVANTAGES

- Highly precise gas detection using MQ9 sensor.
- Very economical to the users.
- Ease in production owing to less no of components.
- Any deceitful nature like partial fill of gas can be provided check for the user because of weight sensor.

#### IV. BLOCK DIAGRAM



The input data from load cell and gas sensor is furnished to the pic microcontroller using embedded c programming. Based on the appropriate analytics being done the user will get to know if any leakage of gas occurs and also about the status of the cylinder. Through AT commands given to GSM module message can be made.

#### V. HARDWARE DESCRIPTION

- A. **GAS SENSOR(MQ9):** It is useful for gas leakage detection (in home and industry). It is used for detecting LPG, carbom monoxide, and methane. Because of its high sensitivity and fast response time,

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calculations can be taken as soon as possible. The sensitivity of the sensor can be modified by using the potentiometer.

The output voltage from the Gas sensor increases when it increase the concentration of gas. The sensor value only reflects the approximated gas concentration in an allowable error range, it does not mean the exact gas concentration. Sensitivity of the gas can be modified by changing the potentiometer.



Figure 5.1(MQ9) Gas sensor

- B. **LOAD CELL:** Transducer converts a load acting on it into an electronic signal. This signal may be a change of voltage, change of current or change of frequency depending on the type of load cell used. There are different kinds of load cells i.e., resistive load cells and capacitive load cells. To book a cylinder we should be aware in the amount of gas present in the cylinder. For this event the level of gas present in the cylinder has to be monitored continuously.



Figure 5.2 Load cell

- C. **PIC16F877a:** One of the most advanced microcontroller from Microchip. This controller continuously sense LPG gas and its level(weight)sensor output. This controller used for experimental and modern applications because it has low price, high quality, and ease of availability.
- D. **LCD:**LCD (Liquid Crystal Display) screen is an electronic display module and it is used in wide range of applications. A 16x2 LCD display is widely used in various devices and circuits. A 16x2 LCD signifies it can exhibit 16 characters per line and there are 2 such lines.



Figure 5.3 LCD

- E. **SIM 800L:** It is called as Quad-band GSM/GPRS that can also be embedded in many customer applications. SIM800L is a Quad-band 850/900/1800/1900MHz capable of transmitting Voice, SMS with very low power consumption. Bluetooth as well as Embedded AT provides a total savings cost for customer applications.

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In Global systems, Mobile communication provides modulates and demodulates signal. If weight goes below the threshold level, Gas leakage is detected. Then by using GSM, message will be sent to the gas agency and the user.

### VI. SOFTWARE DESCRIPTION

**MP LAB SOFTWARE:** The Integrated Development Environment (IDE) which is a free and can utilized for the development of embedded applications using Microchip PIC microcontrollers. It holds a capacity of 32-bit application for fast development applications and super-charged debugger. It could be used as a single, graphical user interface (GUI) for extra Microchip and third party hardware and software development tools.

### VII. EXPERIMENTAL RESULTS

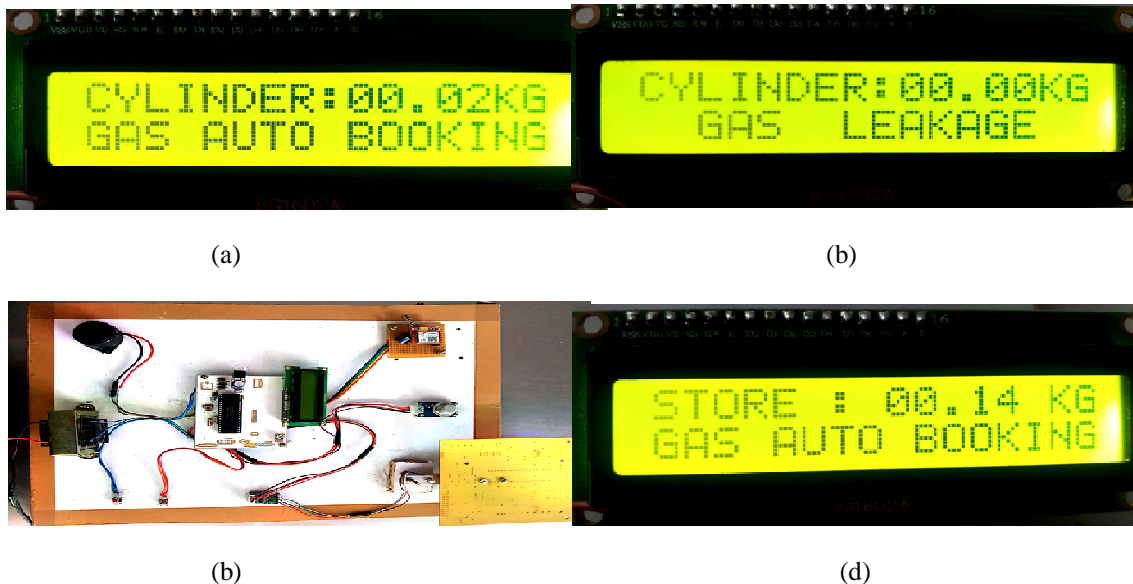


Figure 7.1 the above figure shows that (a) Gas leakage is detected using Gas sensor, (b) The threshold value of gas present in cylinder and automatic gas booking is done, (c) The weight of the cylinder SMS will be sent to the user, (d) Overall circuit connection.

### VIII. CONCLUSION

The system prototype has been constructed and even if a small amount of LPG is leaked then the gas sensor which is MQ9 used for sensing gas in the kitchen will be having high level of efficacy in detecting the leakage. If it occurs accidentally as this sensor can detect even the leakage of most of the combustible gas present in the cylinder. And then Load cell's action of detecting the level of gas is done using weight sensor and the corresponding change in resistance is converted into voltage to be fed to the Microcontroller. SIM800L is used for precise and on time sending of message to the user.

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