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Contactless Charging of E-Vehicle to E-Vehicle Bi-Directional Power Transfer

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***Abstract*: Bidirectional Magnetic resonance Wireless Power Transfer (WPT) is a technique that can liberate people from annoying cables. In Electricity, the principle can be easily used to reduce cost, loss and performance [1]. Indeed, the WPT adopted the same basic theory that had existed for at least 30 years with the Induction Power Transfer Concept (IPT). BWPT technology has progressed exponentially in recent years. The transmission distance at kilowatt electricity increases from a few millimetres to several hundred millimetres, with a grid power output of over 90 percent. In the proposed system in which battery power is used for the fuel of a street light unit, we provide a wireless communication network. Per road usually has more than 1000 vehicles a day. When the energy we collect from each car can be used to power the road lights without hampering their operations.**

***Keywords*: Inductive power transfer (IPT), Wireless power transfer (WPT).**

1. Introduction

As the world's population grows, electricity demand is growing steadily. There is now an efficient and controlled use of electricity as the most important feature of the modern power grid. Most of the electricity grid uses an incredibly high wired power transfer. The wired power and distribution alone was responsible for about 30% of the overall power loss [2]. The main cause for the failure is the cable resistance. With the use of ultra-high-temperature super conductor hybrid overhead and underground wires, wired transmission efficiencies can be increased. The transmitting, however, remains ineffective. The Indian grid is the biggest power deficit in the world. Wireless transmission can be an efficient way to control those errors regardless of the use of wireless mode. Electricity theft has now been an important aspect [3]. Losses of electricity theft in India rise quickly and cable transmission everywhere enables power theft. In the Power System, in addition to losses, power waste is a big concern. According to India's most recent government report, carbon efficiency at 8 percent is high. Excess electricity applications include domestic equipment, public utilities, traffic lighting and transport services [4]. Since the human mindset is subject to outlets such as home equipment and government agencies, we can regulate waste energy through technological know-how rather than technical experience [5].

Waste management by road lights and other transport installations Over the years, many strategies for reduction of leaks and energy waste have been built by transport installations such as solar road lights and traffic grids, but they are still not successful as they are intermittent and environmentally friendly. Wireless power conversion and operation can be highly beneficial in the production and delivery of electricity. Wireless power transmission basically operates under the theory of the transformer. We might assume that a wireless power transfer motive is transformer. The propagation of wireless data transmits power only instead of data. It's similar, too [6]. It is possible to minimise expense, loss and reliability effectively by using the principle of energy. Finally, we will build a much higher performance, low driving costs and safe method of power theft. In the proposed system in which battery power is used for the fuel of a street light unit, we provide a wireless communication network. This defeat can be a good way of stopping.

2. Block Diagram

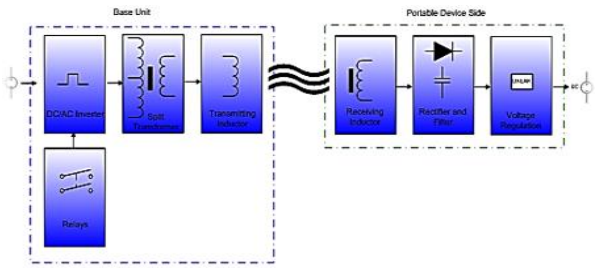

Fig. 1. Block diagram

The input control of the device is either from the battery of the car. The voltage is regulated step-down and converted into DC voltage by rectifier. The transmission controls the control panel and the temperature of the bobbin. Transmission and the receiving of the spiral if these components transfer power are the key components of the device. The primary and secondary bobbins are effectively segregated. One coil of each transformer is used for transmission and reception of electricity. The causes of the phenomenon are the magnet coupling. In high-power systems, such as assembling plug-in-hybrid cars, end-to-end efficiencies (AC input to DC output) of over 90 per cent have been demonstrated. This performance requires 97-98 percent or

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more efficiency at each point of the system. Careful architecture is important for minimizing errors at all stages to achieve high efficiency.

A. Transmitter Section

The DC voltage output supplied by the link relay is the DC voltage on the DC/AC inverter input. The AC voltage is given to a divided induction transformer, which divides the voltage and supplies the voltage that we want. The splitting voltage is based on the transformer ratio and the voltage is transferred to the converter of the inductor (inductor coil) and the voltage flow is passed on as electro magnet wave to an inductive transmitter.

B. Receiver Section

The induction coil receives the electromagnetic waves that generate voltage in the AC spiral. This pressure was transferred by correction and filter circuits, which transform the AC voltage into DC shape and filter out the undesirable contents. Used for seamless power supply. The voltage produced can be adjusted unregulated by the voltage regulator to change the DC voltage at the power output.

3. Experimental Results

The performance energy efficiency of the machine is between 50% and 60%. However, by following, we can boost performance.

A. By Increasing Coupling Coefficient

The use of two identical spindles with a low separation, as opposed to the width of the belt, assures a strong interconnection coefficient. By the interconnection coefficient of both coils, as seen in the figure below, the efficiency of the power transmission is improved.

The Coupling Coefficient M is given by,

$$M = k \sqrt{L1 * L2}$$

Where k is degree of Coupling Strength and its value lies between 0 to 1
L1 is Transmitter Coil Inductance
L2 is Receiver Coil Inductance

4. Software Design

A. Algorithm

1. Start the Power Supply
2. It will make Controller ON. Press the Switch to Initiate Charging
3. The LCD Will Show Charging ON Status
4. After Charging Complete Press the Key Again to Stop Charging
5. The LCD Will Show Charging OFF Status.

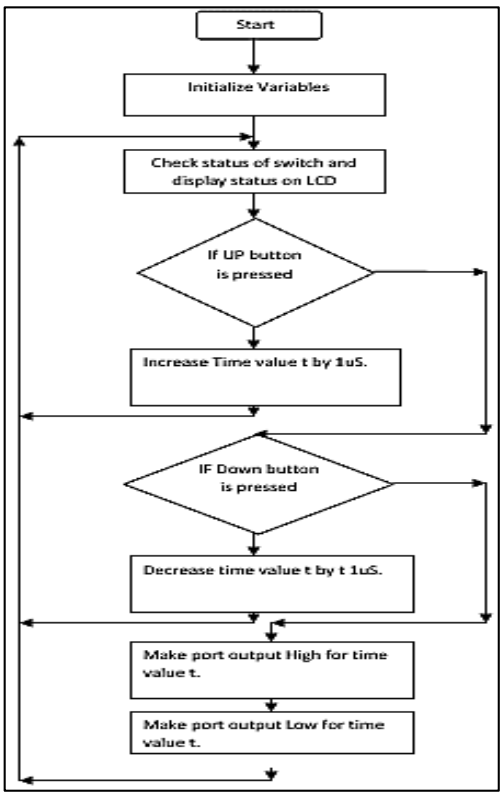

Fig. 2. Flow Chart

5. Result

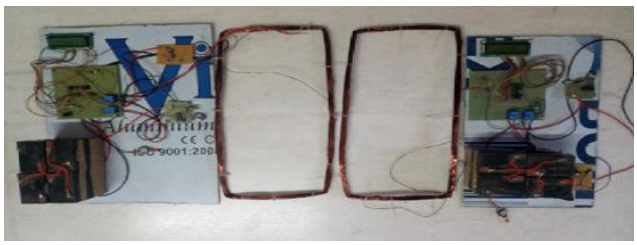

Fig. 3. Hardware setup

- Higher charging cutoff 14.5v
- Charging current 1amps at 1.5ft distance

A. Result of Power Transfer

- Battery 12v 6AH
- Charging Current 2A at 1 Feet
- Charging Current 1.2 at 1.2 Feet
- Over Voltage Cutoff 14.2V
- Charging On at 12.5V
- Time 1 Hour at 80% Discharge at 1 Feet
- Bi-Directional Vehicle to Vehicle
- Charging Time 1.5 Hours at 1.5 Feet
- Charging Time 1.5
- Coil Diameter 1.5 Feet X 1 Feet
- Coil Gauge 24

6. Conclusion

The Bidirectional WiTricity technology is a non-radiative electric power transmission system based on the magnet near to

the ground. Magnetic fields are very small and technically considered safe to interact with mammals, both human and animal. WiTricity goods are designed to meet the relevant quality requirements and regulations. So for two-way WiTricity technology is secure. WiTricity passes power depending on the source and receiver. Where it is very close and can exceed 95%. Performance is mostly determined by the difference between the power supply and the capture; however, the form may impact efficiency. Power can also be moved across walls. Standard magnetic induction usually causes the energy to be sent very close to each other in millimetres. The Bidirectional WiTricity technology is based on highly resonant, power-efficient connections, even though the distances between the power source and the captured device are more than half the system's height.

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