

# Electrical vehicle battery monitoring system with V2H

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**Abstract** - Batteries are appreciably used to strength electric powered cars. This paper “EV battery monitoring system with V2H” is focused mainly on battery monitoring in our daily life. The main function of battery monitoring system is to ensure that the battery is protected and any operation out of its safety limit is prevented. It monitors the battery’s state of charge (SOC) along with the state of health (SOH). Battery monitoring system is a device which is connected to the lithium ion (LI-ion) battery system. Battery testing should be considered an integral part of any vehicle maintenance routine and should be performed before the occurrence of problem. Vehicle to home (V2H) correspondence includes linkage between a vehicle and the owner’s home, sharing the task of provided energy. During power outages or emergency, the vehicle’s battery can be used as a power source using V2H technology. The battery management system will monitor voltage, different temperature and charging discharging conditions. Lithium – ion batteries that possess high charge density and power in most electric cars. Therefore, these batteries should never be overcharged or not to be allowed to reach a state of deep discharge at any point. So, it should be monitored periodically to increase the life of the battery.

**Key Words:** Lithium-ion battery (LI-ion), state of charge (SOC), state of health (SOH), vehicle to home (V2H).

## 1. INTRODUCTION

Now-a-days electric vehicles are becoming emerging technologies and the growth of electric vehicles are come into advancement in recent years. According to survey, electric vehicle demand in India has grown drastically in the last three years. The advantage of using electric vehicle is no fuel is required, zero emission of toxic gases, less pollution to environment, low maintenance and energy efficient. In current times, research is focused on improving the quality of lithium batteries which purpose is to limit the cost of lithium battery and generate much less noise as compared to conventional electric powered vehicle. The developing interest for diminishing fossil fuel byproduct and improvement of predominant and speedy charging stations are the two components expected to impel the blast of electric vehicle market. Electric vehicles are powered by a massive number of battery cells, requiring an effective

battery management system to keep the battery cells in an operating condition while providing the power efficiently.

## 2. OBJECTIVE

[1] The safety of individuals in and around the electric vehicle will be expanded undeniably by nonstop observing arrangements. [2] The expense spent on batteries can be limited because of the right use of the battery with the help of battery monitoring. [3] By V2H technology, people can be benefited by using loads during AC power supply interruptions. [4] The more amount of electricity can be saved leading to less usage of resources in producing electricity and cost spent on it can be reduced.

## 3. PROPOSED SYSTEM

The proposed system is focused on two significant parts one is monitoring the parameters and the other is vehicle to home (V2H) technology. For monitoring the voltage, current and temperature sensors is used to monitor different parameters. It protects the battery pack from being over charge (cell voltages goes high) or over discharge (cell voltages goes low) in this way the battery’s life. It does by constantly monitoring every cell in the battery pack and calculating exactly how much current is safely going in (charge) and come out (discharge) of the battery pack without damaging it. It also calculates the state of charge by tracking how much energy goes in and out by monitoring the cell voltage. It monitors the complete health of the battery pack by continuously checking for loose connections, breakdowns in wire insulations and defective cells that need to be replaced in the battery pack. These parameters gives notifications to the user for safe operations of the battery pack.

## 4. BLOCK DIAGRAM OF PROPOSED SYSTEM

The block diagram consists of several block,

1. Battery pack.
2. Arduino.
3. Bi – directional charger.
4. Voltage sensor.
5. Current sensor.
6. Relay.
7. Temperature sensor.

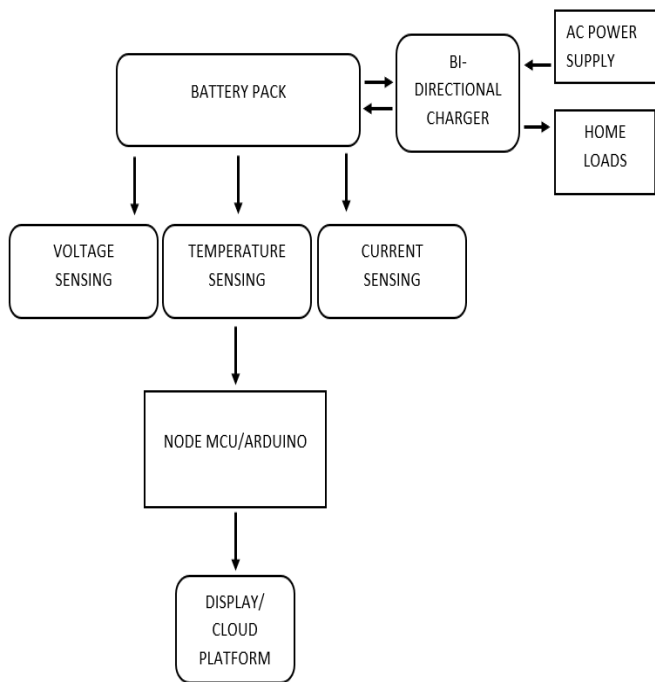


Fig-1: Block diagram

4.1. CIRCUIT DIAGRAM

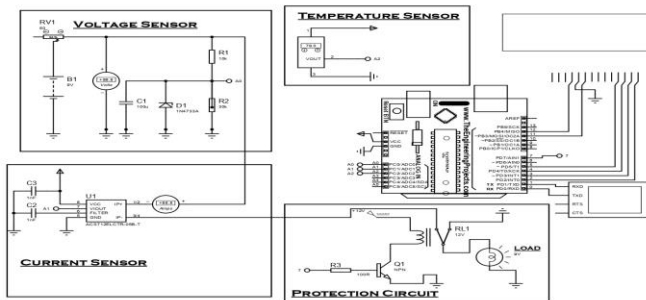
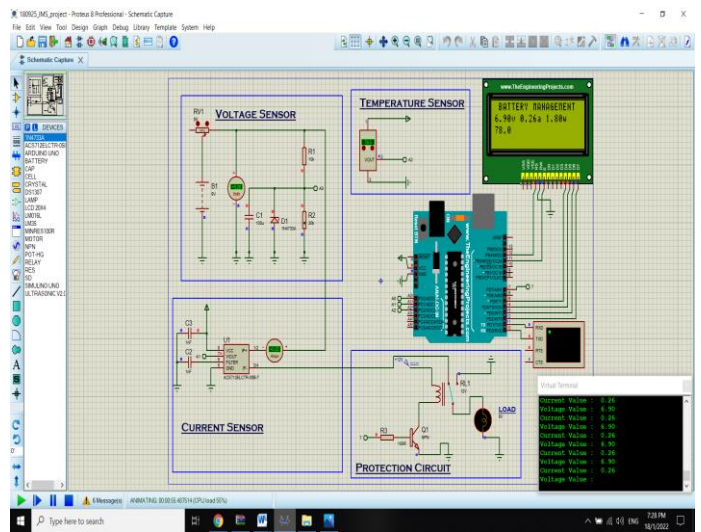


Fig-2: Circuit Diagram

5. SOFTWARE DESCRIPTION

Proteus is used to simulate and design the electronic circuit. The software proteus has been used to display the working of the devices from the prototype of 'Electric Vehicle battery monitoring system'. The protection circuit act as a relay when excess current passes through it will protect from damage. The measured values will display in the LCD display as output.

5.1. EXPERIMENTAL RESULTS



6. BENEFITS

Identification of weak batteries or individual cells and replace it correctly for better performance. Performance of battery bank and utilization can be assured for increase the battery life time. We can continuously monitor the status of the battery bank.

7. CONCLUSION

Thus, the battery monitoring system for electric vehicle batteries has been simulated using proteus software by monitoring certain parameters and ensures the safety of the driver and the companion and thereby reduces the cost spent on the batteries like in maintenance, replacement after the purchase of the vehicle.

8. FUTURE SCOPE

With the increase in demand of electric vehicles in the society, the ultimate aim of the manufacturers and researchers is to ensure the safety of the individuals driving the electric vehicle. So, there will be a higher need of the battery monitoring system in the society and thereby increasing the safety of the people and reduces the cost spent on batteries after purchase.

9. REFERENCE

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