

SMART GAS CYLINDER

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ABSTRACT

In this brief we are going to design smart gas cylinder which is capable of detection of leakage gas. The proposed design is basically inspired from the fire accidents due to the leakage of gas. This system is built using combination of microcontroller and GSM. The system has been design and implemented in a cost effective way so that commercialized user will take benefit from it.

KEYWORDS

Microcontroller, LPG, Gas Sensor, Alarm, GSM, Gas Monitoring System.

1.INTRODUCTION

The liquefied petroleum gas is finding wide usage in homes, industries and in automobiles as fuel because of its desirable properties which include high calorific value, produces less soot, produces very less smoke and does not cause much harm to the environment. However there is a serious problem about their leakage in the air. The gases being heavier than air do not disperse easily and may lead to suffocation when inhaled also when gas leakage into the air may lead to explosion. Due to the explosion of LPG the number of deaths has been increased in recent years. To avoid this problem there is a need for a system to detect and also prevent leakage of LPG. The proposed system reduces the customer burden. It will monitor gas level in the cylinder, when the gas level reaches below it sends SMS alert to the user. It uses a MQ5 gas sensor which can detect LPG gas and a microcontroller to alert when the levels of gas detected is beyond safety limit. The alert mechanism in the proposed system includes an LED indication, buzzer and an SMS sent to the stored numbers with the help of GSM. This system is designed for use in homes which use LPG or natural gas; however it can be used in industries and other applications involving the gas cylinders.

2.SYSTEM STRUCTURE & OPERATION

Fig (1). shows the system block diagram and Fig (2). Shows the system circuit diagram. The system mainly consists of LPG leakage detection system and Microcontroller with GSM module. The main function of gas leakage detection module which consist of gas sensor to continuously detect the gas leakage in the air. For the gas leakage detection a solid state gas sensor MQ5 is used. MQ5 gas sensor which offers many advantages like long lifetime, low cost, reliable and high sensitive to LPG. In gas sensors Tin dioxide is the most common material. MQ5 gas sensor less sensitivity to air but high sensitivity to combustible gases.

When target LPG gas or combustible gases exist in the environment the conductivity of gas sensor increases and whose conductivity is less in the air. When using MQ5 gas

sensor sensitivity is very necessary. We calibrate the detector for 300 to 5000 ppm of LPG and Natural Gas.

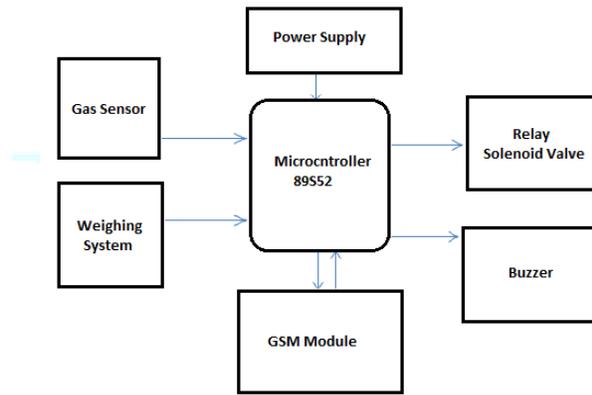


Fig (1). BLOCK DIAGRAM

The sensor works with 5volt power supply. When the concentration of gas in the air exceeds the certain level then activate the audio visual alarm which includes LED, Buzzer and send the message to the consumer by using GSM module. The GSM module is used to send short messages when gas leakages. Any number of mobile numbers can be included to which SMS must be sent about the above mentioned details. This wireless module is used to alert the consumer even when they are away from home. An audio-visual alarm provided to immediately alert the people at home in abnormal condition. As added feature it monitors the weight of the gas in cylinder. When the weight of the gas is less than or equal to 2 Kg, a logic high pulse is fed to a port pin of microcontroller. As this pin goes high, microcontroller will send a booking message to distributor of format, "REG_AMARGAS_12345". An indication SMS will be sent sto the consumer if found the gas level reaches below or gas in the cylinder is going to empty. The microcontroller forms the heart of the entire system controlling all processes that take place.

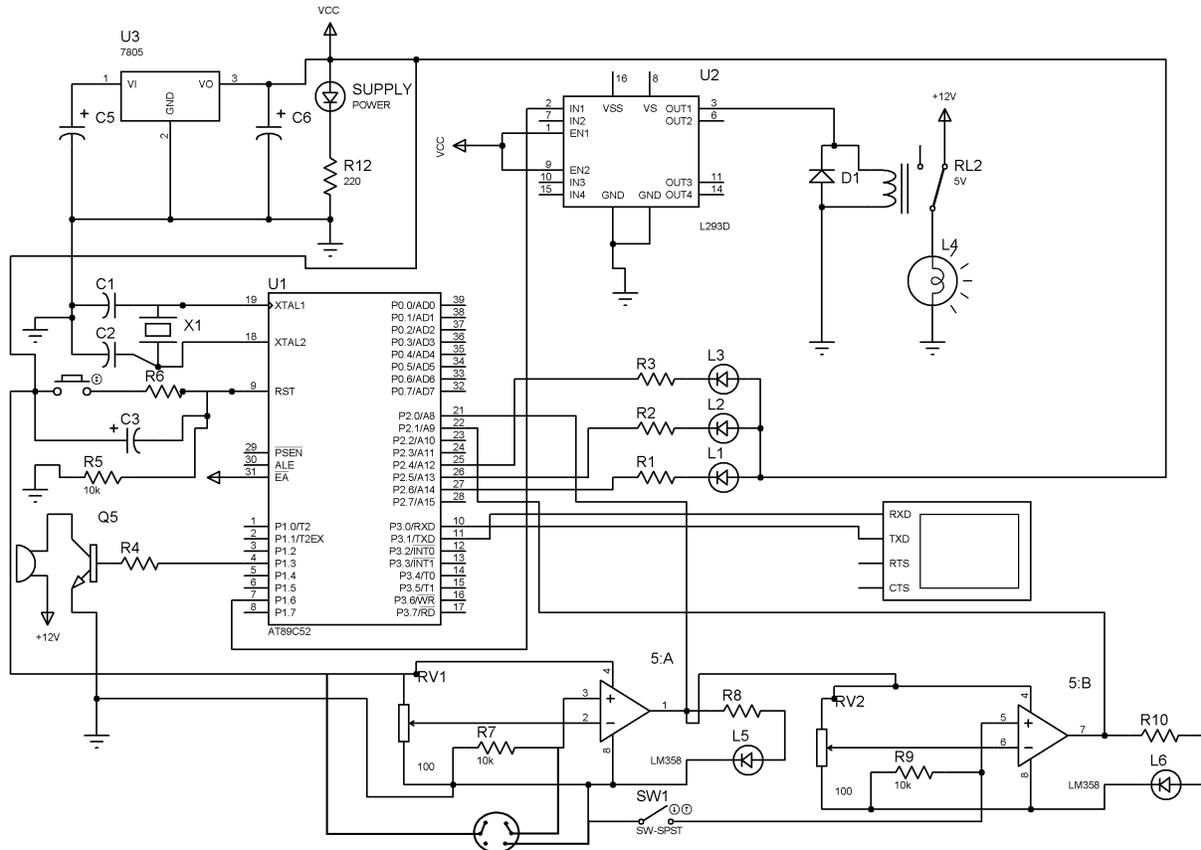


Fig (2). CIRCUIT DIAGRAM

3. RESULT

Overall system was designed and tested by introducing the small amount of LPG near gas sensor module. The system detect the level of gas in the air if it exceeds the safety level then send a SMS to the consumer using GSM modem and activate the audio-visual alarm which includes LED, Buzzer to alert the user at home in abnormal condition and to take the necessary action and the system continuously monitors the level of the LPG present in the cylinder and if the gas level reaches below then activate the LED and send a SMS to the consumer using GSM modem.

4. CONCLUSION

These design innovations will allow to navigate in kitchen to accomplish task with safety. This will greatly simplify the gas leakage control problem and give the house a full safety.

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