WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Design and Fabrication of Self Charging Electric Car

[1]Gogineni Vedavyas, [2]Ramagiri Vamshi, [3]Bolloju Ajay, [4]Bejjanki Vishnuvardhan

[1]UG Student, [2]UG Student, [3]UG Student, [4]UG Student.
Department of Mechanical Engineering, Vignan Institute of Technology and Science, Hyderabad, India

ABSTRACT:

In the world of electric cars (EVs), the self-charging electric car represents a significant innovation that addresses some of the drawbacks of the established EV charging infrastructure. With the help of cutting-edge technology, the self-charging electric car can produce and store energy both while moving and at rest, minimizing the need for external charging sources. The vehicle is able to absorb and convert kinetic energy into electrical energy, which is then used to power its electric drive train, by integrating regenerative braking and cutting-edge energy storage devices. These include increasing the effectiveness of energy collection, balancing energy generation with the needs of the vehicle in terms of power, and making sure that reliable safety precautions are included. For the technology to be widely used, its affordability and scalability will also be important.

1. INTRODUCTION

In all-electric automobiles, sometimes referred to as battery electric vehicles (BEVs), an electric motor replaces the internal combustion engine. An electric car may access the grid by plugging into a charging station. They store the electricity in rechargeable batteries and use them to power an electric motor that turns the wheels. Because they accelerate more quickly than vehicles with traditional petrol engines, electric vehicles appear to be lighter to drive. The biggest benefit of electric cars is the potential improvement in air quality in cities and suburban areas. Since they have no exhaust, pure electric cars produce no carbon dioxide while they are moving. Air pollution is significantly reduced as a consequence. "EV" is an acronym for "electric vehicle." EVs are cars that are powered exclusively or primarily by electricity. By lowering gasoline prices and moving use away from foreign oil towards more domestically produced electrical sources, EVs boost the state's economy.

These fuel savings turn into increased disposable cash that will be mostly spent locally, adding to the state's employment opportunities. The transportation industry has a chance to transition away from fossil fuels thanks to electric vehicles (EVs). The transportation industry might become more energy efficient and less polluting by electrifying it.

2. LITERATURE REVIEW

ELECTRIC CARS

Automobiles known as electric vehicles (EVs) rely on electric motors that are powered by rechargeable batteries rather than conventional internal combustion engines. As a greener and more sustainable alternative to conventional automobiles, EVs have attracted a lot of attention. They have zero tailpipe emissions, lessen reliance on fossil fuels, and help to slow down global warming. Electric vehicles (EVs) are a viable approach to lowering greenhouse gas emissions and enhancing air quality in cities.

3. DESIGN AND DEVELOPMENT

System architecture

The general structure and arrangement of the numerous components and subsystems that make it possible for the vehicle to function effectively is referred to as the system architecture of a self-charging electric car. It includes the regenerative braking system, electric motor and powertrain, energy management system, solar panel integration, and battery management system. The system architecture guarantees top performance, low energy consumption, and easy interoperability across the various subsystems.

MATERIALS REQUIRED

• 48V 750W BLDC ELECTRIC MOTOR

• CONTROLLER (48-60V, 30A)

• BATTERIES (48V, 18000mAh)

• ALTERNATOR (12V, 36A)

• 4 TYRES (145/80R12)

• SQUARE SHAPED IRON PIPE OF SIZE (2x2 Inches)

• STEERING

• DIFFERENTIAL

• CHAIN KIT • SEAT

• 2-SHAFTS (30mm Dia.2.5 Feet length)

• DISC BRAKE

• PILLOW BLOCK BEARINGS

1) [32mm dia. – 2PIECES] 2) [20mm dia. -2 PIECES]

• 4-WHEEL HUBS

- SUSPENSIONS – 2 (BIKE)
- BATTERY LEVEL INDICATOR (12-60V)
- ALTERNATOR 12V 36A
- 48V 750W BLDC MOTOR

ELECTRIC MOTOR AND DRIVETRAIN

Energy management system, section 3. A self-charging electric car's energy management system (EMS) is essential for its effective management and distribution of energy from various sources. It keeps track of the energy flow, evaluates the power needs of various components, and makes the best use of the energy sources at hand. By carefully balancing power supply and demand, the EMS makes sure that the electric automobile runs as efficiently as possible.

A self-charging electric car's battery pack performance is monitored, managed, and optimized by the battery management system (BMS). It makes sure that the batteries are properly charged, discharged, and temperature-regulated to extend their life and performance. The driver or the vehicle's control system may access crucial data about the battery's level of charge, health, and remaining range thanks to the BMS. The stable and secure operation of the energy storage system in an electric vehicle depends on an effective BMS.

These parts and systems work together to create a self-charging electric vehicle that can run on a variety of energy sources, including solar energy and regenerative braking, while maintaining effective energy management and top performance.

4. PERFORMANCE EVALUATION

COMPARATIVE ANALYSIS WITH CONVENTIONAL EV's.

Comparative analysis compares the performance of traditional electric vehicles (EVs) that rely on external charging infrastructure versus self-charging EVs. In this analysis, variables including range, charging time, price, and convenience are taken into account. It seeks to determine the benefits and drawbacks of self-charging technology in comparison to conventional EVs.

SPECIFICATIONS

- BASE FRAME (34.5*93.5 Inches)
- SQUARE SHAPED PIPE (2*2 Inches)
- VEHICLE NET WEIGHT– 150Kg
- WEIGHT OF EACH TYRE – 9Kg
- BLDC MOTOR LOAD CAPACITY (350 – 400Kg)
- SUSPENSION CAPACITY – 350Kg
- BATTERY CAPACITY (48V-18000mAh)
- ALTERNATOR CAPACITY (36A,12V)
- SINGLE DISC BRAKE (CAPACITY 350Kg)
- BLDC MOTOR (2800 RPM)
- BLDC MOTOR AFTER REDUCTION (480 RPM)
- GROUND CLEARANCE – 10 INCHES
- MRF TUBELESS TYRES – 145/80R12
- RATED TORQUE – 15.36 N-m

- SEATING CAPACITY - 1 (SINGLE PERSON)
- RATED POWER – 750W
- VEHICLE LOAD CARRYING CAPACITY -200Kg

5. CONCLUSION

Self-charging electric cars have the potential to revolutionize the automotive industry by addressing the limitations of traditional electric vehicles (EVs) that require external charging infrastructure. We have made a car which charges it self by the new technique by rotating the dynamo along the direction of rotation of wheel in return dynamo charges the secondary battery.

REFERENCES

1.Abdel-Gawad, H. and Sood, V. K. (2014) ‘Small-signal analysis of boost converter, including parasitics, operating in CCM’, Proceedings of 6th IEEE Power India International Conference, PIICON 2014. doi: 10.1109/34084POWERI.2014.7117622.

2.Al-otaibi, M. S. (2020) ‘SELF-CHARGING ELECTRIC CARS’. European Patent Office (EPO).

3.Al, M., Van, J. and Gualous, H. (2011) ‘DC/DC Converters for Electric Vehicles’, Electric Vehicles - Modelling and Simulations, (September). doi: 10.5772/17048.

4.Gopal B T, V. (2017) ‘Comparison Between Direct and Indirect Field Oriented Control of Induction Motor’, International Journal of Engineering Trends and Technology, 43(6), pp. 364–369. doi: 10.14445/22315381/ijett-v43p260.

5.Schaltz, E. P. (2011) Electrical Vehicle Design and Modeling. Edited by Seref Soylu. InTech Janeza Trdine 9, 51000 Rijeka, Croatia Copyright.

6.Terras, J. M. et al. (2011) ‘Simulation of a commercial electric vehicle: Dynamic aspects and performance’, Proceedings of the 2011 14th European Conference on Power Electronics and Applications, EPE 2011, (January).

7.Un-Noor, F. et al. (2017) ‘A comprehensive study of key electric vehicle (EV) components, technologies, challenges, impacts, and future direction of development’, Energies, 10(8), pp. 1–82. doi: 10.3390/en10081217.

8.V, V. (2019) ‘A Complete Mathematical Modeling, Simulation and Computational Implementation of Boost Converter Via MATLAB/Simulink’, 114(10), pp. 407–419. doi: 10.31227/osf.io/cydq