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Hybrid Two-Wheeler

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Abstract: The traditional internal combustion engine made economic sense when oil was cheap and plentiful and the effects of burning fossil fuels and pollution were not understood. The environmental damage from internal combustion engine is compounded by the problem of air pollution. As well as carbon dioxide emissions, cars also produce dangerous chemicals such as nitrogen oxides (NOX), Sulphur oxide (SOX) and carbon monoxide emissions. The problem of lost energy, as well as the need to reduce carbon emissions and dangerous pollutants, has spawned the industry to attempt to meet these challenges, whilst sticking to the traditional petrol and diesel run engine. Indeed a lot of these technologies, whether it be turbo chargers to improve fuel efficiency

Key word: Hybrid Electric Vehicle, Two Wheeler Hybrid Vehicle, Hybrid Electric Scooter

1.0 Introduction

The invention of internal combustion engine is one of the greatest inventions of humankind. The conventional vehicles with ICE provide a good performance and long operating range. However, they have caused and continue to cause serious problems for poor fuel economy, environment pollution and human life. Reducing fuel consumption and emissions is one of the most important goals of modern design. The hybridization of a convectional combustion engine vehicle with an advanced electric motor drive may greatly enhance the overall efficiency and achieve higher fuel with reduced emissions. Considering the urban status in India, a well-organized and fuel-efficient scooter has to be designed and developed. [1]

2.0 Objective

The main objectives of our work is to increase vehicle efficiency, decrease the fuel efficiency & Durability. Also to design and development of both customer and eco-friendly Vehicle.

3.0 Working Principle

The working principle of HYBRID TWO-WHEELER involves three processes, the first process involves when the vehicle is running by means of internal combustion engine, second process involves when the vehicle is running by means of an electric motor and the third process involves when the vehicle is running in both the modes according to the requirements. When the vehicle is driven at the outside of the city and need more power to drive, the vehicle is powered by means of internal combustion engine. The power from the engine is taken from pulley and then it rotates the wheel. [2]

3.1 Petrol Mode

In petrol mode, engine will supply power to the rear wheel as shown in fig.1. When the switch is moved to this position, the microcontroller will sense the position of the switch and transmits signal to the relay, which will energies the ignition coil and operate the starter motor.

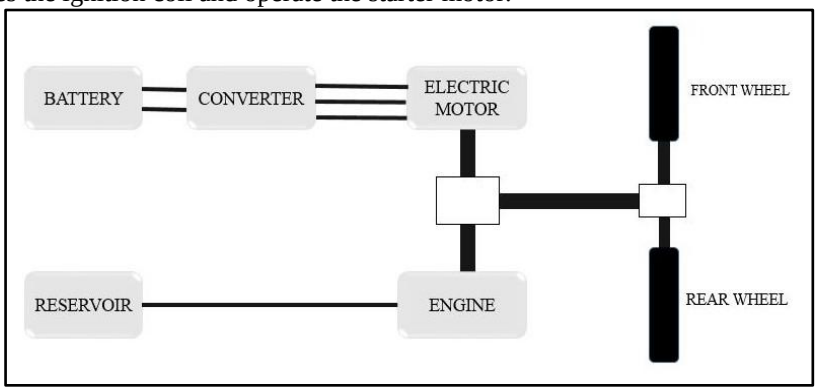

Fig.1 Working Principle of Hybrid Two-Wheeler

The rider can control the speed by means of ordinary accelerator handle. In this mode, the BLDC motor will be in ideal position at the front wheel, where its battery connections are cut off by another relay, which again controlled by thee micro controller. This mode can be activated when we require high power. [3]

3.2 Electric Mode

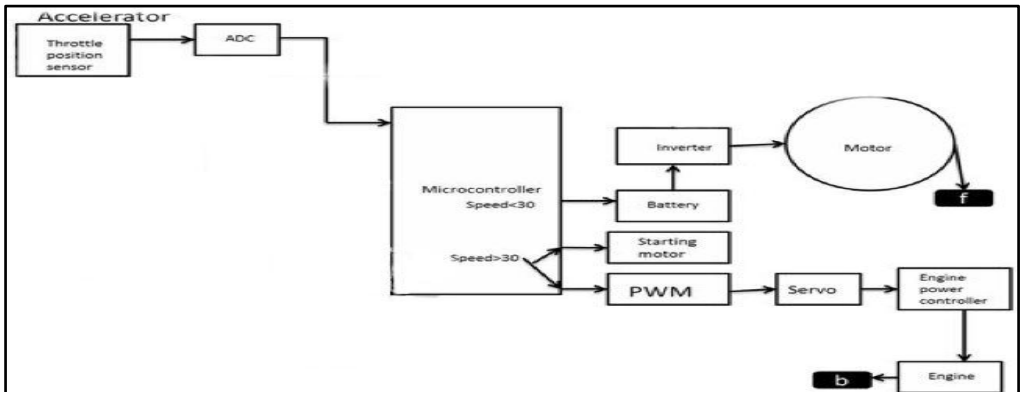

Fig.2 working principle of electric mode

Here we are using the BLDC hub motor, which is running with help of battery power. Battery is placed in the goods space under the seat as shown fig.2. The motor are fixed on the front wheel of the vehicle and it is controlled through the controlled unit. The hub motor is steadily emerging as a standard drive method just like e-bikes, scooters, solar cars, and many other light electric vehicles. With a hub motor conversion, there is no need for external mounting brackets and drive chains to support a motor and transmission. The direct drive hub motor is about as simple as things get. The motor are exactly fixed as in center axis of the wheel hub. Now the vehicle rim starts to spin over the axis body for rotation of wheel. The electric power supply is charged to the battery through the separate charger. Here some losses may be occurred due to mechanical friction. Here we are also having the fuel drive, which is coupled with the back wheel of the vehicle. [4]

3.3 Hybrid Mode

This is a special type of mode where rider does not care about the current mode of operation. This is entirely controlled by microcontroller. In this mode switch will be in S3 position. Microcontroller is programmed, as when the vehicle is running in 30kmph or less than that, electric mode will be activated. If it is above 30kmph, then petrol mode is to be operated. To sense the speed of the vehicle, we are going to take speedometer readings as input. At city limits, the vehicle operates in electric mode and in outer it will operate in petrol mode. Therefore, we can reduce the energy consumption, pollution, rupees per kilometer.

4.0 Components

4.1 Components:

- **Hub motor**

Hub motors are an interesting development which could offer benefits such as compactness, noiseless operation and high efficiency for electric vehicles. These motors have stators fixed at the axle, with the permanent magnet rotor embedded in the wheel. The traditional exterior rotor design has the hollow cylindrical rotor spinning around a stator axle. There is a radial air gap between the stator and rotor. The stator consists of stacked laminated steel plates with wound coils. Pulse width modulated current is used to supply current to the stator. [5]

- **DC Controller**

The controller connects the power source to the motor. It controls speed, direction of rotation, and optimizes energy conversion. While batteries produce constant voltages which decrease as they are used up, some controllers require a DC to DC converter to step down this changeable voltage to the motor's expected constant operating voltage, but other controllers incorporate a DC-to-DC converter and can accept a varying voltage. [6]

- **Accelerator**

The accelerator mode is similar to how a motorcycle operates. When the accelerator is engaged the motor provides power and propels you and the bike forward. It allows you to kick back and enjoy a free ride. Most accelerators can be fine-tuned like a volume dial between low and full power. [7]

4.0 Conclusions

The power train efficiency of the range-extended electric vehicle is compared in different driving cycles, energy management strategies, and range-extended control methods the range-extender uses thermostat control method, the system efficiency is the maximum. The energy efficiency can reach 33%, the comprehensive efficiency of the generator, rectifier can reach above 90% .The influence of the CD-CS, Blended strategy on the economy is compared in different driving cycles, daily trip mileage is 130 km per full charged battery and one liter petrol. Different driving cycles, and control strategies have influence on the economy of the range-extended electric vehicle. The hybrid bike can be powered by dual source such as IC engine and electricity. Compared to ordinary bikes this hybrid bike is more efficient and economic. This hybrid bike will be an innovation in automotive era, it is more eco-friendly because it cause less pollution. The hybrid bike is a better solution for hiking fuel cost day to day. Hybrid-electric vehicles (HEVs) combine the benefits of gasoline engines and electric motors and can be configured to obtain different objectives, such as improved fuel economy and increased power.

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