IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 8, March 2025
Impact Factor: 7.67

Design and Development of Battery Protection System for EV

Prof. C. K. Shejwal[1], Gaikwad Ravindra[2], Aher Hrushikesh[3], Aher Pushpa[4], Aher Seema[5]
Department of Electrical Engineering[1-5]
SND College of Engineering & Research Center, Yeola, Maharashtra, India

Abstract: *Electric vehicles (EVs) utilize lithium-ion battery packs as the source of power. These batteries, however, are susceptible to thermal runaway, overcharging, deep discharging, and electrical failures, influencing performance, safety, and durability. This project targets the development and design of a sophisticated battery protection system that can guarantee efficient and safe use of EV batteries.*

The system proposed has a Battery Management System (BMS) along with real-time voltage, current,over temperature, and state of charge (SOC) monitoring. The BMS has overvoltage, Temprature , overcurrent, and thermal protection features, which minimize the likelihood of battery degradation and failure. A thermal management system is also employed through liquid cooling or phase change materials to control battery temperature and avoid overheating.

To increase safety, the system provides short-circuit protection, fault detection algorithms, and emergency shutdown capabilities. Machine learning can be investigated to anticipate battery failures and optimize performance. Through software and hardware integration, the project shall establish a comprehensive battery protection system that increases the battery lifespan, vehicle efficiency, and user protection. The project shall experiment and simulate to authenticate the efficacy of the system within actual EV implementations.

Keywords: Battery Protection System, Over current protection, Overvoltage Protection, over Temprature Protection, Over current Protection, Short-Circuit Protection, Fault Detection, Lithium-Ion Batteries