

# Detection of Petrol Theft by using Weight Sensor with Pic Microcontroller

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**Abstract**— In modern days our world going towards to digitized, if we make fuel meter in the vehicle also digital it will help to know exact amount of fuel present in fuel tank. In our Project we have made digital fuel meter. Here, we make designed of digital fuel meter indicating actual amount of fuel present in tank. That value is in numerical digits (ex: 1lit, 1.5 lit, 2lit etc.). In all over the world thefting of fuel is a big problem. In our project whenever there is fuel thefting buzzer is ON. This is real time occurring process. The previous vehicle system doesn't have such functionality that there is no accuracy in previous system. And also overcome the calibration misused, to avoid theft of patrolling system and to provide security for that petroleum system.

**Key words:** LCD Display Keypad, Weight Sensor, Fuel Tank, Buzzer, Power Supply, PIC Microcontroller

## I. INTRODUCTION

Now a day's world becomes a digitalized in all over field. As related to previous day Digital fuel meter is also implemented in two wheeler, but they does not shows the exact weight of fuel which is present in the tank i.e. they shows the fuel In the form of bars and not in numbers. Because of this user not get proper idea about how much amount of fuel present in tank. Due to that problem we develop the Digital (numeric) fuel meter which shows exact amount of fuel in terms of liter or milliliter [1].

This value of fuel display in liters will be in the form of digits like as 1lit, 1.3 lit, 2lit. This project mainly concentrates about the indication of fuel level in two-wheeler tanks. In the recent times we are constantly hearing about petrol the thefting. In Most of the fuel pumps doing fraud at the pumps such that displays the how much amount of fuel is entered in the customer fuel tank. But the actual quantity of fuel in the customer's tank is different. Due to that fuel thefting petrol owner goes to huge amount of profits but the customer's faces to lots of money loses. In All our India used of analog meter in vehicles So it consist of analog meters and they not get accurate result and also fuel present in the tank and also it is not possible to cross check the quantity of fuel filled in the petrol bunk. In this project we focus on creating a digital display of the exact amount of fuel contained in the Vehicle tank and also help in cross checking the quantity of fuel filled at the petrol theft. Previous method consists of dash board in that needles are moved to indicate the amount of fuel but that is not accurate it just show the approximate value Authors in have mentioned about improvement of conventional methods for fuel measuring. The security and accuracy of contactless measuring devices has helped a lot in accurate and error free measuring. There should be some provision at the user know the fuel weight at all times. It is more importance to user safety and security. In the recent years, escalating oil demands and costs of fuel are increasing.

## II. LITERATURE SURVEY

### A. Analog Fuel Meter

In all over the world all the vehicle are having an analog fuel meter. This meter indicates three states of fuel level which are empty, half and Full. So we cannot judge the actual fuel present in the fuel tank. In Fig1 we can see analog meter, which shows the fuel level by using needle. But due to this we do not get proper idea about fuel level present in fuel tank. Due to improper knowledge of fuel present in the tank we can undergo in trouble due to low fuel.

As considering previous analog system we are going to implement advanced system. In our system we are doing digital fuel meter and theft detection. In digital fuel meter we are indicating the amount of fuel in the tank in liters. This value in liters will be in numerical digits (Ex: 1 lit, 1.5 lit, 2 lit).



Fig. 1: Analog Meter

### B. Fuel Thefting

There is major problem of fuel thefting all over the world. Thefting is malpractice which includes removal of the Fuel pipe in the absence of owner and misusing the fuel from the bike. The owner of the bike unaware of fuel theft and he will come to know about it only when he wants to ride his bike on the next time. Previously due to absence of any burglar alarm or buzzer the system.

The people were not aware about fuel thefting. To overcome this problem we have put this idea of digital fuel meter and fuel thefting. Using PIC microcontroller .In our project whenever there is fuel thefting, due to the noise of burglar alarm people are aware of the fuel thefting .and also during fuel thefting a text message delivered on mobile to the owner of the bike. This is real time occurring process. Recently the lock system for the pipe ensured least amount of fuel thefting but it lasted only for small duration of time. The disadvantages of this lock system are thief can break the system by using duplicate key and removal of fuel from bike. Most of the petrol bunks today have frauds the pumps such that it displays the amounts entered but the quantity of fuel filled in the customer's tank is much lesser than the displayed value. [3] All the vehicles in India consist of analog meters hence it is not possible to precisely know the amount of fuel currently in the vehicle. Also it is not

possible to cross check the quantity of fuel filled in the petrol bunk.

### III. MODELING AND DEVELOPMENT OF SYSTEM

#### A. Block Diagram

The basic block diagram of the Digital Fuel meter using PIC micro-controller is shown in Fig 2. Mainly this block diagram consists of the following essential blocks: Power Supply, PIC18F4520 microcontroller Display, weight Sensor, Buzzer, Driver IC ULN2003

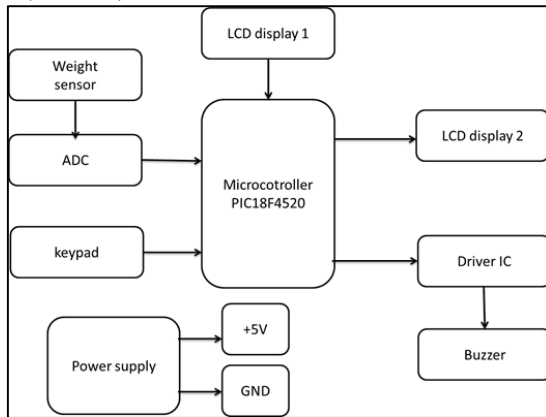


Fig. 2: Block Diagram

##### 1) Power Supply

Linear regulated power supply, all the electronic circuit needs a dc voltage is derived from the single ac phase main supply. For this purpose we have to use a regulated dc power supply. The basic building blocks of regulated dc power supply are Step down transformer, Rectifier, Filter, Voltage regulator IC's, Load.

##### 2) PIC18F4520 Microcontroller

The microcontroller is required to serve the purpose main transformer information such as temperature, voltage and current through the LCD display, personal computer and triggering the relay when there is any fault. Modern power networks require faster, more accurate and reliable protective schemes. Touring the microcontroller based protective schemes is capable of fulfilling these requirements.

They are superior to electromagnetic and static relays. These schemes have more flexibility due to their programmable approach when compared with the static relays which have hardwired circuitry. Therefore in order to achieve this task the PIC18F4520 microcontroller was chosen because of its suitability for this project such as speed, power consumption, universal synchronous asynchronous receiver transmitter (USART) functionality, in built ADC, and amount of RAM and ROM on the chip.

##### 3) LCD Display

Interfacing between micro-controller and the LCD is required for displaying the status of Fuel level present in the fuel tank. The LCD is set to 16x2 displays. Depending on the status of fuel level, the LCD displays the level of fuel in digit like 1.1 lit, 1.2lit etc. The data from the microcontroller is communicated using upper 4 bits of one-of the ports and the data pins of the LCD is connected to data pins D4, D5, D6, D7 of the LCD. The LCD is enabled using Enable (E) pin. Reading and writing of data to the LCD is handled using R/W pin.

The sensing unit usually uses a float connected to a potentiometer, typically printed ink design in a modern automobile. As the tank empties, the float drops and slides a moving contact along the resistor, increasing its resistance. In addition, when the resistance is at a certain point, it will also turn on a “low fuel” light on some vehicle. The Indicator unit is measuring and displaying the amount of electric current flowing through the sending unit. When the tank level is high and maximum current is flowing, the needle points to “F” indicating a full tank. When the tank is empty and the least current is flowing, the needle points to “E” indicting an empty tank.

##### 4) Weight Sensor

Weight Sensor Module is based on HX711, which is a precision 24bit analog to digital Converter designed for weight scale and industrial control applications to interface directly with a bridge sensor. Compared with other chips, HX711 not only has a few basic functions, also contains high integration, fast response, immunity, and other features. The chip lowers the cost of the electronic scale, at the same time, improving the performance and reliability.

The input interface of this weight sensor module is used sensor interface, which is compatible with Adriano I/O port. The output adopts compact terminal that makes weight sensor module easier to connect the weight sensor. It's the best choose for electronic enthusiast to do some tiny home scale.

The weight sensor module can be combined with weight sensor on the market. We also help you to pick a small range of weight sensor.

##### 5) Buzzer

Buzzer is an electronic device commonly used to produce sound light weight simple construction and low price make it usable in various application like computers call bells etc. It is the phenomenon of generating electricity when mechanical pressure is apply to certain material and the vice versa is also true.

##### 6) Driver IC ULN2003A

The ULN2003A/L and ULN2023A/L have series input resistors selected for operation directly with 5 V TTL or CMOS. These devices will handle numerous interface needs — particularly those beyond the capabilities of standard logic buffers. The ULN2004A/L and ULN2024A/L have series input resistors for operation directly from 6 to 15 V CMOS or PMOS logic outputs. The ULN2003A/L and ULN2004A/L are the standard Darlington arrays. The outputs are capable of sinking 500 mA and will withstand at least 50 V in the OFF state. Outputs may be paralleled for higher load current capability. The ULN2023A/L and ULN2024A/L will Withstand 95 V in the OFF state.

##### 7) Keypad

It is 4\*4 matrix membrane keypad. This 16-button keypad provides a useful human interface input component for microcontroller project. Convenient adhesive backing provide a simple way to mount the keypad in a variety of application.

#### B. Working

From the block diagram shown in figure , the working of system is shown in which we used PIC18F4520 microcontroller ,weight sensor ,LCD display 16\*2,relay with driver IC both equipment are connected to

microcontroller. The actual weight of fuel is display on LCD screen. It also shows theft of fuel on the screen at the time of filling fuel at fuel pump. Buzzer is used for security purpose. Weight sensor measure the fuel and shown on LCD, at that time it also show how much amount of fuel filled in the tank. If the total weight of fuel is not match to the actual weight at that time it shown theft value on screen and buzzer start for indicating for unskilled persons.

### C. Algorithm

- 1) Start.
- 2) Initializing the switch of vehicle.
- 3) Start the engine of the vehicle.
- 4) Display the present weight of fuel in liter on LCD display.
- 5) Fill petrol in the tank of fuel and note on keypad.
- 6) LCD shows actual amount of fuel and filed fuel weight in liter.
- 7) Comparing both
- 8) If there is no theft displayed message Everything is OK.
- 9) If both calculations are wrong then, it shown theft on LCD and start the buzzer.
- 10) Stop

### D. Flowchart

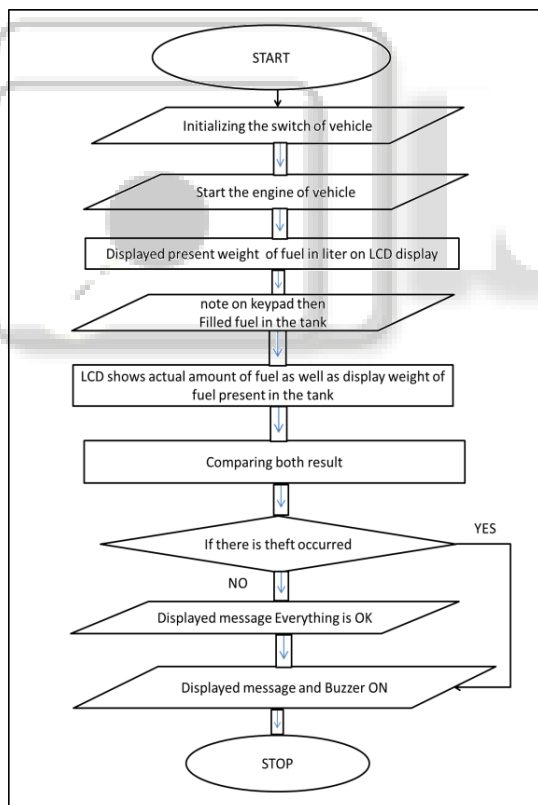


Fig. 3: Flowchart

### IV. RESULT

Using this technique we get the actual weight of fuel and filed fuel weight for calculations. If any theft is occurring at the time of filling fuel, then it shown message on LCD. It also showed the how much fuel is theft by comparing both weight. And buzzer is start if fuel theft is done.

### V. CONCLUSION

In this Project we have made Digital Fuel Meter, Which shows the level of fuel digitally and also theft detection can be done. It gives the high accuracy by digits than the Analog Meter and latest digital meter. This measuring unit should be fixed to the entire vehicle so that we get an exact quantity of fuel to measure the inflow.

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