

IOT Based LPG Booking System and Leakage Detection

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Abstract: - Talking about the technologies we are using now a days there are so many things in our life which operates automatically, which makes our life very easy. Now a day's booking of LPG cylinder is done by calling the distributor number and booking the cylinder but it done by us when our cylinder goes empty. In our project we try to design the system which monitors the weight of cylinder and book the cylinder automatically before it goes empty. Also this system detect leakage of LPG gas using sensor and if leakage is detected it not only turns on alarm and exhaust fan quickly. This is very important to avoid explosions due to leakage of gas which save human life, which is main significance of our project.

Key Words: — *LPG Cylinder, Automation, Gas, Explosion.*

I. INTRODUCTION

LPG it is used for many needs such as domestic fuel, industrial fuel, automobile fuel, heating, illumination etc. because of the versatile nature of it. LPG, first produced in 1910 by Dr. Walter Snelling is a mixture of Commercial Propane and Commercial Butane having saturated and unsaturated hydrocarbons. Demand for LPG is raise day by day. The explosion occurs due to leaked gas when it goes ignited. The number of deaths due to the explosion of gas cylinders has been increasing also. Thus there is a need for a system to detect LPG Leakage which can avoid accidents due to LPG leakage The reason for such accidents are substandard cylinders, old valves, bad working regulators and lack of precautions taking while in handling gas cylinders. There are many technologies introduced to avoid such accidents. For booking of cylinder also there is requirement to book the cylinder by calling the distributor. Petroleum companies have launched the customer-friendly service -Interactive voice Response technique.

II. SYSTEM OVERVIEW

2.1 Working

2.1.1 Working of Automatic Gas Booking:

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In automatic Gas booking system, Load cell monitors the weight of the gas in cylinder continuously and displays it on seven segment LCD display. When the weight of the gas goes between 0.8 or to low continuously, then logic high pulse is fed to microcontroller. As this port pin goes high, microcontroller will send a message "Gas book" to wifi module and also display

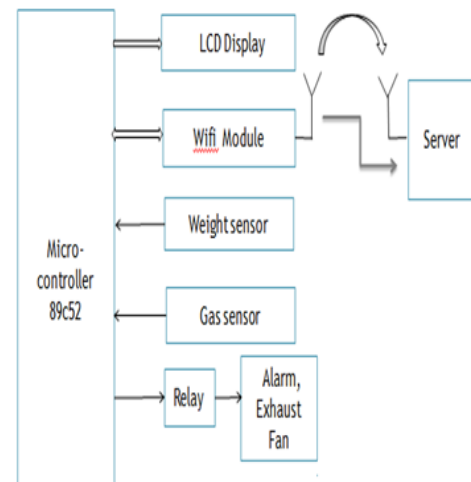


Fig.1. Block Diagram

it on LCD display. Also the weight changes below 1kg are continuously updated on a website which gives a gas booking message also "User1 gas book".

2.1.2 Working of Gas Leakage Detection and Prevention

In LPG leakage, gas leakage detection is on the given a highest priority. At the vicinity of the gas cylinder we placed MQ6 gas sensor.

The resistance of the sensor decreases increasing its conductivity at the time of Leakage. When pulse is fed to microcontroller and at the time switches on the buzzer and exhaust fan which we can reset by a manual reset switch. When Gas sensor detects the leakage of LPG it may leads to explosion. Also an alert notification message is display on a website-”Gas Leakage Detected”.

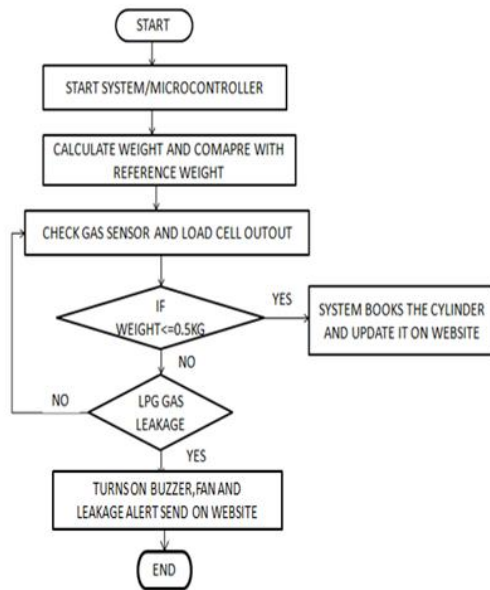


Fig.2. Flowchart for Booking System and Leakage Detection

2.2 Components Used in Project

- 89C52 microcontroller
- Load cell sensor
- MQ6 Sensor
- Buzzer
- Exhaust fan
- ESP8266 Wifi Module
- LCD display
- Bridge Rectifier Circuit
- Reset Switch
- 7805 Voltage Regulator
- Relay

Description of Components:

Microcontroller 89C52:

To continuously sense the LPG gas we need efficient working and fast working microcontroller and its level (weight) sensor's output. Also it should give a fast reply is desired when leakage is found. Also we need capacity to store some information which can be used for other operations required in microcontroller. Above operations require a very fast, single cycle execution rate microcontroller like 89C52. The LCD module connected to 89c52 is used to display the required messages. From the relay circuit we take an output from weight sensor module and it is also connected to 89c52 microcontroller which is used to monitor gas level continuously. 89C52 microcontroller is base of this project. Input given to the microcontroller is from gas sensor MQ6 and weight sensor load cell. Output from the microcontroller is given to LCD display and Wifi module. It operate on 5v power supply.

ESP8266 Wifi Module:

Espressif's ESP8266EX delivers highly integrated Wi-Fi solution to meet customer's continuous and changing demands for reliable performance, efficient power usage and compact design in the Internet of Things (IOT) industry. ESP8266 is a 3V wi-fi module. This module is very useful and popular for its Internet of Things applications. It works on simple AT commands which can be implemented by interfacing it with microcontroller. It requires less memory to send and receive text messages. One of the greatest feature of this module is it cannot only connect to wi-fi network and acts as web server but also set up network of its own allowing devices to connect directly to it and access web page.

MQ6 Gas Sensor:

The LPG gas consists of the material isobutene, propane, methane, etc. A sensitive, efficient gas sensor is required that senses only LPG gas contents and is less sensitive to other gases like cooking fumes, cigarettes. It has high sensitivity. It gives fast response. It has stable and long life. It continuously senses the gas. If the concentration level of LPG Gas goes above danger level then it turns ON buzzer and fan through relay.

Load Cell:

Load cell having capacity to carry weight up to 5-50 kg. It continuously monitors the level of Gas preset in the cylinder. And informs weight to microcontroller. Level of gas present in the cylinder has to be monitored continuously to book the cylinder before it goes empty. The load cell having required weighing capacity for domestic cylinder is used and for

calibration purpose the weight sensor module is used along with the load cell.

LCD Display:

Liquid Crystal Display Of 16*2 is going to be used in this project. It operates on 5v supply. It shows small messages like booking number, weight of cylinder and gas leakage detection.

Advantages -

- Sensor has excellent sensitivity, Quick and fast response time.
- Highly reliable and secure.
- Low maintenance cost
- High accuracy of performance.

Future Scope:

We think that, in our project, this system can be used where in domestic use in homes. Also in small scale industries. But for a huge large scale industries where LPG is used in large amount, there this project/system should need to be more powerful preferring to the leakage which can avoid explosion.

III. CONCLUSION

Firstly talking about automatic gas booking system, this system continuously monitors the LPG level of the cylinder and books the cylinder automatically before previous one goes empty. It also shows status of booking cylinder on a website. And in LPG gas leakage detection and prevention system, when a small amount of LPG is brought near the system, the system sensor detects the leakage and activates the alarm and switches on the exhaust fan.

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