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

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***Abstract*: Bidirectional Wireless power transfer (WPT) utilizing magnetic resonance is the technology which could set human free from the irritating wires. The concept can be used efficiently in Electricity to minimize Cost, losses and maximize the Efficiency. Indeed, the WPT followed the same fundamental principle as the Inductive Power Transfer (IPT) concept had already existing for at least 30 years. In recent years, BWPT technology has rapidly evolved. At kilowatt electricity the transmitting gap rises with a grid output of more than 90% from few millimeters, to few hundred millimeters. We establish a wireless communication network in the proposed framework where vehicle battery power is used to fuel a street light device. Generally, every road has over 1000 vehicles per day. If the energy, we receive from each automobile can be used to fuel the street lights on the road without hindering its operations.**

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

1. Introduction

Electricity demand is rising constant as the world's population increases. The most critical aspect of the new power grid has therefore been the effective and regulated usage of energy. Most of the power system uses wired power transmission, which is extremely high. Around 30% of the total power loss is due to the wired power and distribution alone. The major reason for this loss is the resistance to transmission of wires. Wired transmission efficiencies can be improved with the use of super high-temperature super conductor composite overhead conductors and underground cables. However, the transmission remains inefficient. The grid of India is the largest in the world in terms of electricity losses. Wireless transmission can be an effective way to limit those losses because wireless transmission uses wireless mode. Theft of electricity has also become a key factor. Power theft losses in India are rising rapidly and cable transmission allows power theft somewhere. In Power System, power wastage is a major problem, in addition to losses. According to the latest government survey of India, carbon consumption is extremely effective at 8%. Applications of excess energy cover household machinery, government departments, street lights, transit services. As the human mentality is subject to sources like home appliances and government offices, we can control electricity wasting using technical knowledge because we need awareness rather than technical expertise.

Waste management through street lights and other transport facilities Over the years many methods to reduce leakage and electricity wastage through transport facilities such as solar-based road lights and traffic systems have been developed but they are still not able to provide an effective solution because they are irregular and subject to environmental conditions. In electricity generation and transmission, wireless power transfer and its application can be extremely helpful. In essence, wireless power transfer works on the transformer principle. We might say that transformer is a wireless power transmission motive. The wireless data transmission only transmits power instead of data. It is also analogous. Effectively using the concept in electricity, cost, losses and efficiency can be reduced. In conclusion we can develop a much higher efficiency, low drive costs and power theft secure system. We establish a wireless communication network in the proposed framework where vehicle battery power is used to fuel a street light device. This loss can be an effective way to stop.

2. Block Diagram

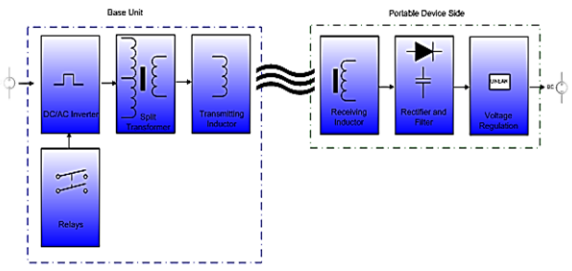

Fig. 1. Block diagram

Either from the battery of the vehicle is the input power for the system. Voltage is regulated by step-down controller and

converted by rectifier into DC voltage. Transmission controls the control panel and controls the coil temperature. The main components of the system are the transmission and receipt of coil when these components transmit power. Bobbins are essentially separated by primary and secondary bobbins. For transmission and receipt of power respectively one coil of each transformer is used. The magnet binding is the cause of the phenomena. End-to - end efficiencies (AC input to DC output) of more than 90 percent have been demonstrated in high power applications such as assembly of plug-in hybrid vehicles. These efficiencies require an efficiency of 97-98 percent or more at every stage of the system. In order to achieve high performance, careful design is essential in every stage to minimize losses.

A. Transmitter Section

The DC voltage source provides the DC voltage at DC/AC inverter input that is delivered with the connection relay. The AC voltage is given to the split-induction transformer, which splits voltage and provides the voltage as required by us. The splitting voltage depends on the transformer ratio and the voltage is then transmitted to the inductor transmitter (induction coil) and the voltage flow through this coil is transmitted to an inductive transmitter as electromagnetic waves.

B. Receiver Section

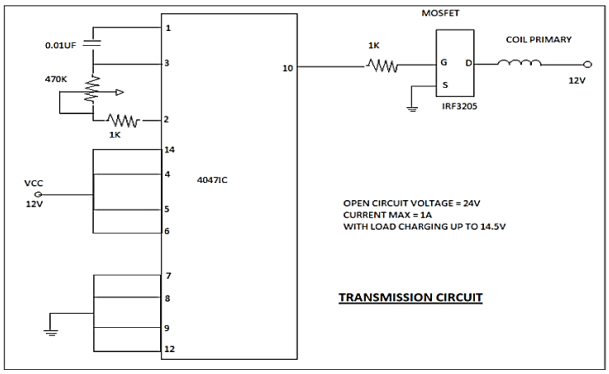

Fig. 2. Transmission circuit

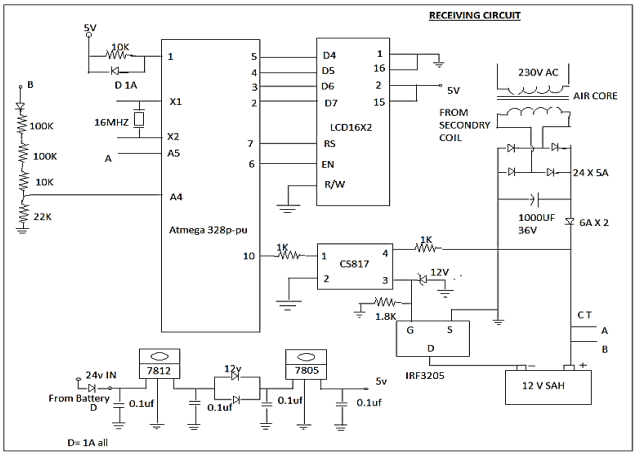

Fig. 3. Transmission and Receivers Circuit

The transmitting inductor (induction coil) absorbs the electromagnetic waves that produce voltage within the AC spiral. This tension has been passed through correction and filter circuits which transform the AC tension into DC form and filter out the unwanted contents. Used to supply smooth DC voltage. The obtained voltage can be managed by the voltage regulator in uncontrolled fashion, so that we can adjust the DC voltage at the power output.

3. Experimental Results

The system is shown with an output power efficiency of 50 to 60 percent. We can nevertheless improve efficiency through following,

A. By increasing coupling coefficient

The usage, in contrast to the coils width, of two equivalent spindles with a slight spacing guarantees a high connecting coefficient between them. The efficiency of power transfer is increased by increasing the connectivity coefficient between the two coils as shown in the following figure.

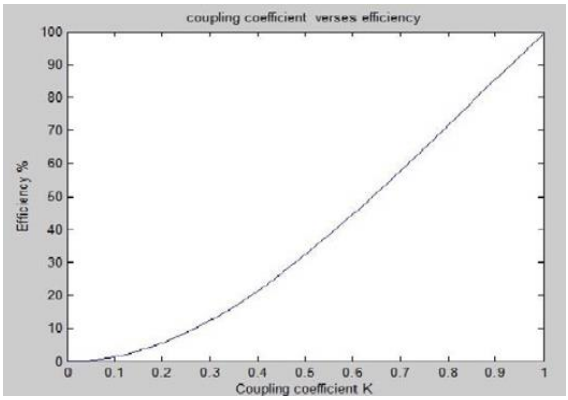

Fig. 2. Graph of coupling coefficient verses Efficiency

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

Fig 2. Shows how efficiency increases with increase in Coupling Factor we can increase coupling Coefficient.

- By increasing number of turns in the coil
- By reducing the gap between turns of coil.
- By Increasing 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.

B. Flow chart

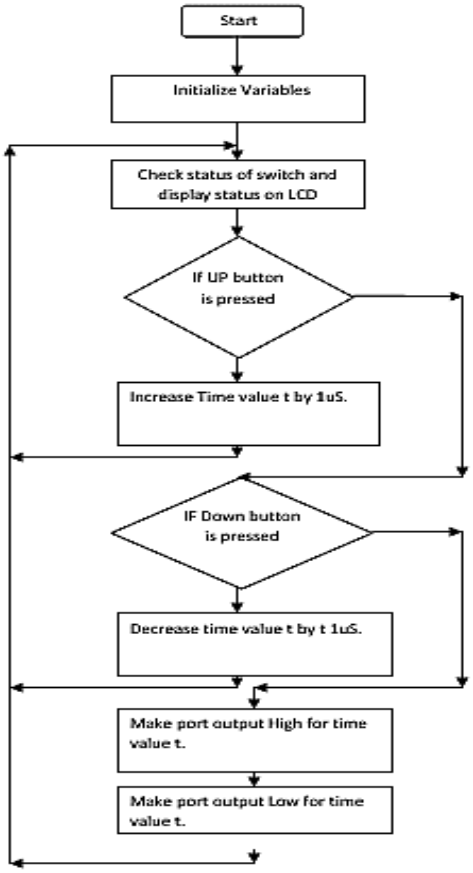

Fig. 3. Flow chart

5. Conclusion

The technology of Bidirectional WiTricity is a non-radiative method of transfer of electricity, which relies instead on the close field magnet. Magnetic fields communicate with species-both humans and animals-very weakly and theoretically are deemed healthy. In order to comply with the applicable safety standards and regulations, WiTricity products are designed. Hence, technology is secure for bidirectional WiTricity. It depends on source and receipter, WiTricity will pass control. If it is fairly similar and may be more than 95%. The distance between the power supply and the capture device is determined primarily by efficiency; however, the shape may affect efficiency. Power can also be transferred via walls. Standard magnetic induction typically allows the voltage and the capturing tool to be very near each other in millimeters to effectively pass electricity. Bidirectional WiTricity technology is built on extremely resonant, strong links that can effectively transmit power even if the gaps between the power source and the capture unit are more than half the size of the system.

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