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RUN TIME TIRE PRESSURE MONITORING AND CONTROLLING SYSTEM

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ABSTRACT:

Improper tire pressure is a safety issue that is usually ignored. But the fact is that a drop in tire pressure can result in the reduction of mileage, tire life, vehicle safety and performance. This paper is providing a new approach to tire pressure monitoring system. This electronic system design to monitor air pressure inside the tire. Inform the driver via display in run time. If pressure is below the desired, compressor refill the tire if it is above desired excess pressure release through a solenoid valve. Test results show that the design to supply air to all tires via rotary union and compressor, overcome the problem of inflated tires and achieves good results.

Keywords: *PIC Microcontroller, Pressure sensor, Rotary union, Air compressor, Solenoid valve*

1. INTRODUCTION

When we travel in four wheeler or more wheeler vehicles and if there is puncture in tire ,then many problems are faces to user like cannot reach in proper time, also main problem is we do not avoids accidents any time. We cannot control and manage the vehicle in puncture situation. If we use this system we can drive the puncture vehicle without trouble. And also increase the efficiency. In this system tire pressure monitoring and controlling in run time, so safety of driver is increases. In these system air filling automatically with the help of air compressor and extra air excess through solenoid valve. This system is very useful for saving fuel, safety of peoples and vehicles, reduction of mileage. Because tire pressure information to driver via the display. So this system very important and useful for users.

2. NECESSITY OF PROJECT

In our busy scheduled life more use of vehicles, many problems occurred due to inflated tires of vehicles. Real fact is that most of the accidents done due to under inflated tires. Vehicle users are not aware of that fact they do not measure tire pressure correctly. The over-flatted or in-flatted tires looking like same so user does not correct measure pressure in difficult situation. Many times owner of vehicles losing money to change the tire wear and also decrease the fuel efficiency. In all improper tire conditions user and experts view point 'run time tire pressure monitoring and controlling system' very useful and safety for users.

3. BLOCK DAIGRAM

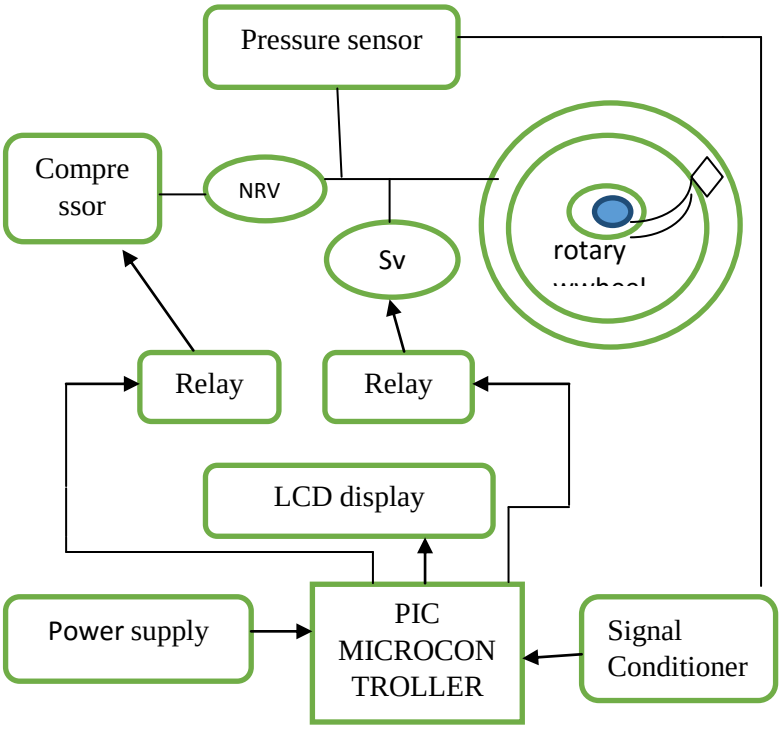

Fig.1. Block Diagram

4. HARDWARE DESIGN

4.1. PIC16F877 MICROCONTROLLER

PIC16F877A Microcontroller is the core controller. In PIC Controller, a clock/machine cycle, with high-speed, high-reliability, low power consumption characteristics, Only 35 single-word instructions to learn, All single-cycle instructions except for program branches, which are two-cycle. Operating speed: DC 20 MHz clock input and DC 200 ns instruction cycle. Up to 8K x 14 words of Flash Program Memory, Up to 368 x 8 bytes of Data Memory (RAM), Up to 256 x 8 bytes of EEPROM Data Memory.

4.2. PRESSURE SENSORE

The smart pressure device SPD series of the pressure sensor are silicon based and encapsulated in modified plastic Dual in packages. Various pressure ranges are available. Its voltage is typical 5V. It is ideally suitable for microprocessor and microcontroller based system. In this system we use SPD100GA pressure sensor. It is easily available in market.

4.3. AIR COMPRESSOR

12V Air Compressor Tire Pump is used. No efforts are required for pumping air as it is all electronic & is powered directly from your car battery. Quickly operation, very Compact and easy to store in car dickey suitable. Easily filled the air in inflated tires.

4.4. ROTARY JOINT

Must have approx. 40mm hole in the centre to allow for the axle to either pass through or support the joint.Air inlets and outlets must be located at the outer radius to allow the hoses on the outside of the joint to clear the vehicle spindle and hub. Overall thickness of the joint must be no greater than 25mm to so as not to interfere with the vehicle driveline or suspension components. Ball bearing system must be used to reduce contact friction between the two rotating halves both axial and planar**.**

5. SOFTWARE DESIGN

Mikro C

We are using here Micro C programming language. Mikro C is a powerful, feature rich development tool for PIC micros. It is designed to provide the programmer with the easiest possible solution for developing applications without compromising performance or control.

6. FLOWCHART

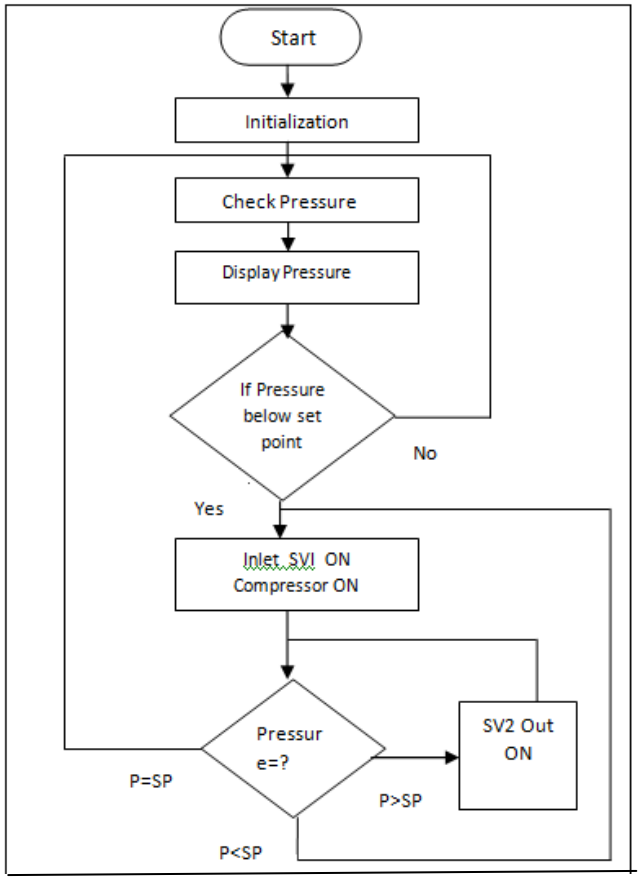

Fig.2.Flowchart

7.TIRE PRESSURE DISPLAY

Fig.3. Tire pressure display

Input: pressure (0 to 33 psi)

Output: Digital signal

8. CONCLUSION

After putting many efforts, we have successfully completed the project. As per our requirements, it is seen that tire pressure is maintained in the range of 30-33PSI without much human interposition. Hence, we guarantee that if our system design is adapted by various automobile manufacturers, it will be beneficial and economical at the same time to the end users.

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