

Design and Implementation of Mini-Electric Bike

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ABSTRACT

This paper represents design of electric vehicle using lithium ion batteries supplied through solar cell as energy source. Today's Growing concern over the environmental impacts and oil dependence has prompted the investigation of alternate propulsion technologies for motor vehicles. Recently solar cell energy charged electric vehicles technology has emerged as one of the promising alternatives to reduce petroleum consumption and vehicular emissions with reduced load on power grid. Two-wheelers are an important mode of transport option in urban India and their high fuel consumption and emission contribution needs to be attended to improve the air quality.

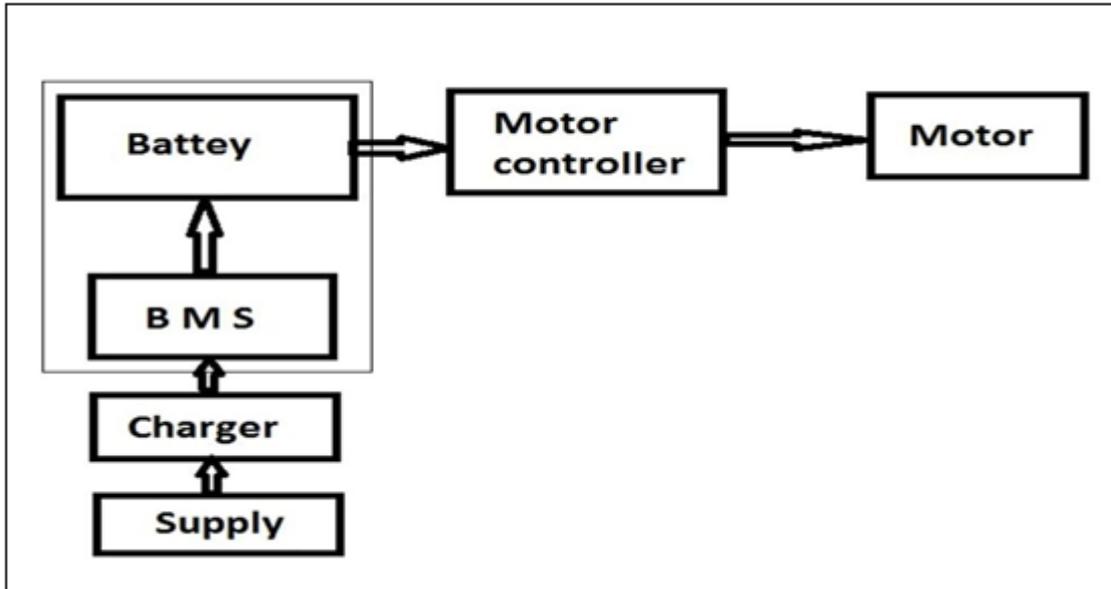
As the two-wheelers contribute to two-thirds of the total vehicle population in India, the implementation of plug-in electric vehicles concept for the existing two-wheelers may save a large quantity of petrol with little consumption of electricity. If this electricity can be produced by renewable sources like solar, wind, hydro, etc. then it will save consumption of imported petrol to a large extent.

1. INTRODUCTION

All existing vehicles that are in the market causes pollution .The fuel cost is also increasing day by day. In order to compensate the fluctuating fuel cost and reducing the pollution a good remedy is needed i.e. our transporting system. Due to ignition of the hydrocarbon fuels, in the vehicle, sometime difficulties such as wear and tear may be high and more attention is needed for proper maintenance. Our vehicle is easy to handle and fuel cost is very low compared to the other existing vehicles.

Hence a need for a change in the existing alternative system which can produce higher efficiency at minimum cost was thought about an attempt has been made to design and fabricate such an alternative system. So this project "Design and Implementation of electric vehicle" is very much useful, since it is provided with good quality of power sources and simple operating mechanism for short range.

2.BLOCK DIAGRAM



3.COMPONENT INFORMATION

3.1.Motor

Construction	Brushless Gearless Hub motor
Rated voltage	48 volt DC
Rated power	1000watt
Weight	8kg
Rated efficiency	>80%
RPM at no load	400-600 RPM
Torque	37Nm
Max torque	72Nm
Carrying capacity	200 kg

Typically brushless motors (sometimes called brushless direct current motors or BLDCs), which replace the commutator and brushes with half-a-dozen or more separate coils and an electronic circuit. The circuit switches the power on and off in the coils in turn creating forces in each one that make the motor spin. Since the brushes

press against the axle of a normal motor, they introduce friction, slow it down, make a certain amount of noise, and waste energy. That's why brushless motors are often more efficient, especially at low speeds. Getting rid of the brushes also saves having to replace them every so often when friction wears them down.

How does the circuit know which of the coils to switch on and off. There are several tiny magnetic field sensors (known as Hall-effect sensors) positioned between some of the coils. As the permanent magnets on the outer rotor sweep past them, the Hall-effect sensors figure out where the north and south magnetic poles of the rotor are and which coils to activate to make it keep spinning. The trouble with this is that it means the motor does need an electronic circuit to operate it, which is something you don't need for an ordinary DC motor.

3.2. Controller

Specifications

Rated voltage: 48V DC

Match motor: 48V 1000 W

Conversion efficiency: 95%

Under Voltage Protection: 42±0.5V

Speed regulator (throttle): 1-4 V

Wiring

This controller has 8 connectors, compatible with many 48V bikes with up to 1000W motors

1. Battery / 2. Motor / 3. Brake / 4. Brake light / 5. Indicator light / 6. Ignition lock / 7. Charger port / 8.

Derailleur (throttle)

These controllers have 4 groups' necessary cables: Battery, Motor, Ignition lock, Derailleur (throttle), when hook up these 4 groups' cables, the E-bike can run normally.

Besides, this controller have other optional functions, you can hook them up according to your applications.

3.3. Battery

Battery Type- lithium ion

Capacity-20 Ah

Voltage rating- 48v

C rate-0.5c

3.4 Battery management system

A **battery management system (BMS)** is any electronic system that manages a rechargeable battery (cell or battery pack), such as by protecting the battery from operating outside its safe operating area, monitoring its state, calculating secondary data, reporting that data, controlling its environment, authenticating it and / or balancing it.

A battery pack built together with a battery management system with an external communication data bus is a smart battery pack. A smart battery pack must be charged by a smart battery charger

Functions

- Monitor
- Electric vehicle system: energy recovery
- Computation
- Communication
- Protection
- Battery connection to load circuit
- optimization

4.DESIGN

4.1 rear wheel design

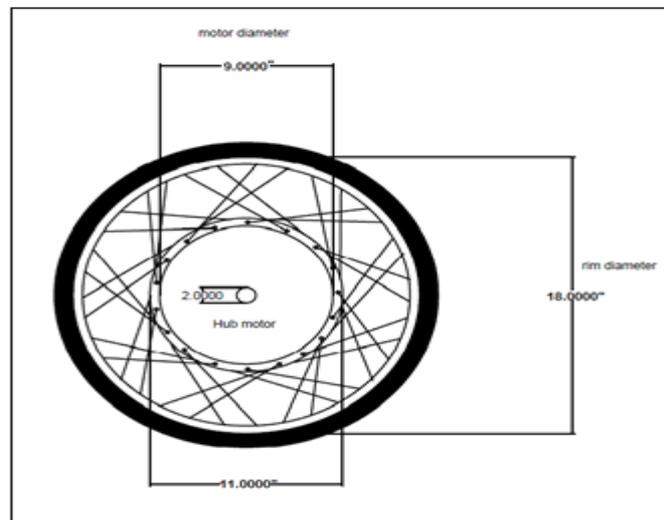


Figure1

4.2 Chassie Design

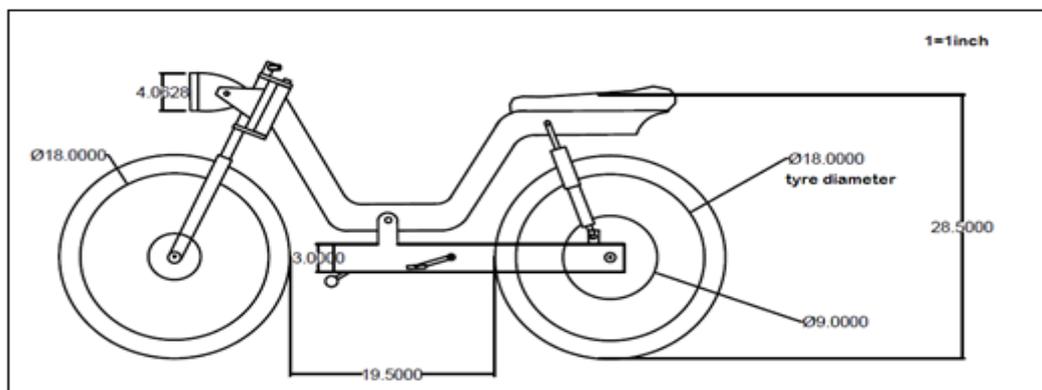


Figure2

5.CONCLUSION

Thus we conclude that the electric bikes does not produce any harmful gases they are ecofriendly, also there running cost is low since as compared to petrol prices electricity prices are low. Maintenance cost of electric bike is also low

From our project we obtained following result

1.Speed-55kmph 2.Range-50km

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