

Central Tyre Inflation System For Four Wheeler

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Abstract

Roads are the most important mode of transport nowadays cars are an integral part of it. Tyres lose air through normal driving-especially when run through pot holes permeation. Moreover temperature changes (seasonal) are also one of the reasons due to which tyres lose air. Thus vehicles run with an under-inflated tyre which may cause accidents. Studies show that a drop in tire pressure by just a few PSI can result in the reduction of gas mileage, tire life, safety, and vehicle performance. This project aims to develop an automatic, self-inflating tire system. Such a system ensures that tires are properly inflated at all times. Our project design is successfully tested and implemented with the help of a centralized compressor. The compressor will supply air to all four tires via hoses and a rotary joint fixed between the wheel spindle and wheel hub at each wheel. The Rotary joint is an integral component of the system-which has half of its part rotating with the wheel rest half part is stationary. The rotary joints effectively allow air to be channeled to the tires. Thus the rotary joint facilitates untangling of hoses. Considering today's ever increasing environmental threats; oil price hikes, energy consumption our system is most compatible and potential improvement in gas mileage tyre wear reduction which leads to an increase in performance of Tyre in Diverse Conditions.

KEYWORDS:-(Self inflating, centralised compressor, Rotary joint)

I. INTRODUCTION

After the discovery of wheels by man, it has been used extensively for a variety of purposes. Wheels have become the vital part of human lives since ages. The effective use of wheels with more innovative ideas further developed with developing technologies. One such upcoming technology is the automatic air inflation system used in automobiles. This system is used to maintain the pressure of tires in running condition. A central tire inflation system (CTIS) is a system to provide control over the air pressure in each tire of a vehicle as a way to improve performance on different surfaces. For example, lowering the air pressure in a tire creates a larger area of contact between the tire and the ground and makes driving on softer ground much easier. It also does less damage to the surface. To develop an automatic air filling system, this recognizes and fills air in the respective tire when its pressure goes below the desired/required pressure (under inflated condition). Underinflated tires overheat more quickly than properly inflated tires, which cause damage to tires. To reduce this problem we are designing this system. As soon as a tire Pressure goes under inflated, then a pressure sensor senses it and sends it to the Controller which activates the solenoid valve and air is filled up to proper inflation.

II. RELEVANCE

This automatic centralized compressor self-inflating tyre system ensures that all tyres are always properly inflated and thus improves the tyre life, safety, reduction of gas mileage and vehicle performance by supplying air to all tyres via hoses and a rotary joint fixed between wheel spindle and wheel hub at each wheel whenever there is a pressure drop inside the tyre. When a car in high speed on that time tyre puncture it going to be dangerous for passengers so our project work on a simple

system which gives indication about puncture and so that driver gets a chance to slow down the vehicle and can get a car on the road side.**MOTIVE**

Due to the growing number of accidents due to tyre problems, a lot of people are losing their lives. This motivated us to solve the issue of tyre inflation. Being socially aware we decided to reduce the problems of accidents which will lead to saving a lot of lives.

III. PROBLEM STATEMENT

To design automatic air refilling system for four wheeler using Close loop system for sensing the air pressure in individual tyre and refiling the air accordingly

IV. OBJECTIVES

- [1] Design a functional mechanism that will help to introduce pressurized air to the rotary tyre.
- [2] Design of system component: - Rotary union, piping and wheel rim.
- [3] Selection of sensing device and air compressor.
- [4] Interfacing of sensing devices

V. SUMMARY

In order to serve efficiency and increase the vehicle performance, tire life and overall safety of the vehicle it is necessary to implement central air inflation technique. This causes thrifty fuel consumption, better vehicle mobility due to better traction and reduces the vibration with minimum leakage taking in consideration the load trans-ferred on the rotary joint. Also providing a better idea of working, advantages, limitations of “Automatic tire inflation system” used in vehicles. Automatic centralised compressor self-inflating tire system ensures that all tyre are always properly inflated and thus improves tyre life, safety, reduction of gas mileage and vehicle performance by supplying air to all tyres via hoses and a rotary joint fixed between wheel spindle and wheel hub at each wheel wherever there is a pressure drop. This system is the most compatible and potential environment in gas mileage and tyre reduction. Excess use of vehicles leads to the ultimate goal of engineering discipline that ensure sat- isfactory service provision. Proper maintenance is the best possible way to get rid of any such problem. This would surely reduce accidents on the road and contribute in saving a lot of lives. This system is monitored and controlled by Java/Android program which detects low pressure and initiates compressor ON/OFF states. This is environment friendly realising zero gases and is self-sustaining using independent power source from the vehicle itself. Whenever in running condition alternative sensors are used. The air will be filled in the tyre pressure per second. The air filling efficiency is calculated to find the punctured tyre and solve the problem by using this advanced technique which is cost effective. The type of component used in manufacturing may have a big impact on osmosis. The composition and the gauge of the tyre inner liner compound also plays significance in osmosis.

VI. WORKING

Our project consists of a solenoid valve, control unit, pressure sensor and Tyre model. We are using a pressure sensor to detect the pressure level in the Tyre. The level of pressure is already programmed in the control unit. When the pressure level is decreased, the sensor gives signal to the control unit. After that the controller unit will open the solenoid valve for filling the air when the required pressure is obtained the control unit will turn OFF the solenoid valve. In case the pressure level will be more than the required level means the control unit will switch ON another solenoid valve for air to the atmosphere. When the required pressure is reached the operation will be stopped by the control unit.

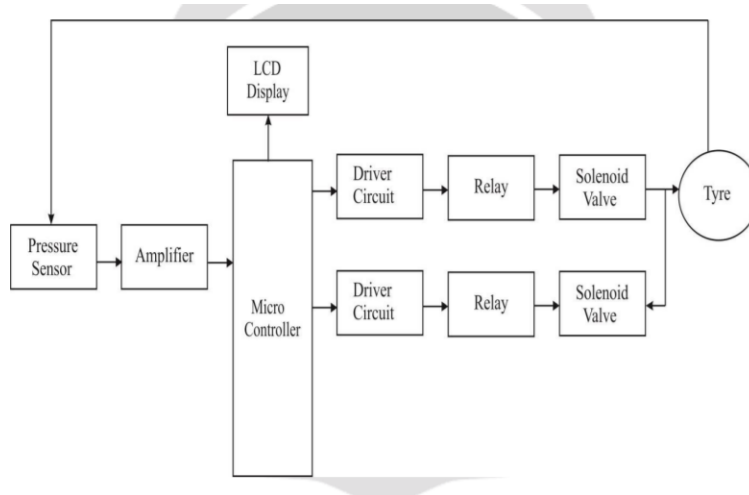


Fig 1. Block Diagram

VII. DESIGN

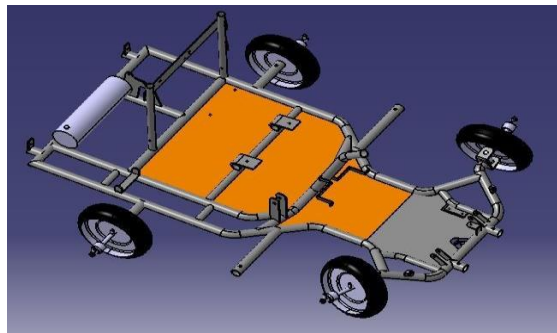


Fig 2. Central tyre inflation system.

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