Remote Power Exchange for Electric Vehicle Application

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***Abstract*--Wireless power transfer (WPT) using magnetic resonance is the technology which could set human free from the annoying wires. In fact, the WPT adopts the same basic theory which has already been developed for at least 30 years with the term inductive power transfer. WPT technology is developing rapidly in recent years. At kilowatts power level, the transfer distance increases from several millimeters to several hundred millimeters with a grid to load efficiency above 90%. The advances make the WPT very attractive to the electric vehicle (EV) charging applications in both stationary and dynamic charging scenarios. This project reviewed the technologies in the WPT area applicable to EV wireless charging. By introducing WPT in EVs, the obstacles of charging time, range, and cost can be easily mitigated. Battery technology is no longer relevant in the mass market penetration of EVs. It is hoped that researchers could be encouraged by the state-of-the-art achievements, and push forward the further development of WPT as well as the expansion of EV.**

Key words—Dynamic charging, electric vehicle (EV),inductive power transfer (IPT), safety guidelines, stationary charging, wireless power transfer (WPT).

I. INTRODUCTION

For vitality, condition, and numerous different reasons, the jolt for transportation has been doing for a long time. In railroad frameworks, the electric trains have just been all around produced for a long time. A prepare keeps running on a settled track. It is anything but difficult to get electric power from a transmitter rail utilizing pantograph sliders. In any case, for electric vehicles (EVs),the high adaptability makes it difficult to get control correspondingly. Rather, a high power and extensive limit battery pack is generally prepared as a vitality stockpiling unit to make an EV to work for an attractive separation. As of not long ago, the EVs are not all that alluring to purchasers even with numerous administration impetus programs. Government sponsorship and assessment impetuses are one key to expand the piece of the pie of EV today. The issue for an electric vehicle is nothing else except for the power stockpiling innovation, which requires a battery which is the bottleneck today because of its unacceptable vitality thickness, constrained life time and high cost. In an EV, the battery isn't so natural to outline due to the accompanying necessities: high vitality thickness, high power thickness, moderate cost, long cycle life time, great wellbeing, and unwavering quality, ought to be met at the same time. Lithium-particle batteries are perceived as the most focused answer for be utilized as a part of electric vehicles .

II. EXISTING SYSTEM

In an EV, the battery isn't so natural to plan as a result of the accompanying necessities: high vitality thickness, high power thickness, moderate cost, long cycle life time, great security, and dependability, ought to be met all the while. Lithium-particle batteries are perceived as the most focused answer for be utilized as a part of electric vehicles. In any case, the vitality thickness of the popularized lithium-particle battery in EVs is just 90– 100Wh/kg for a completed pack [2].1 This number is so poor contrasted and gas, which has a vitality thickness around 12 000 Wh/kg. To challenge the 300-mile scope of an inside burning motor power vehicle, an unadulterated EV needs a lot of batteries which are too overwhelming and excessively costly.

III. PROPOSED SYSTEM

This undertaking begins with the fundamental WPT hypothesis, and after that gives a concise outline of the principle parts in a WPT framework, including the attractive coupler, pay arrange, control gadgets converter, contemplate philosophy, and its control, and some different issues like the security contemplations. By presenting the most recent accomplishments in the WPT zone, we trust the WPT in EV applications could pick up a far reaching acknowledgment in both hypothetical and handy terms. Likewise, we trust more specialists could have an intrigue and make more splendid commitments in the creating of WPT innovation.

IV. BLOCK DIAGRAM

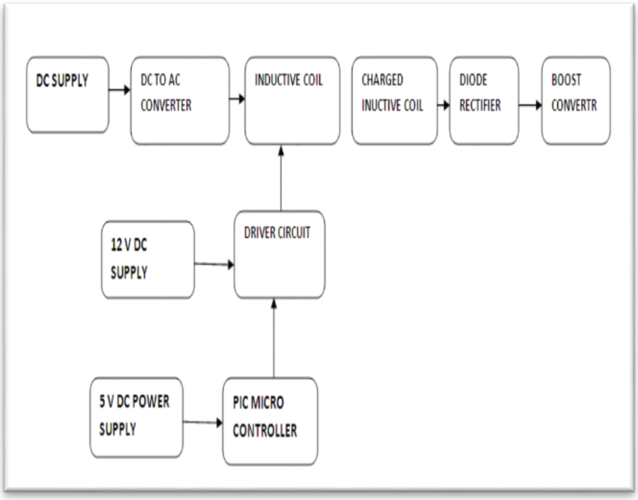

Fig. 1.Block diagram

The high frequency transformer is the core of our system.The high frequency transformer is empowered by the supply taken from the solar panel.By utilizing inverter it is changed over into AC supply.Otherwise it is associated specifically to the AC supply.The inverter is driven by the driver circuit which is controlled by the pre customized microcontroller. Based on attractive reverberation the optional loop of transformer is stimulated and it is rectified back to get DC supply.The DC control is put away in a battery or straightforwardly associated with the DC engine.

V. CIRCUIT DIAGRAM

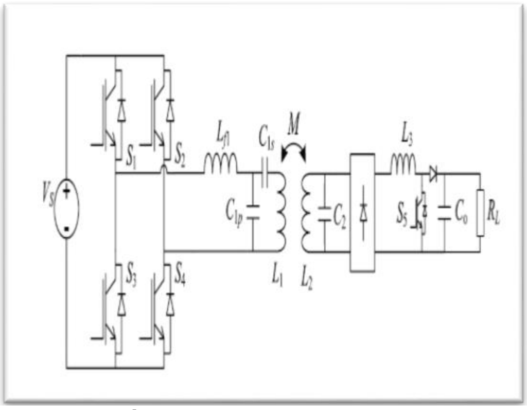

Fig. 1.Circuit diagram

VI. COMPONENTS

A. Inverter concepts and basics

The dc-ac converter, otherwise called the inverter, changes over dc energy to ac power at wanted yield voltage and frequency. The dc control contribution to the inverter is acquired from a current power supply organize or from a turning alternator through a rectifier or a battery, energy unit, photovoltaic exhibit or magneto hydrodynamic generator. The channel capacitor over the info terminals of the inverter gives a steady dc interface voltage. The inverter in this way is a flexible frequency voltage source. The arrangement of air conditioning to dc converter and dc to ac inverter is known as a dc-connect converter. Inverters can be comprehensively characterized into two kinds, voltage source and current source inverters. A voltage– fed inverter (VFI) or all the more by and large a voltage–source inverter (VSI) is one in which the dc source has little or insignificant impedance. The voltage at the information terminals is steady. A current – source inverter (CSI) is bolstered with flexible current from the dc wellspring of high impedance that is from a steady dc source. A voltage source inverter utilizing thyristor as switches, some sort of constrained recompense is required, while the VSIs comprised of utilizing GTOs, control transistors, control MOSFETs or IGBTs, self replacement with base oIr entryway drive signals for their controlled turn-on and kill. A standard single-stage voltage or current source inverter can be in the half-extension or full scaffold design. The single-stage units can be joined to have three-stage multiphase topologies. Some modern utilizations of inverters are for flexible speed air conditioning drives, enlistment warming, standby air ship control supplies, UPS (uninterruptible power supplies) for PCs, HVDC transmission lines, and so on.

B. PIC microcontroller

The Microcontroller used here is the PIC16F877. PIC(Peripheral Interface Controller) is a family of microcontrollers. It has attractive features and they are suitable for a wide range of application.It consists of I/O parts,3 timers, ROM, RAM, Flash memory and inbuilt ADC. PIC channel 10bit inbuilt ADC which convert the analog value into 10 bit digital data. PIC is programmed to convert 10 bit data into an 8 bit data and to transmit the data into a transistor driver. Figure 2 shows the architecture of PIC microcontroller.

Fig. 3.PIC16F877

- word instructions to learn.
- All single cycle instructions except for program
- Branches which are two cycle.
- Operating speed: 20MHz clock input,200 ns
- instruction cycle. High performance RISC CPU
- Only 35 single
- Up to 8k x 14 words of FLASH program memory, up
- to 368 x 8 bytes of Data memory(RAM). Wide
- operating voltage range:2.0V to 5.5V
- Low-power consumption:

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- -0.6 mA typical @ 3V,4MHz
- -<1µA typical standby current
- Timer0: 8-bit timer/counter with 8-bit prescaler.
- Timer1: 16-bit timer/counter with prescaler,can be
- incremented during SLEEP mode.
- Timer2: 8-bit period register, prescaler and postscaler
- Timer0: 8-bit timer/counter with 8-bit prescaler.
- Timer1: 16-bit timer/counter with prescaler,can be
- incremented during SLEEP mode.
- Timer2: 8-bit period register, prescaler and postscaler

C. Lithium ion battery

Fig. 4.Lithium ion battery

A lithium-ion battery or Li-ion battery (abridged as LIB) is a sort of rechargeable battery in which lithium particles move from the negative cathode to the positive terminal amid release and back while charging. Li-particle batteries utilize an intercalated lithium compound as one anode material, contrasted with the metallic lithium utilized as a part of a non-rechargeable lithium battery. The electrolyte, which takes into consideration ionic development, and the two anodes are the constituent segments of a lithium-particle battery cell.

VII. RESULT AND DISCUSSION

Since in the present true charging of electric vehicle is took more time,by plan and usage of this venture the electric vehicle is charged by methods for remote power exchange and decrease the time taken for charging of vehicle

VIII. CONCLUSION

This paper exhibited a survey of remote charging of electric vehicles. Obviously vehicle charge is unavoidable on account of condition and vitality related issues. Remote charging will give numerous advantages as looked at with wired charging. Specifically, when the streets are energized with remote charging capacity, it will give the establishment for mass market entrance for EV paying little mind to battery innovation. With innovation advancement, remote charging of EV can be conveyed to fulfillment. Additionally ponders in topology, control, inverter outline, and human wellbeing are still required in the close term.

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