Dynamic Wireless Charging of Electric Vehicle

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Abstract- *In this paper, Wireless Power Transfer (WPT) utilizing attractive reverberation is an innovation that could set humans free from irritating wires. Indeed, the WPT embraces a similar essential hypothesis that has just been created for something like 30 years with the term inductive power exchange. Recently WPT innovation is growing rapidly. At the kilowatts control level, the exchange separates increments from a few millimeters to a few hundred millimeters with a lattice to stack proficiency above 90%. This makes the WPT very useful for electric vehicle (EV) charging applications in both stationary and dynamic charging situations. This paper surveyed the advancements in the WPT territory material to EV remote charging. By presenting WPT in EVs, the snags of charging time, range, and cost can be effectively relieved. Battery innovation is never again pertinent in the mass market entrance of EVs. It is trusted that specialists could be supported by cutting-edge accomplishments, and push forward the further improvement of WPT just as the extension of EV.*

Keywords- Power transfer coil, voltage regulator, bridge rectifier, E-vehicle, Embedded.

I. INTRODUCTION

Dynamic wireless electric vehicle charging (DWEC) systems aim to provide a more efficient and convenient way to charge electric vehicles (EVs) on the road. Traditional EV charging requires the vehicle to be stationary and physically connected to a charging station, which can be inconvenient and time-consuming. With DWEC, the vehicle can charge while in motion, eliminating the need for frequent stops to recharge and increasing the vehicle's range.

II. APPARATUS REQUIRED

Dspic30f2010, voltage regulator, bridge rectifier, Power transfer coil, LCD 16x2, 12V DC battery.

i.Dspic30f2010

This Dspic30f2010 contains the basic introduction, feature, and pinout as well. In it, the **core** always has the 24-bit instructional word. PC (Program Counter) is 23 bits extensive with LSb (least significant bit) and the MSB (most significant bit) is always ignored during the normal running of the program except for certain conditions or instructions. Then the PC addresses up to 4M instructional words. There it uses an instructional mechanism just to maintain throughput. The program loop uses the *DO* and *REPEAT* instructions. These both are interruptible at any point in the program. 16 x 16-bit register act as data, address and offset register. When we talk about data space which is 64 Kbytes (32K words) and split into 2 blocks referred to as X and Y data memory. Both of these blocks have their own Address Generation Unit (AGU)

.ii. voltage regulator

The battery in your car that gets charged from the alternator, the outlet in your home that provides all the electricity you desire, and the cell phone you likely keep on hand every minute of the day all require a specific voltage to function. Fluctuating outputs that jump from ±2V can cause inefficient operation and possibly even damage to your charging devices. There's a variety of reasons why a voltage fluctuation may occur: condition of the power grid, other appliances turning off and on, time of day, environmental factors, etc. Due to the need for a steady, constant voltage, enter the voltage regulator.

A voltage regulator is an integrated circuit(IC) that provides a constant fixed output voltage regardless of a change in the load or input voltage. It can do this in many ways depending on the topology of the circuit within, but to keep this project basic, we will mainly focus on the linear regulator. A linear voltage regulator works by automatically adjusting the resistance via a feedback loop, accounting for changes in both load and input, all while keeping the output voltage constant.

iii. Bridge rectifier

A Bridge rectifieris an Alternating Current(AC) to Direct Current (DC) converter that rectifies mains AC input to DC output. Bridge Rectifiers are widely used in power supplies that provide the necessary DC voltage for electronic components or devices. They can be constructed with four or more diodes or any other controlled solid-state switches.

Depending on the load current requirements, a proper bridge rectifier is selected. Components' ratings and specifications, breakdown voltage, temperature ranges, transient current rating, forward current rating, mounting requirements, and other considerations are taken into account while selecting a rectifier power supply for an appropriate electronic circuit's application.

iv. Power transfer coil

The power transfer coil (PTC) is a critical component of a dynamic wireless electric vehicle charging system using inductive power transfer (IPT) and is typically installed on the transmitter side. The PTC generates a magnetic field that transfers power wirelessly to the vehicle.

v. LCD 16X2

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and the seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

v. 12V DC Battery

Batteries come in various shapes, measures, and contrasts in their purposes. The 12V battery is one such normal battery. In any case, what do you are familiar with the 12-volt battery and what is its utilization? A 12-volt battery is a sort of battery that is frequently utilized for different electrical contraptions and machines. The 12-volt battery is unmistakable and different in its utilization, as it comes in various shapes andsizes.

III. WORKING PRINCIPLE

When a vehicle equipped with the receiver unit approaches the transmitter unit, the control system on the receiver side communicates with the transmitter to initiate the charging process. The transmitter generates a magnetic field that is captured by the receiver coil and converted into electrical energy, which is then converted into DC power by the power electronics system and used to charge the vehicle's battery. As the vehicle moves along the road, the transmitter unit adjusts the power output and the receiver unit adjusts its position and orientation to maintain an optimal charging rate. Once the battery is fully charged, the control system terminates the charging process, and the vehicle can continue on its journey.

IV. BLOCK DIAGRAM

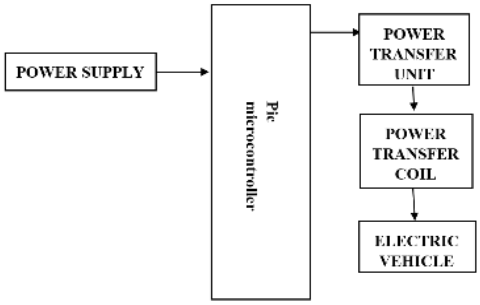

Fig 5.1 Block diagram

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