

DIGITAL FUEL LEVEL INDICATOR

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ABSTRACT

Today in this digitalized world, if the fuel indicator in the automobiles is also made digital it will help to know the exact amount of fuel available in the fuel tank. The above furnished fact is considered in our project and we found out a proper solution for indicating the accurate availability of fuel in the tank digitally. A Liquid pressure transducer is used to find out the fuel level which is economic and also accurate. The added Feature in this fuel level indicator is that, the reserve condition is pre-informed to the user with an alarm, which helps to tune it to the reserve position before the engine stops and this helps to avoid knocking and engine damage. This project mainly concentrates about the indication of fuel level in irregular tanks (two wheeler and four wheeler tanks). Various other features like the distance covered, mileage obtained, can be added with this arrangement which explains the clear performance of the vehicle and the fuel used. We can also predict the time for refueling the vehicle and also to check the amount while fueling can be done in future. By using this digital fuel level indicator device the amount of fuel available in the tank at any position of the vehicle is predicted. The calculation is based on the principle of liquid pressure through which the pressure of Vented fuel available in the tank is found out and the accurate amount of fuel in the tank is displayed in the scale of liters.

INTRODUCTION

In this project we use liquid pressure sensor which works on principle of piezoelectric effect and calibrated to 1 atmospheric pressure, it is connect to the output of the fuel tank. This pressure sensor is of 0.100bar which gives electric output inmA. The output of the pressure sensor is measure in digital multimeter. Pressure sensor send data to electric circuit which is then calibrated in circuit IC. In this circuit we used Atmel IC 89S52. The electronic circuit has programmed by machine language which is easy to handle and can be modified as per requirement. The project circuit is also an additional advantages that it is manufactured to run on 12V battery supply. The input to circuit is given through keypad provided with multiple combinations. The circuit also has a seven segment display which shows the exact fuel level in tank in terms of liters. Circuit need 230 V AC or 12 V DC supply, the provision of both is given in circuit. The project also contains low fuel indication with combination Appropriate and over flow beep with LED blinking.

PROJECT CONSISTS OF FOLLOWING COMPONENTS.

1. Sensor
2. Electronic circuit
3. Fuel tank unit

1. SENSOR:-



Fig.1 Liquid pressure Transmitter

Principle:-

Sensor based on the piezoelectric effect can operate from transverse, longitudinal and are insensitive to electric fields and electromagnetic radiation. The response is also very linear over wide temperature ranges, making it an ideal sensor for rugged environments

The PT-H pressure transducer contains a minimum of components: the sensor element one signal conditioning ASIC and a power stage. The ASIC is a precision CMOS circuit with EPROM data storage utilizing an analog signal path, with the extended temperature range for industrial an automotive applications. The stainless steel port resists

Specifications:-

- Accuracy :- $\pm 0.25\%$ FS
- Input voltage :- 24VDC
- Output :- 4-20,A,0-5V,0-10V DC
- Temperature :- $-40-125^{\circ}\text{C}$

2. ELECTRONIC CIRCUIT:-

The figure below shows the concept of electronic circuit. Figures contain power supply which is alternating current 230V which is first given to transformer which is step down type to step down supply then transferred to rectifier where AC converted to DC then it again filtered by π filter. Then this filtered +5V supply given to Analog to Digital converter which 24 Bit continue to supply sensor. ADC is connected to IC89S52 or either equivalent IC which is programmed by Machine language, the signal coming from sensor is continuously are temporarily stored in ROM (24C04). IC initializes all

input data from sensor and keyboard and gives output on seven segment display. The user interface between machine and man is keyboard which has near about thirty two combinations out of few are required to

- Calibration
- correction factor
- to decide step size of 10,50 100,500 ml
- to lower or higher the quantity of low level indication system

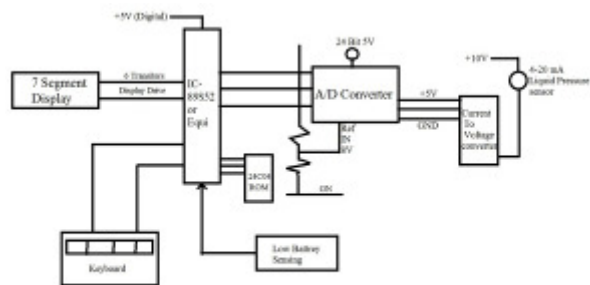


Fig 2 Electronic circuit

3. Fuel Tank Unit:-

The below fig shows the fuel tank of size (250 *135*175) mm. Tank has capacity of 5 liters. As shown in figure at the bottom of tank junction is made for fitment of

- Sensor
- Manometer
- Drain



Fig.3 Fuel Tank Unit

TEST PROCEDURE:-

The test procedure is as follows.

- Connect the three way junction at outlet of fuel tank out of which one is connected to the Liquid pressure sensor and remaining to the Manometer and Drain
- Make the necessary connection to complete the circuit



Fig.4 Wire Connection

- The above figure shows the connection made towards sensor and circuit .The Red wire of sensor is connected to the Red wire of circuit, Black wire of sensor is connected to the Red wire of multimeter and black wire of multimeter is connected to the Black wire of circuit.
- Start the supply and calibrate the sensor.
- Then pour specific amount of fuel say 1 liters
- The display shows the reading of the amount of fuel present in the tank in ml i.e 1000ml.
- Low level fuel indicator will show after the fuel reach below level as per setting.

CONCLUSION:-

Using calibration with a minimum amount of software, the required reliability,

resolution and accuracy for an automotive fuel level system design can be achieved. Calibration result of the liquid pressure sensor is linear than the Float level sensor and hence it can be used to measure level of the tanks. Also the size of the pressure sensor setup is very small.

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