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A Survey on Smart LPG Gas Regulator

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ABSTRACT: LPG leak detector model is a compact electronic device which detects the presence of LPG in the air. Gas leak detection is the detection of gas leaks with a sensor specially designed to identify the leaks. In order to detect gas leaks with traditional methods, the gas itself must either be in close proximity to the detector or within a pre-defined area. Outdoor environmental conditions such as changing wind directions and quick dispersion of a potential gas cloud, which can be found e.g. on an offshore platform, can result in undetected gas leaks, leading to extremely dangerous situations.

Gas is intentionally odorized so that the average person can perceive it at a concentration well below the explosive range. That odorant concentration is generally between 0.5 to 1.0 percent by volume or as local applicable codes dictate. Gas odor is a common and effective indication of a leak. A report of gas odor should be investigated immediately. If a leak is found, the migration pattern of the gas should be determined. If an immediate hazard is determined to exist, the hazard potential should be eliminated and the leak repaired immediately. Odor is not always totally reliable as an indicator of the presence or absence of gas leaks. For this reason all gas leak reports should be investigated using a leak detection instrument. Gas personnel should remember that the primary purpose of the gas odor is to provide a warning to the public, who do not have gas detection instruments.

LPG gas detection projects main idea is to implement security system for detecting leakage of gas in closed environment. In this project gas leakage is identified by using sensors which works only in closed environment. In present situation there are many cases related to gas leakage which cause innocent people lives and property damage. Implementing this application can be useful for companies, houses, which can save lives of people.

KEYWORDS: ATmega328p controller, LPG sensor, GAS LEAKAGE DETECTOR.

I. INTRODUCTION

LPG is comprised of Commercial Propane and Commercial Butane having soaked tooa sun immerse hydrocarbons. On account of its flexible nature of LPG it is utilized in numerous necessities, for example, household fuel, mechanical fuel, auto-portable fuel, enlightenment and so on and the interest for LPG is consistently expanding step by step. The condensed oil gas is utilized generally in homes, businesses and in auto-mobiles as fuel due to its attractive properties which incorporate high calorific worth, it makes less smoke and doesn't make a lot of damage the earth .Natural gas is another broadly utilized fuel in homes.We use AT-MEGA 328 to perform the desired task by interfacing Gas sensor, Buzzer and LCD to display. The output of the Gas sensor is in analog form which can be converted into digital form using MCP3201 which is an ADC (Analog to Digital Converter). Initially when there is a leak the Gas sensor detects it and gives voltage related to the amount of gas that is getting escaped from the apparatus. We create a set-point to the AT-MEGA 328 so as if the Gas sensor gives the output above the set-point the controller drives the buzzer ON as an indication to the user.

1.1 Problem Statement:-

This study seek to answer the following questions:

What the purpose of making a Smart LPG GAS Regulator?

What component should be used in the machine to provide simple and inexpensive means to accurately and positively control the comfort?

How acceptable is the project, in terms of convenience and efficiency, for the consumers ?

What price consumers willing to pay for the commodity?

All the above Questions shows or mentions the problem statement which are expected to be completed through this project and should be efficient and convenient for the consumers.

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1.2 Need of the system:-.

- Safety of people.
- Safety for environment

1.3 Objectives of the system:-

- The researchers proposed this study with the following objectives:
- The primary objective of the project is to Safety of people for leakage of LPG Gas.
- To provide safety.
- To provide economical, reliable & easy to setup.
- To determine the acceptability of the study in terms of convenience and efficiency.
- To determine the acceptable price of the system to the consumer.
- To able to make an income generating project for the community.

III. SYSTEM DESIGN

A. ***Block Diagram***

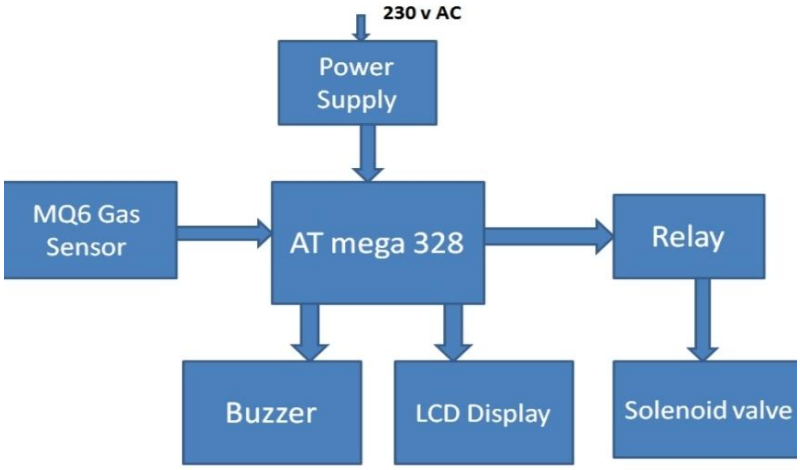

Fig 1. Block Diagram

- **ATmega328p**:

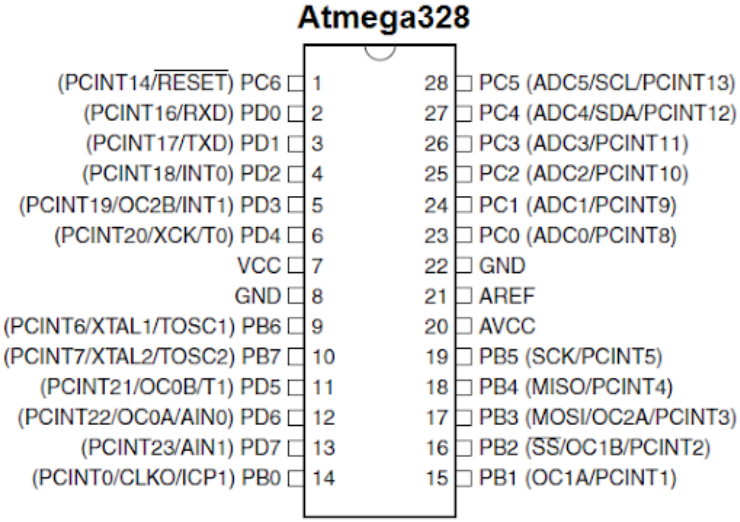

Fig 2. AT 328 Pin Diagram

AVR Microcontroller was created by the "Atmel Enterprise". The Microcontroller incorporates the Harvard design that works quickly with the RISC. The highlights of this Microcontroller incorporate various highlights contrasted and other like rest modes-6, inbuilt ADC (simple to computerized converter), inward oscillator and sequential information correspondence, plays out the guidelines in a solitary execution cycle. These Microcontroller were extremely quick and they use low capacity to work in various force sparing modes. There are various designs of AVR microcontrollers are accessible to perform different activities like 8-Bits, 16-Bits, and 32-Bits. It is an 8 bit and 28 pin microcontroller. It follows RISC architecture and flash memory of 32kb. It will be used as primary microcontroller of the system. All the peripherals will be interfaced with this microcontroller.

LPG GAS sensor:-

The **MQ-6** module is used in **gas** leakage detecting equipment in family and industry, This module has high sensitivity to LPG, iso-butane, propane and LNG. ... This is a simple-to-use **MQ-6** Liquefied Petroleum, iso-butane, propane **gas Sensor** module

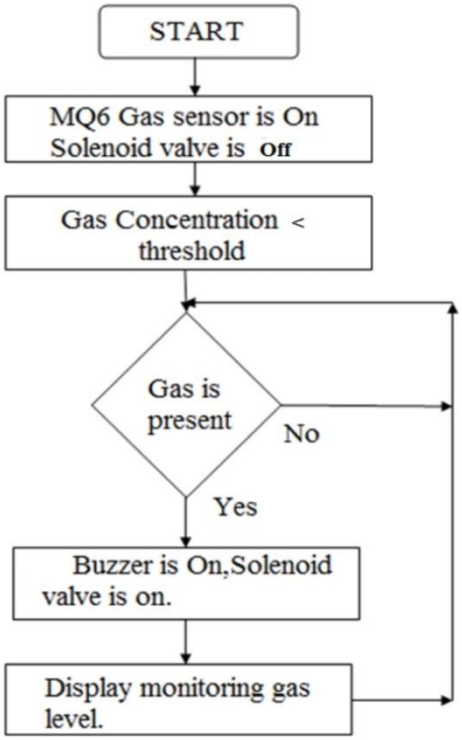

Fig.3 Flowchart

IV. SYSTEM WORKING

The functioning of the circuit when the device is powered ON. First the microcontroller initializes the LCD display and starts reading the analog voltage from the MQ-6 sensor. The MQ5 sensor gas module has 4 pins. Two pins are used for interfacing with developrnent board and other two pins are VCC and ground. Out of two interfacing pins one pin is analog output and other is digital pin. The analog output pin of the module is used for detecting concentration level of gas leakage and interfaced with the A0 analog input pin of the ATmega 328 ic. The analog voltage from the sensor is digitized using the in-built ADC channel and stored in a variable as a 10-bit value.

The 16X2 LCD display is used to display the value of gas concentration. lt is connected to the ATMEGA 328 by connecting its data pins to pins 4to7 of ATMEGA328. The RS and E pins of the LCD are connected to D2 and D3 pins of the AT MEGA. respectively. The RW pin of the LCD is connected to the ground. The sensor value is compared with a calibrated threshold and if the sensor value exceeds that value, the buzzer gets activated. The buzzer is connected to the Dg pin of the MICROCONTROLLER . A 10k potentiometer is also connected to the LCD pin VD, the battery and the ground. This is used for the contrast on the LCD display of the written alphabets or digits. When the leakage of the gas is within a limit or there is no leakage of LPG , the circuit detects and it displays the

ADC value or the numerical value which is less than 100. A message showing "LO\[/" keeps on displaying on the LCD screen .The buzzer is kept off for the condition. lf the leakage level is fatal or if the level is at initial stage i.e. there is medium leakage of LPG, the circuit detects and it displays the ADC value, a numerical value greater than 100 and less than 700 on the display. A message showing "YOU ARE SAFE" keeps on displaying on the LCD screen. The buzzer starts alerting by producing a low frequency sound in this condition. lf the leakage level is higher i.e. in the danger level, the circuit detects and it displays the ADC value or the numerical value greater than 300 on the displ?V, ? message showing "LPG GAS LEAKGAE' keeps on displaying on the LCD screen. The buzzer alerts the surrounding by producing a high frequency sound which is audible to all. This is how LPG Gas Leakage Detection circuit works and it alerts when there is high leakage of LPG which is really very dangerous for us. On the LCD screen at that condition

V. CONCLUSION

Overall system was designed and tested by introducing the small amount of LPG as near gas sensor module. The system detects the level of gas in the air if it exceed the safety level, this system automatically alerts the people by Buzzer and take necessary action of preventing the gas leakage.

In recent households, the use of LPG is taking a big role. From the use of cylinder up to the use of petroleum pipeline. The biggest advantage by using this technology is security. And our project will prove to be boom for households,hostels,vehicles and industries. It is an efficient home security system and also can be use in industries and other place to detect gas leaks. The cost involved in developing the system is significantly low and is much less than the cost of gas detectors commercially available in the market.

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