

LPG MONITORING SYSTEM USING LOAD CELL

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ABSTRACT

In the modern world, the use of LPG (Liquefied Petroleum Gas) has become a basic necessity of life. In homes, it is used for cooking, hot water, heating etc. In electricity generation field, it is used in generators, gas turbines etc. It is used in other fields as well, for example- Transportation, agriculture, livestock etc. LPG gas cylinders do not have any detection meter or detection system mounted on it which can show the amount of gas left in the cylinder. This paper mainly focuses on the technique for detecting low level of LPG gas in the cylinder. Generally in households, when the cylinder gets empty, order for newly pressurized cylinder is placed. Sometimes delivery of this cylinder is delayed due to various reasons which creates problems for the common people. It is the most basic and general problem of the current world and generally people ignore it. This technique is about making the use of microcontroller and weight detection sensor for the detection of low level of LPG in the cylinder so that a newly pressurized cylinder can be ordered before the current cylinder is empty.

General Terms

Transducer, Arduino UNO, IDE, GSM, Comparator, ATmega328P.

Keywords

Microcontroller, LPG, LED.

1. INTRODUCTION

A load cell is a transducer that creates an electrical signal whose magnitude is directly proportional to the force being measured. Normally, the weight of an average LPG cylinder used for cooking is around 29.5 kg completely filled with gas and the weight of an empty cylinder is around 14.5 kg. When the weight of the cylinder falls below a certain level then this sensor will detect the reduced weight and simultaneously give the indication to the user that there is going to be the need for a newly pressurized gas cylinder. A microcontroller is a little PC on a solitary coordinated circuit. For the proper detection of low level of LPG gas in the cylinder, a program will be stored in the microcontroller board.



2. LITERATURE REVIEW

The design of LPG leakage monitoring system was proposed for home safety. The accidents due to the explosion of LPG are increasing day by day. In this system, leakage of LPG is detected by gas sensor and the owner is alerted about the leak by an SMS to his or her personal mobile and activate the alarm. In addition to this, the system monitors the level of the LPG in the cylinder using load sensor and if the level is below the minimum limit the system inform them by SMS and also by the LCD display. So that the user have an idea about the max time the LPG lasts. An automatically booking of the cylinder using a GSM module is used in this proposed system. The device ensures safety and prevents suffocation and explosion due to gas leakage.

3. MODULES

3.1 Load cell

Load cell is a type of transducer which plays the role of converting force into an electric output which can be measured. Load cell can be found at the heart of any weighing machine or electric scales. This type of transducer is highly accurate which provides user with required information that is difficult to obtain by other technology owing to certain commercial factors.

3.2 Comparator

A comparator is a device that compares two voltages or currents and outputs a digital signal indicating which is larger. Weight sensor output is in analog form and microcontroller requires digital signal. For this reason we have used comparator IC. Comparator is a mediator or communication channel between micro controller and weight sensor.

3.3 Arduino Board

Arduino UNO is an open source micro controller board based on the ATmega328p microcontroller. There are sets of digital and analog input/output pins that are interfaced to various expansion boards and other circuits. The Arduino Software (IDE) allows you to write programs and upload them to your board.



4. FUNCTIONING

An arduino program will be written on the arduino software which will make red LED blink if the weight of the cylinder falls below a certain level. When the weight of the cylinder is above this level then there will not be any blinking of an LED

but when the weight Red LED will blink if the weight of the cylinder falls below this level. The detection process will be performed by the load cell which will command to the arduino about the weight of the cylinder. Arduino and the load cell will be connected to each other through comparator.

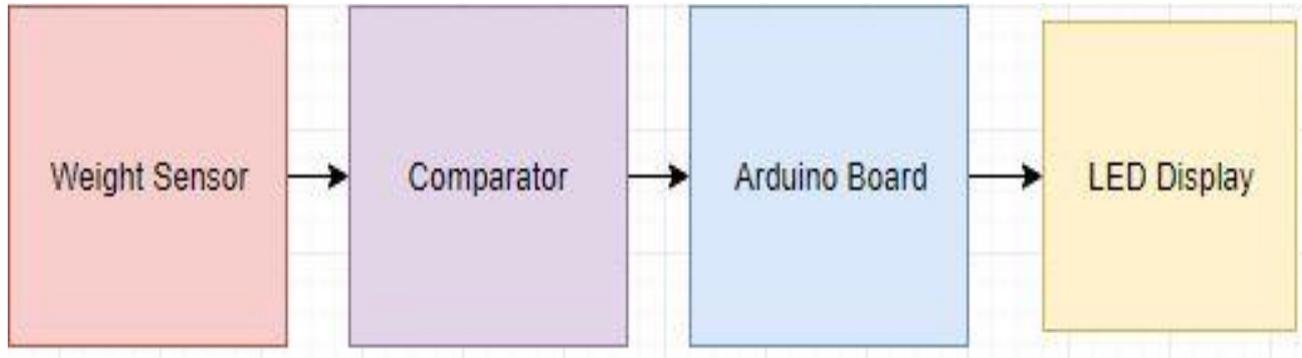


Fig: Block Diagram showing the arrangement

4. METHODOLOGY

The main advantage of this technology is that whenever there is a need of a newly pressured cylinder, the user is warned before time so that he or she can make the proper arrangement for a newly pressurized cylinder and there will not be any disturbance in the process. The load cell will be kept below the LPG cylinder which will detect the weight of the cylinder. When the weight falls below the level then Load cell will send a signal to Arduino through comparator which will then start the blinking of red LED which will indicate the user about the low level of LPG in the cylinder.

5. WORKING

While using this technology, a load cell i.e. weight sensor will be kept below the LPG cylinder and this sensor will be connected to a comparator. The work of a comparator is to convert analog signal coming from the weight sensor into the digital signal which can be read by the microcontroller. Now microcontroller convert the digital weight reading into the normal weight and analyze whether the weight value is higher than the minimum value or lower than the minimum value, if it is lower than the minimum weight value then blinking of red LED will start which will warn the user about the low level of LPG in the cylinder.

6. REVIEW

In our country, it is not possible to supply LPG through pipes due to low production of LPG in the country. A lot of work is done in this area so as to make the human more comfortable and relaxed with the use of LPG. An SMS technology is being talked about in which by the help of GSM (Global System for Mobile) one can get an SMS if the level of LPG in the cylinder is below 20%. This would also require a weight sensor, a comparator and a microcontroller. Some advancement is also done in the gas leakage detection area which makes the use of an LPG sensor which detects the leak of methane gas and warns the user about LPG leakage. In this system also SMS technology can be used by the help of GSM.

7. CONCLUSION

At present we have a system Advance LPG cylinder booking through IVRS or online which is very complex and difficult to understand for the illiterate and busy schedule people to book the LPG cylinder in advance. Another Major problem which LPG cylinder users face is they don't know exactly the status of LPG gas completion which makes even more delay in booking the cylinder which is uncomfortable most of the times. The technology given in this paper may help a lot to solve this basic problem of general public. The components shown in this technology are not too expensive if seen from the perspective of a common man and can be easily bought so this technology is very cheap and easy to be applied into the daily life.

8. REFERENCES

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