Volume, Temperature and Ph Value Measurement of Liquid Tank

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Abstract- *Accurate Measurement of fluid level is very vital both in industrial and consumer market. LASER pointing technology is one of the solutions used by the industry.However,an optimized balance between cost and features are a must for almost all target applications.This measuring system is based on Ultrasonic sound using LASER pointing utilizing an AT 89S52 microcontroller.CP3007 Ultrasonic Distance measure using LASER pointing module is used to both generate and detect the ultrasound required for level computation.The LM35 is a precision IC temperature sensor with its output proportional to the temperature (in ºC).The maximum height that can be measured is 18 meters. The amplitude of the echo received by the system is so low that it is not detectable by the ultrasonic LASER pointing module,the system goes out of range.This is indicated by displaying the error message on the LCD.With LM 35,the liquid temperature can be measured more accurately than with a thermistor.The operating temperature range is from -55ºC to 150ºC.This temperature and liquid level of tank is displayed on alphanumeric LCD with an accuracy of ±2.2cm. A very important measurement in many liquid chemical process(industrial,manufacturing,food) is that PHvalue, the measurement of hydrogen ion concentration in a liquid solution.The PH electrodes generate the voltage directly proportional to the PH of the solution.PH sensor electrodes generate voltage proportional to PH value and this value of PH isgiven to ADC to convert it into digital value.*

Keywords- Volume, echo, sensor, ultrasonic LASER, emperature, PH.

I. INTRODUCTION

Accurate, Affordable and reliable level measuring technology is of great importance for industrial, domestic and other verities of applications. Such applications including fluid fuel storage, providing flood warning in the biochemical industry and simple water level control in home.The techniques of distance measurement using ultrasonic LASER pointing in air include continuous wave and pulse echo technique. In the pulse echo method, a burst of pulses is sent through the transmission medium and is reflected by an object kept at specified distance. The time taken for the pulse to propagate from transmitter to receiver is proportional to the distance of object.The amplitude of the received signal gets significantly attenuated and is a function of nature of the medium and the distance between the transmitter and target. At the same time we find out the temperature of the liquid and PH value of the liquid by using the LM35 and PH sensor.LM35 temperature sensor which communicate in analogue voltage which is connected to the analog to digital convertor. A PH sensor is a scientific instrument that measures the hydrogen-ion activity in water based solutions, indicating its acidity or alkalinity expressed as PH value.

II. SYSTEM DESIGN AND IMPLEMENTATION

This research creates a monitoring system of liquid volume,temperature and PH value inside the fuel tank by combining some components: Ultrasonic LASER pointing sensor, microcontroller AT89S52,Temperature sensor LM 35,ADC 0808,16*2 LCD,PH value Sensor.These components are to form a simple circuit for obtaining liquid volume,temperature and PH value data in the tank and get the location of the tank.

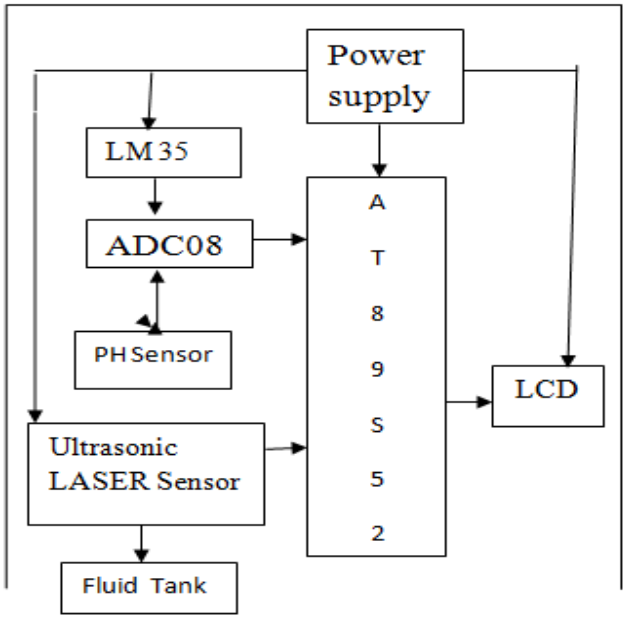


Figure 1.0 Block diagram of Different parameter measurement of liquid.

III. BLOCK DIAGRAM DESCRIPTION

A. POWER SUPPLY

It is mainly used to provide DC voltage to the components on board. It supplies 5V for Microcontroller, ADC 0808, LM35, LCD display and PH value sensor.

B. SENSORS

1.CP3007 Ultrasonic LASER Sensor.

The ultrasonic distance meter +LASER pointer is a perfect tool to quickly know the distance. It can measure distances in a straight line from 0.6m to 18m.Distance measurer transmits ultrasonic waves to a point to measure.a built in laser pointer helps user to measure distance accurately and efficiently.It works on 40KHz frequency and LASER wavelength is 650nm.

2. LM35

LM35 sensor is used for accurate temperature measurement. It is connected to ADC of the microcontroller. The LM35 series are precision integrated circuit temperature sensor.The output voltage of LM35 is proportional to the Celsius (centigrade) temperature.The LM35 have linear output, low output impedance and precise inherent calibration make interfacing to readout or control circuitry very easy.

3. PH Sensor

PH value is a measure of acidity and alkalinity, or the caustic and base presents in a given solution. It is generally expressed with a numeric scale ranging from 0-14.The value 7 represents neutrality.The number of the scale increasing alkalinity,while the numbers on the scale decrease with increasing acidity.The PH value is also equal to the negative logarithm of the hydrogen ion concentration or hydrogen ion activity.

C. MICROCONTROLER

A microcontroller is a small computer used in one IC containing a processor core memory and programmable input output peripherals .It performs the operation of giving the switching signal, computing the distance, converting the hex value to decimal and then to ASCII to be displayed in theLCD.

D.LCD (LIQUID CRYSTAL DISPLAY)

The LCD is used in a project to visualize the output of the application.We have used 16*2 LCD which indicates 16 columns and 2 rows.so,we can write 16 character in each line.so total 32 characters we can display on 16*2 LCD.The LCD can also use in a project to check the output of different modules interfaced with the microcontroller.

E. ADC 0808

[1]ADC 0808 is an 8 bit analog to digital convertor with eight input analog channels that is it can take eight different analog inputs.The input which is to be converted to digital form can be selected by using three address lines.The voltage reference can be set using the Vref+ and Vref-.

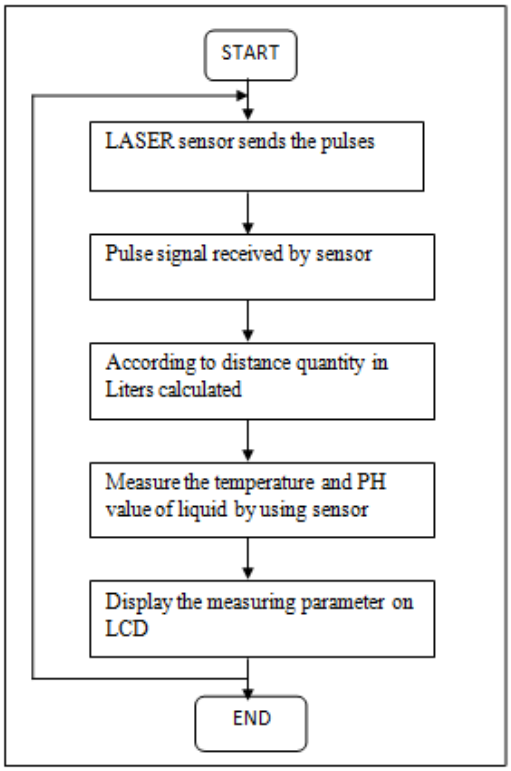
IV. EXISTING SYSTEM

Accurate measurement of liquid quantity present in tank using non- contactless method is very important in industry [4].Till date so many systems are design to detect level of liquid in tank.the level of liquid is detected using contact method.But we are going to design system for accurate measurement of liquid quantity, temperature and PH value using non contactless method.

V. PROPOSED SYSTEM

The proposed system overcomes all the drawbacks of existing system. The ultrasonic LASER pointing sensor used to measure the long distance up to the 0.6 to 18m.In future that our next generation will develop this Ultrasonic LASER pointing system with increases the measuring distance using different sensor .We can replace the LCD by using mobile phone to give the message of liquid level.

FLOW CHART



VI. CONCLUSION

LASER pointing sensor is not limited for particular application; it is to be used in a variety of agricultural applications, fuel industries, and chemicalindustries.

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