

Development of Electric Two-wheeler Vehicle

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Abstract: Now a days the petrol or diesel vehicles emits lots of emissions. These emissions cause lots of pollution. To reduce these emissions the electric vehicles are best option. These electric vehicles emit zero emission and eco-friendly. There is no need to burn fossil fuels and maintenance cost is also low. These are rechargeable and long-lasting batteries are used.

Here we modified the petrol two-wheeler vehicle to electric two-wheeler vehicle. Modification is done in steps

1. Replace the petrol engine with hub wheel motor
2. Batteries are used for power source of vehicle
3. Converter and Controller are used in between the hub wheel motor and batteries.
4. Shock absorbers are placed at back side.

The old vehicles which emit lots of pollution and facing engine problems can be modified like this. In future we see most of electric vehicles two-wheeler vehicles rather than petrol two-wheeler vehicles.

Keywords: Hub wheel motor, Rechargeable batteries, Controller, DC Converter.



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I. INTRODUCTION

In the mid 19th century, the first electric vehicles are appeared. Generally electric vehicles are very popular in recent days. These are made to travel very short distance. These vehicles are travelling range is 25 to 45 km range only. In India most of the people use two-wheeler vehicles and those two-wheeler vehicles are petrol vehicles they emit lot of emissions. To control these emissions electric vehicles are best choice. By using these electric vehicles, we save fossil fuels for the future generations and control pollution.

Most of the old vehicles are very strong and those body can survive more years but those vehicles emit lots of pollution and facing some repairs or problems. Instead of keeping them useless we can modify them into electric vehicles. These are very less in the weight. These are rechargeable, by using these vehicles we can travel short distance quickly. By using this type of vehicles, we can improve the quality of air around us. These vehicles do not make any noise.

We modified the old two-wheeler petrol vehicle into two-wheeler electric vehicle. We are completing these projects by electric vehicles components kit available in the market. Some changes are done at back side of vehicle due to suspension purpose. In the process of suspension, we added shock absorbers at back side of vehicle. Our aim is to reuse the good old vehicle body to electric vehicle which is eco-friendly and emits zero pollution.

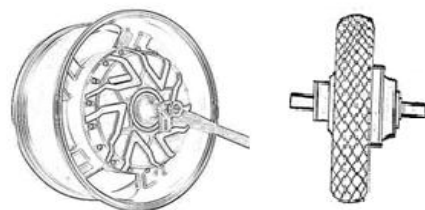
II. COMPONENTS REQUIRED

- A. Hub wheel motor
- B. Controller
- C. DC Converter
- D. Shock absorbers
- E. Throttle
- F. Power on/off key
- G. Lithium Batteries
- H. Battery Charger

II-A. HUB WHEEL MOTOR

Hub wheel motor is also called as wheel motor, wheel hub drive, hub motor or in-wheel motor. The motors' outer part follows, or tries to follow, those fields, turning of the attached wheel. At the starting stage

electric motor have great torque. Wheel hub motor is the most trending electric vehicle driving technology, which installs two or more motors in the wheel, Electric wheels is also known as direct driving wheels, commonly, which is especially used for pure electric vehicles. The effect from magnetic field on the current force, which makes the motor to rotate. Electrical energy into mechanical energy converted by a motor is a rotating electric machine that transforms. Hub wheel motor mainly made up of rotor and stator. The direction of current and magnetic inductance magnetic field direction is related to the direction of force movement of electric conductor in the magnetic field.



HUB WHEEL MOTOR

In a normal motor, it consists a hollow, outer, ring-shaped permanent magnet that stays static (stator) and an inner metallic core that rotates inside it (rotor). The spinning rotor has an axle running through the middle that helps to drive a vehicle. Working of hub wheel motor connects to the central, normally rotating axle to the static frame of a two-wheeler vehicle or the chassis of a vehicle. When you switch on the power, the outer part of the motor rotates, becoming a wheel (or wheels) that power the vehicle forward.

II-B. CONTROLLER



The controller helps to transforms the battery's direct current into alternating current (for AC motors only) and regulates the energy flow through the battery. An electrical switch is connected that creates a full

circuit in which electricity can flow, telling the controller to then connect the circuit from the battery to the motor.

The combination of Power electronics and embedded micro-computing elements which makes the efficient conversion of energy stored in batteries of an electric vehicle to generate motion is controlled by controller.

II-C. DC CONVERTER



DC converter converts the energy supplied by the battery to provide the required voltage and current to the remaining parts of the circuit. DC converter is important component in electric vehicle.

DC converter takes the current through the batteries and passes by a switching element, which turns the DC signal into an AC square wave signal.

II-D. SHOCK ABSORBERS



Shock absorbers are useful not to make damage to chassis or vehicle components. Absorb or dampen the compression and rebound of the springs and suspension the unwanted and excess spring motion are controlled by shock absorbers. Shock absorbers helps to make the tires contact with road.

II-E. THROTTLE



Throttle is common in petrol two-wheeler vehicle and electric two-wheeler vehicle. Throttle helps to change the speed of the vehicle as required. Throttle helps to propels you and the bike move forward. At handle bar the throttle control was arranged to accelerate the vehicle.

II-F. POWER ON/OFF KEY



This is used to turn on and off the vehicle power transmission from battery to wheel hub motor. Without power on/off key we cannot start the vehicle and we cannot stop the vehicle

II-G. BATTERIES



Lithium-ion batteries are used in this two-wheeler electric vehicle. These batteries provide a long life. Moreover, the weight is less than other types of batteries. These are rechargeable batteries.

II-H. BATTERY CHARGER



The charger takes 3to6 hours for fully charge the battery. The current flows through the charger to batteries. It Control high and low voltages gives perfect voltage as required. If the uneven voltages charge it

effects battery life time. By using this charger, the battery life increases.

III. SYSTEM OPERATION

Here, we are converting petrol two-wheeler vehicle into electric two-wheeler vehicle. In this process the major change was removing engine and replacing with electric motor with lithium-ion batteries. In the vehicle we removing the engine and replacing with Hub wheel. The power source for running this vehicle was lithium-ion batteries, those batteries were placed under the seat.

Removing back wheel and engine. Then the hub wheel motor is fixed in at back side. Then controller and DC converter is connected to the hub wheel motor. DC converter are connected to batteries and hub wheel motor. Throttle was connected to controller. Power on/off key was arranged to the vehicle. Power on/off helps to start or stop the vehicle.

While we are fixing the hub wheel motor some changes where done at the position of engine, we are placing the lithium-ion batteries. We prefer these batteries because less in weight and long-lasting batteries. Throttle was arranged at handle bar which is used to accelerate the vehicle and maintain required speed for the vehicle.

By removing engine and placing the wheel hub motor some changes were done in measurements are done these effects the hub wheel motor to avoid this suspension was arranged at back of the vehicle. Shock absorbers are used as suspension for these vehicles

IV. CAD VIEW



Rough sketches in cad views.

V. ADVANTAGES

1. These vehicles are rechargeable easily.
2. These vehicles don't burn fossil fuels and these are eco-friendly.
3. These vehicles emits zero emissions and no releasing of smoke.
4. These vehicles less in maintenance.
5. The batteries used in this vehicle are long lasting and more efficient.

VI. DISADVANTAGES

1. These vehicles travel for short distance only.
2. The body is weak because the vehicle can't bear heavy load.
3. Recharging the batteries requires long time
4. These are expensive than petrol vehicles.
5. Models for these vehicles are less in market.

VII. CONCLUSION

Now a days most of the two-wheeler vehicles are petrol vehicle these emits lots of pollution. To control this electric vehicle are best choice. By using these vehicles in urban areas, the pollution can be controlled. These vehicles are also useful to travel short distance instead of fuel vehicles because these vehicles emit zero pollution.

In rural areas the fuel points are very rare we can use these vehicles in those areas because these are rechargeable at home. Fuel prices are increasing in present days so these vehicles are better choice for transportation.

VIII. RESULT



Here two-wheeler petrol vehicle is converted into electric two-wheeler vehicle. In future most of electric vehicles will be appeared by considering this thing here we modified the petrol two-wheeler vehicle into electric two-wheeler vehicle.

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