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Power Engineering 2018- Design and development of smart enclosure for batteries in the application of electric vehicle - Deepak Singh Bhartiya - Skill Development University

Deepak Singh Bhartiya

Skill Development University, India

Abstract

The new technology of battery operated vehicles is likely to replace the conventional IC engine automobile technology soon. Thermal efficiency of IC engine can only 40% at the best, electric motors, drawing energy from batteries, can operated with peak efficiency of up to 90%. Also, electric vehicles can recapture wasted energy through regenerative breaking. To maintain efficient function of battery, an enclosure with auto adaptive material and smart feature is needed to investigate. This research work will provide a solution for development of battery enclosure for automotive. Outdoor enclosures to provide housing for batteries and electronic circuit boards are widely used in a variety of technologies including telecommunications, industrial, railways, automotive, electric vehicle, aviation and military applications. These enclosures protect the equipment against a wide variety of environmental hazards, such as the sun, dust, moisture, etc. As electronic components have become more powerful and complex, thermal management has become a critical issue. Battery enclosures designing requirements are to understand the mechanical, electrical, electronic and safety features. We need to maintain at least Ingress protection of battery enclosure at a level of IP65. The thermal management of the enclosure with IP65 is very challenging due to the additional thermal load from the sun and the requirement of having an air-sealed enclosure. We need to consider the effect of solar heating loads in order to compute the life expectancy of the electronic product. Hence, the enclosure is designed to consider the maximum ambient temperature of 65°C. In the mechanical structure of the enclosure system, many other parameters are to be considered in designing. These include: reliability, maintenance, size and weight, environmentally friendly, ability to cool below ambient, temperature control and stability, heating options, orientation, portability, power, noise and vibration, initial cost, operating and maintenance cost.

The proposed work manages a plan of a battery electric vehicle with self-charging framework for one traveler and for weight up to 50 kg. This technique has been made to manufacture a self-charging battery electric vehicle which uses the rotational vitality of wheels to charge the batteries, along these lines presenting a framework which makes the vehicle contamination free. So as to work with increasingly productive, the sun oriented board can likewise be executed on the highest point of the vehicle. The manufacture of body is made for the comparable measurements with some change in its size and shape utilizing Mild Steel (MS) material. The segments, for example, DC Generator, Motor and Buck-Boost converter was organized in a way to move the rotational vitality being experienced by the MS brilliant pole to the dc generator. The dc generator here has the ability to create 12V to 14V, which is coordinated to buck-help converter through a battery source. Here in buck-support converter the voltage source is ventured up to 24V, which is sufficient to charge the two arrangement of arrangement association which respects 24 V utilization. The batteries are utilized to give the rotational vitality to the pole through an engine. Batteries are getting back the adequate voltage source to revive.

With the appearance of increasingly severe guidelines identified with discharges, vitality asset imperatives and money related emergency, the world has started a worldwide race to jolt transportation. Battery isn't just a key segment of electric vehicles, yet additionally assumes a noticeable job as the joint of intensity and car industry. This paper audits upgrades made in the plan and production of batteries just as advancement of electric vehicles during the previous decades. Best in class for three significant battery advancements in EV application, to be specific lead-corrosive battery, NiMH battery and lithium-particle battery, just as their present application are introduced; and in the perspectives of concoction propoties of the cell and the exhibitions of business pack for EV, point by point near investigations in innovation and economy are performed. The application standpoint of EV battery, its advancement pattern in future and new cell innovations being created are prospected, and it is brought up that the force division of China should pay exceptional considerations to the improvement of EV battery innovation, break down the impacts of EV charging load on power framework and make strides in time. There are a few bottlenecks accepting bribes up by financial administrators and general society everywhere of this innovation, for the most part: cost of buying of an electric vehicle (EV), its restricted range (go nervousness) and long charging time. A large portion of them are identified with the present accessible battery innovation. Improved batteries, possibly along with super-capacitors (purported mixture power-packs) will in all likelihood speak to the center of the turns of events. The joining of the electrically energizing vehicle into the keen electric framework of things to come, which calls for programmed correspondence advances, is another bleeding edge of examination. Advances in these zones will most likely lessen the snags for battery controlled EVs in not so distant future.

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