

AN ALTERNATE CHARGING SYSTEM FOR EVs USING WIRELESS TECHNOLOGY AND Lab VIEW

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Abstract : Now-a-days, the automobile sector has been rapidly developing industry. This paper work discusses an alternative solution for charging electric vehicle (EV) with automated charging stations. Automobiles are plays a vital role in people's transportation. Though fossil fuel prices increase day by day, its usage also increases causing pollution. Since, EVs are the future for transportation, wireless charging methods could play major role in its charging stations to reduce the time consumption and bulk wire usage.

IndexTerms - Battery charging, electric vehicle, power transfer.

INTRODUCTION

In railway systems, the electric locomotives have already been established many years now. However, it not easy to get power in a similar way for EVs. Instead, a high capacity battery is usually used as energy source to make an EV to operate for an acceptable distance. Until now the EVs are not so attractive to consumers, because of the unavailability of charging stations. Though the government offers many motivational subsidies and tax incentives to increase the market share of EVs, it still remains less bought.

This research paper discusses the scope of implementing charging station through wireless power transfer (WPT) method.

Inductive Power Transfer

Wireless charging depends upon the principle of inductive power transfer (IPT) or magnetic resonance, in which transferring an electrical current between two objects through the use of transformer coils to induce an electromagnetic field occurs. Supply voltage is converted into high frequency alternating current which is sent to the transmitter coil by the transmitter circuit. Then the alternating current induces a time varying magnetic field in the transmitter coil i.e., alternating current flowing within the transmitter coil induces a magnetic field which tends to the receiver coil (when within a specified distance). The magnetic field produces current within the receiver coil. The method is also referred as magnetic or resonant coupling and is achieved when resonation of both the coils are at the same frequency.

System blocks



A. Methodology of the system

Swiping the RFID card in the charging station, generates an emf in the RFID reader to cross check the details of corresponding car driver with the details stored in the server. After the verification process, a station is allocated for the car charging. As the EV is placed in the charging station, the AC power source is initiated by the control unit manually using lab. An AC source of 230v is stepped down to 12v, it is rectified to 12 v of direct current and it is amplified in terms of DC for reducing the loss and attaining a good quality. Again, the DC is converted to AC for the generation of an emf in the coil. The current flow in the primary coil will induce the emf in the secondary coil by the principle of the magnetic resonant coupling. Thus, charging of the vehicle can be done by wireless power transfer charger placed in the station.



Fig 1. Wireless power transfer circuit

Test and analysis

The system developed as a prototype was precise, as the reading of RFID matched with the server details.



Fig 2. Front panel view of lab VIEW controlled charging system



Fig 3. Front panel view of lab VIEW based customer login system.

S.No	Air gap between the coils (cm)	Attained Voltage (Volts)
1	0	28
2	1	21
3	2	20
4	3	12
5	4	10

Table1. Voltage measurements for different air gap between the coils.

The wireless charging was also linear as like conventional method of charging.

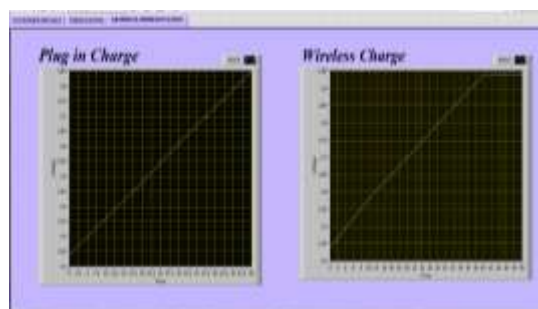


Fig 4. Difference graphical representation shows a linear change in both types of charging.

The voltage attained decreased with the increasing air gap between the coils referring to the principle of magnetic or resonant coupling.

Conclusion

The EVs are the future for transportation to reduce pollution and to maintain a clean environment for better living standards. However, the scope of EVs is reduced currently due to less availability of charging stations. The charging the EVs are wired as well, occupying huge space. The implemented

method of prototype wireless energy transfer system which when developed industrially could be a solution.

Reference

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