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Design and Implementation of a Gas Cylinder Level Monitoring System Using MP Lab Software

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Abstract: Gas Cylinder Level Monitoring System is used to monitor the weight of LPG gas cylinder. In our home we observe that whenever LPG Gas cylinder becomes empty, we give request for new cylinder at the office of Gas cylinder provider. Many times the cylinder is not supplied due to the Rush or due to the shortage of cylinder. So there is a delay in providing the gas cylinder. Main reason behind this is, the delay in informing the gas provider or we inform the gas provider at the last moment when the gas is empty. This can be avoided by intimating the gas level to the user as well as to the gas provider by using the load cell when it reaches the threshold level. Gas leakage is also 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 intimate the gas leakage at vulnerable places. In particular the gas sensor has been used which has high sensitivity for propane (C₃H₈) and butane (C₄H₁₀). Solenoid valve is used to automatically shutdown the valve of the cylinder when a leakage is detected. Gas leakage system consists of GSM (Global System for mobile communications) module, which warns the user by sending SMS. However, the former gas leakage system cannot react in time. This paper provides the design approach on both software and hardware.

INTRODUCTION

LPG consists of mixture of propane and butane which are highly flammable gases. LPG is an odorless gas due to which Ethanethoil is added as a powerful odorant, so that leakage can be easily detected. Amyl mercaptane and Tetrahydrothiophene are most commonly used as odorants. LPG is one of the alternate fuels used now days. Sometimes liquefied petroleum gas is also known as LP gas, Auto gas etc. This gas is commonly used for heating appliances such as boiling the water, cooking, and various other household purposes. LPG is also used as an alternate fuel in vehicles due to soaring in the prices of petrol and diesel. Some people have low sense of smell, may or may not respond on low concentration of gas leakage. In such cases, gas leakage security systems become essential and helps to protect people from gas leakage accidents. This paper provides a cost effective and highly accurate system, which not only detects gas leakage but also alerts (Beep) and turns off the main power and gas supplies, and sends an SMS. GSM module is used which alerts the user by sending an SMS in order to provide high accuracy.

Literature Review

Automatic LPG Booking, Leakage Detection and a Real Time LPG Measurement Monitoring System

A cost effective, automatic liquified petroleum gas booking, leakage detection and real time LPG measurement monitoring system is proposed in this paper. In this system LPG leakage is detected through the sensor and information is sent to the user by short message service (SMS) and simultaneously alerts the customer using a GSM module, while activating the alarm. The additional advantage of the

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system is that it continuously monitors the level of the LPG present in the cylinder using weight sensor and automatically books the cylinder using a GSM module.

Microcontroller based LPG Gas Detector Using GSM Module

Ideal gas sensor is used to detect the dangerous LPG gas leakage in our homes, storage tank environment etc.

This unit consists of an alarm for sound or gives a visual indication of the LPG concentration. The sensor has excellent sensing capability that it sense isobutene, propane, LNG and cigarette smoke when the LPG sensor senses any gas leakage from storage. The output of the sensor goes low. This low signal is monitored by the microcontroller and this will identify the gas leakage. Now the microcontroller is turn on LED and buzzer. After few millisecond delay it also turns on the exhaust fan for throwing gas out and continues to send message as gas leakage to a mobile number written in C code.

Embedded Control System for LPG Leakage Detection and Prevention

The design of a wireless LPG leakage monitoring system is proposed for home safety. The system detects the leakage of the LPG and alerts the consumer about the leak and as an emergency measure the system will switch on the exhaust fan and also checks the leakage. An added feature of the system is that the approximate consumption is indicated in terms of the total weight. The proposed system makes use of GSM module in order to alert about the gas leakage via an SMS. Whenever the system detects the increase in the concentration of the LPG it immediately alerts by activating an alarm and simultaneously sending message to the specified mobile phones. The exhaust fan is switched on and an LPG safe solenoid valve fitted to the cylinder is given a signal to close, avoiding further leakage. The device ensures safety and prevents suffocation and explosion due to gas leakage.

Analytical Report

TITLE	COMPONENT USED	DRAWBACK	REPLACED COMPONENT
Automatic LPG booking, Leakage detection and a Real Time LPG Measurement Monitoring System	Buzzer	Though the user is not in home the buzzer will alarm, which will not reach the user at the right time	SMS based GSM technology
GSM Based Gas Leakage Detection System	Stepper Motor, Relay	This will turn off the main power when it detect the gas	Solenoid Valve
Embedded system for hazardous gas detection and alerting	Comparator	It is used for communication purpose between sensor and microcontroller pic	In this, sensor and microcontroller pic are directly connected
A wireless home safety gas leakage detection system	LPG weight	It detects only the weight of the cylinder	Load cell gas sensor

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Conclusion and Future Work

In this system we have described a new approach for gas leakage detection system at a low concentration. The leakage is detected with the help of MQ-6 gas sensor. Sensor sends a signal to microcontroller. In the next step microcontroller sends an active signal to other externally connected devices. The efficiency and memory of the microcontroller can be increased if Philips microcontroller is used in place of

AT89C51. Multiple SMS can be sent by changing the programming of GSM module. The future work of our project is to intimate the user by voice messages.

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