

# Automation of CNG and Petrol Switches for Automotive Applications

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**Abstract**— this paper is related to one of the basic needs of a common man today viz. the VEHICLES. In general we all use vehicles daily; either two wheelers or four wheelers. Petrol has always been the main fuel for automobiles. The continuous hikes in petrol prices and problem of pollution due to petrol have made people to think for some alternative of petrol. Technical experts have suggested the use of Compressed Natural Gas (CNG) as an alternative of petrol for automobiles. They have estimated that apart from being less hazardous and environment friendly, it can help in reducing the levels of pollutant emissions to great extent. It is quite cost effective. Its extensive use in automobiles has the efficacy to reduce excessive dependence on petroleum imports. Now days the use of CNG has increased as a fuel in automobiles. But the CNG cannot be used as only fuel in the vehicles because of speed and pick up constrains. Thus petrol is always needed to provide the required speed and pick up. Therefore, the switching is required in the vehicles to switch the engine from CNG to petrol and vice-versa. The manual switching is provided in the vehicles. It will be very helpful for the user if automatic switching is provided in the vehicles. This paper gives the details of automatic switching from petrol to CNG and vice-versa.

**Keywords:** Compressed Natural Gas (CNG), Petrol, Automation, Switching, Automobile.

## I. INTRODUCTION

Now day's vehicles run both on CNG and petrol. Irrespective of many advantages, CNG has its own limitations. When a vehicle is running on CNG and suddenly the user notices that the CNG is about to finish, he has to manually switch the vehicle from CNG to petrol. This gives a great discomfort to the user. The users always have a check on the level of CNG. Any kind of unawareness may lead to the vehicle to stop and can cause some dangerous situation. It can be a big relief to the user if engine automatically switches from CNG to petrol whenever the CNG level crosses a minimum specified level.

Moreover, the vehicle is running on roads of hilly areas or on plane roads with some slopes or in case of overtaking, it needs a sudden pickup and more power is needed at that instant of time. CNG is not capable to provide that much pickup and hence the speed. Therefore, one has to switch the engine manually from CNG to petrol. The engine should switch back to CNG after that particular instant of time.

The solution of the problem is that vehicle should switch automatically from CNG to petrol whenever it needs

pickup and from petrol to CNG when CNG crosses to minimum specified level. Moreover, the user may not wish the automatic switching and wants to have full control of his vehicle in his hands. A facility of manual switching may also be provided to satisfy the mood of the user. This makes whole functioning of the vehicle user- friendly and comfortable. The process of automation helps in saving the engine from certain damages, which occur when the engine stops working if CNG finishes while the driving.

## II. THE TECHNICAL DETAILS

The process of automatic switching is divided into the following three modules:

- The automatic switching from CNG to petrol occurs when CNG crosses the minimum specified level;
- The automatic switching from CNG to petrol for a short time when pickup is required and switches back to CNG;
- The manual switching: The user can select either CNG or Petrol. It gives facility to user to drive the vehicle on CNG or petrol without the above-mentioned conditions.

### A. The Switching from CNG to Petrol

- This automation module continuously checks the level of CNG and will compare it with the minimum specified level. When the CNG goes below the minimum specified level, it will enable the engine to switch from CNG to petrol.

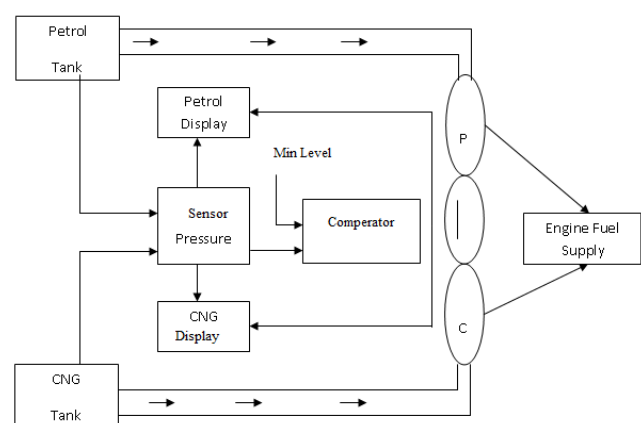


Fig. 1: Block diagram of Switching from CNG to Petrol

### B. The Switching from Petrol to CNG

This automation module regularly keeps an eye on the speed of the vehicle. When pickup is required, this block enables the engine to switch over to petrol for that particular time period to provide more power to the engine to get the

pickup. As soon as the vehicle recovers its normal speed, engine will automatically switch to CNG.

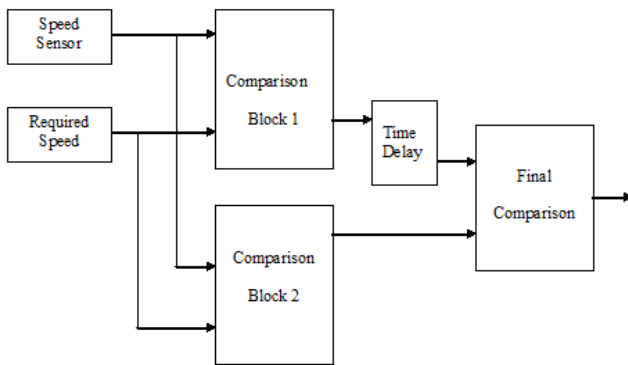


Fig. 2: Block diagram of Switching from Petrol to CNG

### C. The Manual Switching

This module provides a switch to select either manual or automatic mode of switching. If automatic mode of switching is selected, the whole process runs automatically as explained earlier. If manual mode of switching is selected, the vehicle runs on CNG or petrol as per the selection.

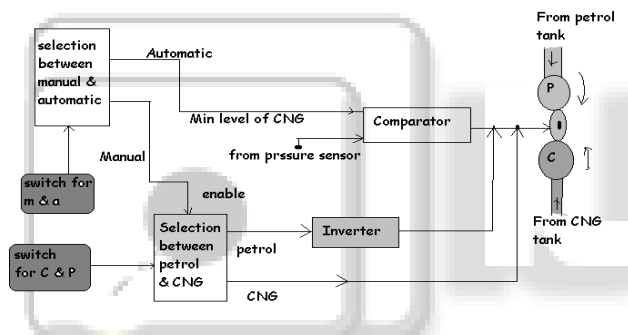


Fig. 3: Block diagram of Manual Switching

### III. CONCLUSION AND LIMITATIONS

This work has been done in lab. The electronic circuits have been developed and implemented on bread board with LEDs. It works successfully under all defined conditions. This work has been done in lab with some electric signals only. The practical implementation requires a lot of sensors and electronic circuitry. The work has some limitations:

- The work has been implemented in the lab and it is not practically tested on vehicles.
- The electrical signals have been used throughout the work.
- It needs some very sophisticated sensors.

The switching from CNG to petrol takes place faster and easily while switching from petrol to CNG takes some time. Moreover, the presence of both CNG and petrol decrease the life of the engine. Hence, avoid these conditions with some further processes of modifications in the presently working situations is needed.

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