Wireless Charger For Electric Vehicles

Mr.K.Balamurugan[1], T.Janani[2], R.Keerthana[3],S.J.Reshma[4]

{balamurugan.k@kpriet.ac.in[1], 18ee030@kpriet.ac.in[2], 18ee037@kpriet.ac.in[3], 19eel007@kpriet.ac.in[4]}

Assistant Professor, Department of Electrical and Electronics Engineering, KPR Institute of Engineering and Technology, Coimbatore – 641407[1], UG Scholars, Department of Electrical and Electronics Engineering, KPR Institute of Engineering and Technology, Coimbatore – 641407[2,3,4]

Abstract. Wireless power distribution is a process of transforming energy without any need for connectors. Inductive charging distribution allows users to connect situations in which people don't even have accessibility to a viable source of energy. All equipment will be capable of connecting to the power source of supply wirelessly in the long term. For so many years, wireless charging for electric vehicles (EVs) is still in research in the prospect of the growing adoption of these automobiles. Inductive charging methods currently, therefore, provide efficient and transparent capable of charging electric vehicles of all the categories and power densities from a commonality source. Accreditation measures are well established to assure system interoperability across vehicle manufacturers and geographies. Numerous nonintrusive plug-in electric vehicle (PEV) getting charged techniques seem to be in research or are generally accessible as supplemental options as in the lighter-weight automotive sector. Wireless transfer of power (WPT) has overtaken the inductive transition of power and electromagnetism coupling as the recognized nomenclature for wireless charging. WPT system is now in its development, although there are a lack of consistency, specifically in terms of scalability, central wavelength determination, magnetic fringing field minimization, and power flow modulation approaches. This research represents a new power system evaluation method in WPT, under which the core enables bandwidth selection and indeed the synched secondary is assessed as a distribution network similar in principle to a power distribution network with reactive current-voltage stabilization.

Keywords: Wireless Charging of Electric vehicles [WCEV], Wireless Power Transfer [WPT], Wireless Charging of Electric Vehicle System [WEVCS], plug-in electric vehicle (PEV).

1 Introduction

Electrical energy is sent by cable from a power plant to every location on the earth. The utilization of cables and batteries can be eliminated or reduced with wireless power transmission technologies [9]. Where connecting wires would be inconvenient, hazardous, or impracticable, wireless distribution can be employed to energize electronic components [1]. Electric cable comprised of copper and aluminum metal is used less with wireless power transfer technologies

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[6]. Metals needed to create electric wire will become extinct in the future [2]. The utilization of electric cable will be reduced if wireless power transmission technology is implemented [7]. It would be advantageous if wireless power transmission innovation might be utilized in the long term to transport energy from the power station anywhere and everywhere without the usage of cables[12]. Another significant incentive to adopt wireless charging is autonomous car fleets [5]. Wireless charging becomes a need rather than a convenience when there is no one to plug in and the vehicle can drive itself to a charging area [14]. This study looks at how magnetic resonance-based wireless power transfer can be used to charge electric automobiles [11]. People are becoming more conscious of the need to transition to electric cars as climate warming worsens. It contains an overview of the technology for this application, some performance data from a state-of-the-art system, a review of initiatives in technology standardization, and a discussion of some remaining barriers to general adoption [10].

2 Proposed system

Wired charging has some drawbacks, such as socket points, charging station spacing, wire range constraints, and the need for the car to shift orientation to connect to the charger. Even if electric vehicles are a viable choice, their charging systems must improve in order for them to become the primary mode of transportation. Electric vehicles can currently only be charged via a plug-in connection due to current technology. The issue arises when the user has to locate a charging point but the charging cord is missing or damaged. The goal of this project is to create a wireless power transfer system for electric automobiles.

3 Block diagram

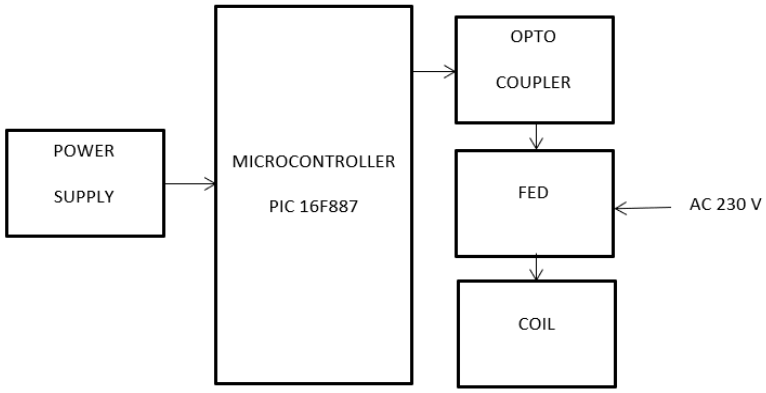

Fig. 1. Block Diagram of the Transmission Side

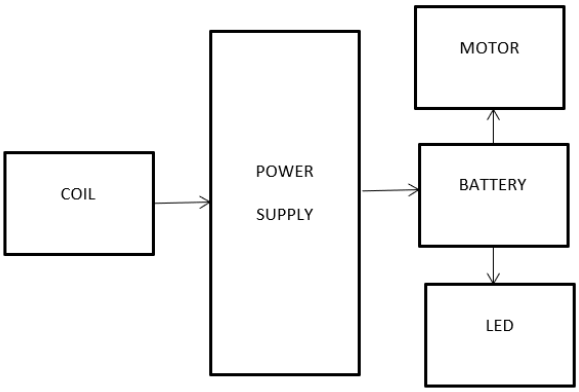

Fig. 2. Block Diagram of the Receiver Side

4 Components

In this system of wireless chargers for electric vehicles, the following components are used:

1. PIC16F887 Microcontroller
2. Power Supply
3. Optocoupler
4. DC MOTOR
5. LED
6. Battery

4.1 PIC16F887 Microcontroller

Microchip Software's PIC series of Harvard architecture microcontrollers is based mostly on PIC1650[1][2][3] specifically created by General Instrument's Microelectronics Division. The initials PIC stood for Peripheral Interface Control system. [4][5] The family's initial components were released in 1976, and by 2013, the firm has supplied over twelve billion individual parts to a vast scope of embedded applications.

For ease of storage, early PIC versions used read-only memory (ROM) or field-programmable EPROM, with some versions including that of the ability to erase memory. For compact storage, all contemporary versions employ Flash storage, and later models allow the PIC to reprogram itself. There is a distinction between memory space and hard disk space. Data memory is 8-bit, 16-bit, and 32-bit wide in the newest versions. The bit amount of programe instructions varies per PIC family and might be 12, 14, 16, or 24 bits long. The operating system varies by model as well, with some more capable CPUs including instructions for digital signal processing.

4.2 Power Supply

A power supply is a device that provides electricity to one or maybe more power network. The phrase would be most usually used to describe machines that transform one kind of electrical energy to another, but it also may apply to equipment that convert mechanically, chemical, or solar energy to electrical energy. A voltage regulator maintains a virtually constant output voltage or current despite variations in load current or the voltage supplied by the power supply's energy source. Each electricity supply must get its energy from that of an energy source, which includes the energy it gives to its demand as well as any energy it consumes while performing that operation. Each electricity supply ought to get its energy from a source of energy, which includes the energy it gives to its load as well as any energy it consumes while doing that operation. A power supply can be built as a discrete, stand-alone device or as an incorporated, interconnected unit. Lower voltage power supplies, for instance, are frequently integrated with their loads in devices such as computers and domestic electronics during the latter scenario.

4.3 Optocoupler

The 4N25 series is a fixed phototransistor coupler that is widely used in industry. The 4N25, 4N26, 4N27, and 4N28 are members of this family. Every optocoupler is made up of such an infrared LED made of gallium arsenide as well as a silicon NPN phototransistor.

4.4 DC MOTOR

A DC motor is designed of electronic components that transforms d.c electrical energy into mechanical energy energy. The most popular varieties rely on magnetic fields to create forces. Almost all Electric motors contain an internal mechanism, either electromechanical or electronic, that changes the flow of the current in a portion of something like the motor on a regular basis. The majority of them generate rotating motion; a linear motor generates force and motion in a straight line.

Because they'd be supplied by existing direct-current lighting power distribution networks, Electric motors would be the first kind to become extensively employed. The speed of a DC motor may be varied across a wide range by varying the voltage source or adjusting the present intensity in the primary winding. Tools, toys, and appliances all employ small DC motors. The universal motor is a light motor that can run on dc current and is utilised in portable power tools and appliances. Larger DC motors are utilised in electric vehicle transportation, elevators and hoisting drives, and steel roll forming drives. With the advent of electrical machines, it is now able to recreate DC motors with AC motors in a multitude of applications.

4.5 LED

A semiconductor light source is a light-emitting diode (LED). LEDs are used as indicator lamps in a variety of platforms that are becoming extremely prevalent in these other lighting applications. Early LEDs emitted low-intensity red light when they were first launched as a functional electrolytic capacitor in 1962, while current LEDs generate a wide range of visible, ultraviolet, including electromagnetic frequencies with ultrahigh luminosity.

That whenever an upwards bias (switched on) light-emitting Semiconductor diode is turned on, electrons can generate carriers and recombine with electron holes within the device, releasing energy in the form of photons. This phenomenon is known as photoelectrochemical, and the intensity of the color (which corresponds to the energy of the photon) is governed by the semiconductor's energy imbalance. LEDs have a limited surface area (less than 1 mm2), therefore optoelectronic equipment can be utilised to modify the pattern of light they emit. Energy conservation, longer service life, better durability, smaller size, and faster switching are just a few of the improvements Led provide over incandescent electric bulbs.

4.6 Battery

An electronic battery is a power source made up of one or more rechargeable batteries that may be connected from the outside world or used to control switching devices. Whenever a battery is draining electric energy, the cathode is the transmitter end and the anode is the negative electrode. When a battery is exposed to an external output terminal, a chemical reaction takes place, converting greater energy substrates to relatively low outputs, and the difference in electronegativity is delivered to the external circuit as energy is created.

5 Methodology

The Qi standard underpins wireless charging technologies (driven by Wireless Power Consortium). This standard is used to charge cellphones wirelessly all over the world. This can also be applied to electric vehicle wireless charging. Wireless charging abilities rely on electromagnetism. When electricity passes through all the base department's wire coils, they operate as main winding and create a magnetic field. Without actually touching the adjacent coil, this field causes a current. Wireless charging is achieved by treating this nearby coil as a secondary winding and connecting it to a charging unit. Wireless transmission can be used to power electronic components when linking cables would be cumbersome, dangerous, or impossible.

The energy converter converts the received electricity from AC to DC before delivering that to the battery system. To minimise unwanted safety problems, power control and battery management models are designed with only a telecommunication system to collect any input from either the transmission line. The charging period is defined by the power level of the source, the size of the charging pads, and the air space between both the windings. For lightweight duty vehicles, the usual distance is around 150–300 mm.

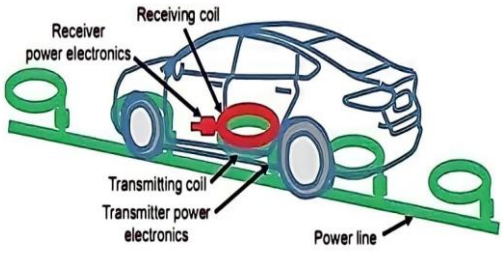

Fig. 3. Static Wireless EV Charging System

6 Result And Discussion

EV popularity is predicted to rise dramatically in the next decade as EV technology, requires organization, and utility-scale facilities to evolve. Inductive charging has received a lot of interest in this area since it is spark-free, agnostic of the environment, and dynamic to unsupervised procedures. The purpose of this study is to provide a thorough examination of wireless charging solutions for electric automobiles. This article gives a comprehensive review of electric car wireless charging technologies. Improved energy efficiency, reduced energy consumption, lower related costs, enhanced flexibility, and workers' compensation are all possible with Wpt systems.

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8 Literature Review

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In recent years, Li-ion battery technology has grown increasingly significant as these Batteries have a lot of potential as a source of energy that can bring us to the electric future. The breakthrough in electric vehicles (EVs) is already started. New Li-ion battery techniques were developed. the emphasis of study at leading material science organizations all throughout the globe The most astounding batteries are lithium-ion batteries. In the last two decades, contemporary electrochemistry has become a success story. They are powerful. The majority of today's portable gadgets appear to have passed the psychological barrier. The utilization of such

high energy density devices on a broader scale is hampered by a number of factors. EV, for example, is a more demanding application. Because this field is rapidly evolving, as well as attracting an ever-increasing number of visitors

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