

THE SMART FUEL TANK

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ABSTRACT

Now-a-days we often come across the situations where we suffer the theft of filling less amount of fuel than required or demanded. Due to increase in theft of fuel at fuel pump station a system is necessary to reduce the theft of fuel, for this purpose a system is to be installed at the inlet of fuel tank. The system consists of flow sensor, digital display where the power supply for system is provided from the internal battery of vehicle. When the fuel is allowed to pass through the sensor the actual amount of fuel passing through system gets displayed on the display provided on dashboard. This system is cost effective and applicable for four wheelers.

Keyword: Fuel tank, battery, sensor, digital display.

I. INTRODUCTION

Customers make complaints regarding less amount of petrol filled in their tank system ex. Improper flow, displaying more units compared to actual amount filled in the tank etc. Such complaints are arises from customers regarding the fuel in the tank. At the petrol pumps we often come across the situations where we suffer the theft of filling less amount of fuel than required or demanded at the cost of whole of the amount of fuel. Regarding the complaints of the customers we are designing a smart fuel tank. The fuel tank is smart enough to indicate whether the amount of fuel demanded by customer to fill in the tank is filled up or not. This smart fuel tank is the system will display the actual amount of fuel fill in the tank. Also will make the process simpler, cost effective and reliable. The smart fuel tank which we designed is microcontroller based and for determining parameter values Arduino Hall Effect sensor will be used. These sensors are interfaced with microcontroller and suitable code is developed which takes signals from sensors and further process it.

II. METHODOLOGY

Arduino hall effect sensor

Measure liquid/water flow for solar, computer cooling, or gardening project using this handy basic flow meter. This sensor sits in water line, and uses a pinwheel sensor to measure how much liquid has moved through it. The pinwheel has a little magnet attached, and there's a Hall Effect magnetic sensor on the other side of the

plastic tube that can measure how many spins the pinwheel has made through the plastic wall. This method allows the sensor to stay safe and dry.

The sensor comes with three wires: red (5-24VDC power), black (ground) and yellow (Hall Effect pulse output). By counting the pulses from the output of the sensor, you can easily track fluid movement: each pulse is approximately 2.25 milliliters. Note this isn't a precision sensor, and the pulse rate does vary a bit depending on the flow rate, fluid pressure and sensor orientation. It will need careful calibration if better than 10% precision is required. However, it's great for basic measurement tasks!

Flow sensor details:-

Electrical:

- ☐ Working Voltage: 5 to 18VDC
- ☐ Max current draw: 15mA @ 5V
- ☐ Working Flow Rate: 1 to 30 Liters/Minute
- ☐ Working Temperature range: -25 to 80°C
- ☐ Working Humidity Range: 35%-80% RH
- ☐ Output duty cycle: 50% +/-10%
- ☐ Output rise time: 0.04us
- ☐ Output fall time: 0.18us
- ☐ Flow rate pulse characteristics: Frequency (Hz) = 7.5 * Flow rate (L/min)
- ☐ Pulses per Liter: 450
- ☐ Durability: minimum 300,000 cycles

Mechanical:

- ☐ 1/2" NPS nominal pipe connections, 0.78" outer diameter, 1/2" of thread
- ☐ Size: 2.5" x 1.4" x 1.4"



Fig1. Hall-effect Flow Sensor

Display: In our system we are using liquid crystal display (LCD) which is basically a 16 X 2 LCD display. The display will show the value of all the three parameter i.e. amount of water flowed and amount of dissolved impurities, with start and stop time.

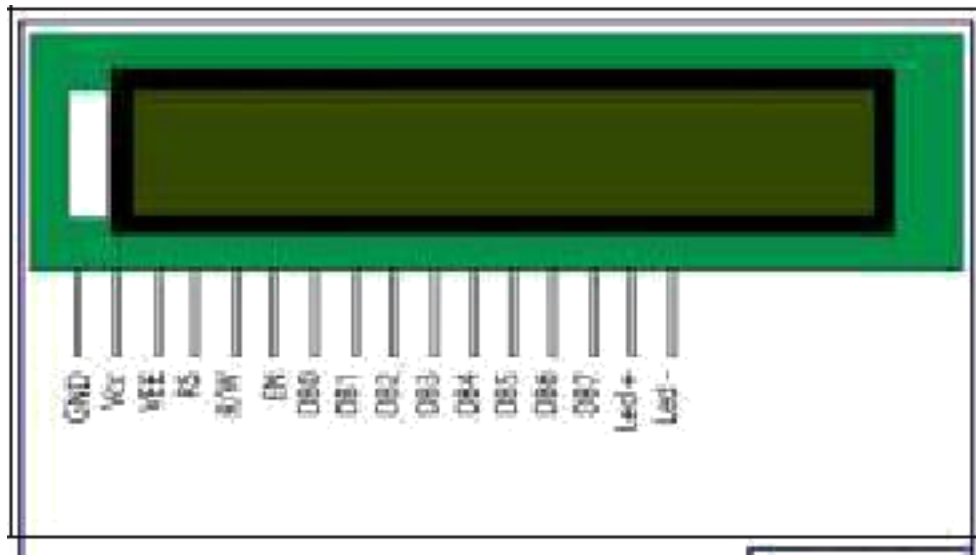


Fig2. Digital display

III .WORKING

The water hall effect sensor is fitted inside the fuel tank of the vehicle. Its output is given to the digital display. Digital display has given power supply from vehicle's battery. When fuel is passed through the sensor inside the fuel tank. The sensor measures quantity of the fuel passed through it. This measured quantity of the fuel is displayed on the digital display.

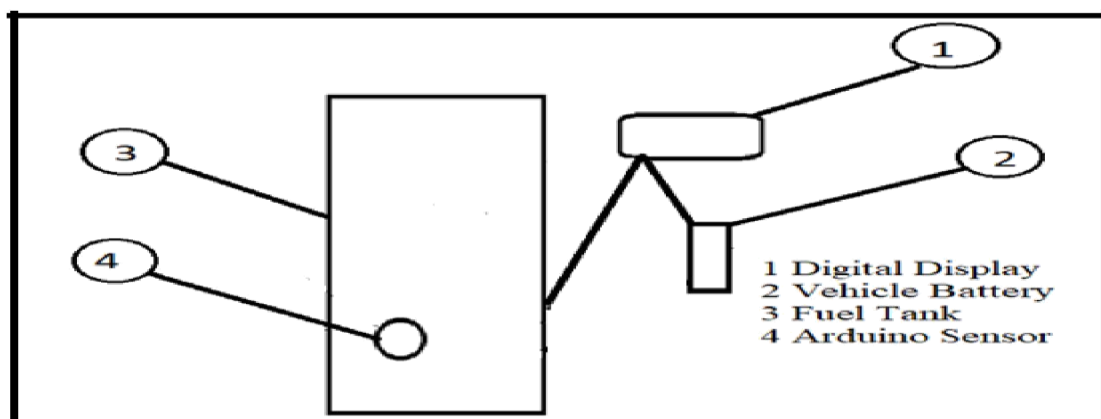


Fig3.Block diagram of setup

III. CONCLUSION

- 1] The actual quantity of fuel to be filled in the tank
- 2] System for avoiding cheating of fuel theft on petrol pumps.
- 3] Customer satisfaction
- 4] cost saving and reliable

REFERENCES

- [1] <https://www.adafruit.com/product/828>
- [2] <https://www.electronics-tutorials.ws/electromagnetism/hall-effect.html>.
- [3] <http://ieeexplore.ieee.org/abstract/document/7023985/>