THE WIRELESS POWER TRANSMISSION SYSTEM

Prasanna P. Titarmare, Yugal Rehpade, Swapnil Narule, Rahul Talmale, Suraj Lende,

Nitin Hirekhan

Assistant Professor, Department of Electrical Engineering. Suryodaya College of Engineering & Technology, Nagpur, India

UG Student, Department of Electrical Engineering. Suryodaya College of Engg. & Technology, Nagpur, India

Abstract

This paper depends on the task of execution and plan of Wireless Power Transfer (WPT) System. This framework is for remotely electrical force transition from a source to the heap with the assistance of the loops. In this undertaking, two curls will be there, the essential loop is on the transmitter side and the auxiliary curl is on the collector side. Here, the force from the source is sent as an attractive transition. Thus, when the AC power is applied to the essential side will be changed over to the attractive motion by the essential loop. Because of this transition the auxiliary loop will be instigated with an E.M.F. Along these lines, the WPT will work for remote force Transmission.

Keywords: *Wireless power transfer (WPT), Highly Resonant WPT, Flux, Field technologies*.

1. INTRODUCTION

The WPT will be characterized as, "The energy will be communicated from the transmitter to a recipient through a wavering attractive field." It works by the head of Electromagnetic Mutual Induction. Here the force is moved from one medium to other medium however there is no any actual association between the loops.

While the transmission and the appropriation of electrical force misfortunes will be there which a major issue is. These misfortunes are around up to 26%. Because of the wire opposition which is utilized in matrix the force misfortune during transmission and dispersion happens.

Nikola Tesla has proposed technique for transmission of power utilizing electromagnetic enlistment. The Technology of the Wireless Transmission is a pattern of improvement in hardware with electrical with electrical applications. As step by step there is increment sought after, the age of force increments and furthermore the force misfortune. Remote Power move is the electrical energy transmission from the essential to auxiliary with no associations of the conduits. Remote force move is valuable on the off chance that where the wiring associations are unrealistic, not advantageous or troublesome.

2. OBJECTIVES

There are a few advantages of utilizing this framework, for example, –

- To build up a gadget for the moving of force remotely
- To usage and plan of a WPT framework for private perspective.
- Elimination of the wired associations that may cause mishaps.
- To Eliminate the wire establishment
- To show a drive for the buyer remote force

3. WIRELESS POWER TRANSFER

Wireless power transmission, otherwise called inductive force move, which might be appropriate for long just as short reach without direct associations. Concerning different advancements WPT framework will be effective, prudent, low support and quicker.

The compact chargers will be permitted to charge themselves while never being associated in omnipresent force wire.

The "Father of Wireless" Nikola Tesla, was the main individual to picture the idea of force transmission remotely and effectively delineated the remote transmission of power in 1891. What's more, he is likewise justified for his exceptional AC age. In 1893, Tesla show the creation of vacuum tubes and lamps without using wires for power transmission at the World Columbian Exposition in Chicago.

Two techniques are there for power move distantly, for instance, nearfield system and farfield methodology.

Overall, nearfield strategy with higher repeat transmission and far-field techniques give lower repeat transmission clear model assessments and complete model assessments.

3.1 CLOSE FIELD TECHNIQUES

The nearfield methods estimated with gadget close from the force source. which can be sub isolated into three classes, like electromagnetic radiation, attractive resounding coupling, and inductive coupling, which might be utilized to annihilate the issue because of insurance and air concerns.

3.2 FAR - FIELD TECHNIQUES

The farfield procedures estimated with load a long way from the force source.

These strategy focuses on high force move and need view. This might be isolated into two developments, similar to microwave power transmission and laser power transmission.

4. METHODOLOGY

This work depends on the idea of plan and execution of Wireless Power Transfer (WPT) System and elimination of the wired associations that may cause mishaps.

This circuit will change AC 230V, 50Hz to AC 12V, High recurrence (HF). The yield is provided to a tunned curl forming as primary of an air center transformer. The 12volt with high recurrence is created by the minor curl.

As soon in light of the fact that the stock given to the machine, it goes to the center sort transformer, a static gadget which may change over the voltage from one voltage level to an alternate voltage level without changing the recurrence. It needs to venture down the transformer. Since the transformer worked then the Bridge rectifier, an electronic gadget which convert one fuel source to various fuel source and controls the voltage from one highlight other point. At that point the transmitter curl communicates the energy by Electro-attractive enlistment law and the recipient gets the energy and they produce an attractive motion without meeting each other and afterward the heaps like mobiles, TVs works.

5. BLOCK DIAGRAM & WORKING

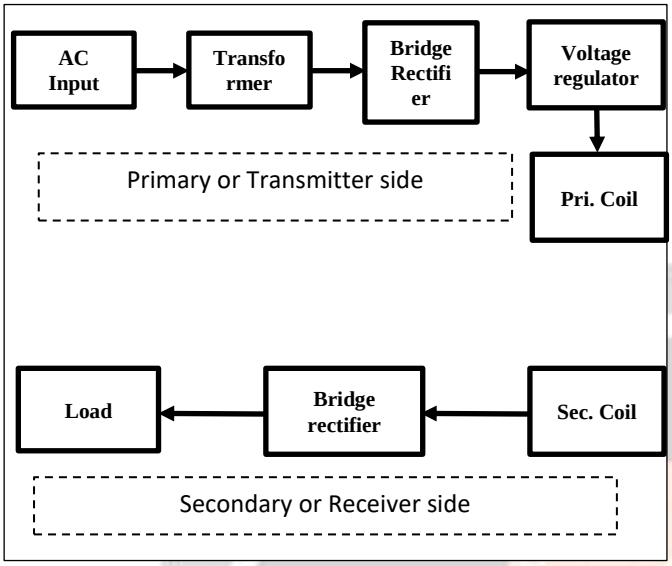

Fig 5.1. Block Diagram

Wireless power transmission work on the rule of inductive coupling between the coils.

In this strategy two coils are orchestrated one at sending end i.e. primary coil and another at the receiving end i.e. secondary coil, the primary coil is associated with the power source (230volts, 50Hz AC) while the other coil is associated with the equipment at the secondary end.

At the point when the power is turned on, the primary coil changes the provided input power over to attractive motion, which flows at a perticuler frequency. This flux gets induced into the secondary coil.

Hence, E.M.F. will be induced in the secondary coil. This instigated E.M.F. can be utilized to supply power to electrical and electronic gadgets.

5.1 Transformer

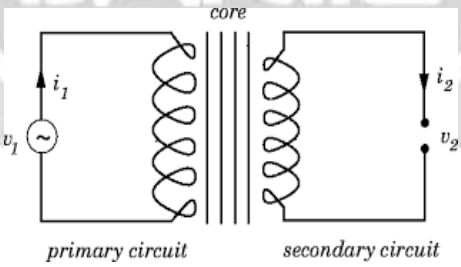

Fig. 5.1.1 Transformer

A static device, having no rotating sections, and it moves an electric force from essential side to auxiliary side without changing recurrence is known as Transformer.

As for work the transformers can be delegated: Step up Transformer and Step down Transformer. A Step up Transformer changes the low voltage on essential side to a high voltage on auxiliary side for example it ventures up the lower input voltage.

Also, if there should be an occurrence of the Step down Transformer, the high voltage on essential side will be changed to the low voltage on auxiliary side for example it steps up down the higher info voltage.

5.2 Bridge Rectifier

Rectifiers change a substituting current over to the immediate current.
The most effective rectifier circuit in the rectifiers is the extension rectifier.

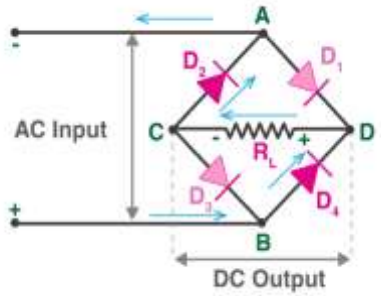

Fig. 5.2.1 Rectifier

The exchanging current (AC) changed over to coordinate current (DC) by the methods for Bridge Rectifiers with the assistance of diodes adjusted in the extension circuit structure.

It is made of at least 4 diodes. A similar extremity wave will be created as the yield wave whatever the extremity is at the information

At the point when the scaffold rectifier is provided by an AC signal, end A gets positive while end B gets negative during the positive half cycle. Subsequently diodes D1 and D3 becomes forward one-sided though D2 and D4 become turn around one-sided.

5.3 Voltage Regulator

Circuit which keeps and builds up a fixed yield voltage, whatever the progressions to the heap or information conditions is Voltage controller [4].

The stockpile voltage is kept up inside a viable reach that is with the other electrical or electronic segments by the Voltage controllers (VRs). Regardless of whether VRs are for the most part used for DC to DC transformation of force, it very well may be utilized for AC to AC or AC to DC power change as well [6].

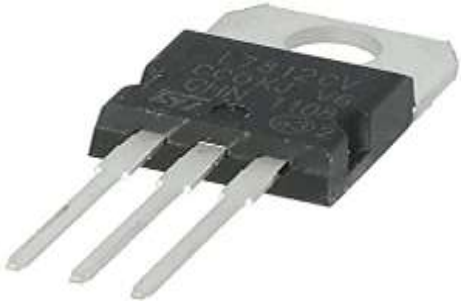

Fig. 5.3.1 Voltage Regulator

It keeps up the voltage in a circuit almost equivalent to the ideal worth. These are quite possibly the most widely recognized electronic segments, though the parts in the circuit can be damaged because of the crude current which is regularly created by the force supply [8].

5.4 Transmitter & Receiver

The power transmission wirelessly is an inductive energy based which is to be moved through a swaying attractive field from the transmitter loop to the recipient curl. The provided DC current is altered into high-recurrence AC current by the especially planned hardware incorporated into the transmitter.

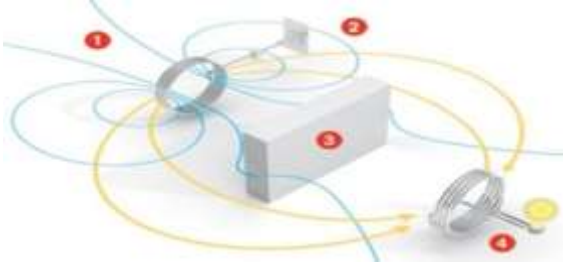

Fig.5.4.1 Transmitter & Receiver

An attractive field is made because of the AC current brought up in a copper wire, in the transmitter segment (XMTR or TX).

The attractive transition can actuate an AC current inside the getting curl, when the RX (Receiver) loop is discovered pretty much the attractive field.

The AC current changed over into DC current by the electrons inside the getting gadget, which makes the working force. These are the most natural of the MR curls. They are doing either of the ensuing two things: (1) send or "broadcast" the RF heartbeat; and (2) get or "get" the MR signal. In their easiest structure, they are roundabout portions of wire with the closures of the wire joined to whatever is preparing the sign or creating the heart-beat/beat.

6 ADVANTAGES

Contrasted with the standard innovation, Wireless power transmission has evident benefits, yet its advancement nonstop to be confined by numerous elements, which needs the examination.

This framework may have the Advantages as-

- It might be more powerful, down to earth when the sending and getting focuses are along a view
- It may have Lower recurrence activity
- It ought to be Efficient
- It will be innocuous for individuals.

7 APPLICATIONS

This strategy might be appropriate for-

- Transport-Avoid the mishaps, Transportation charges are less.
- Consumer Electronics-Products like wireless charging cushion and wireless charging table have started to require place in market.
- Industrial designing – For creation reason.
- Medicals-There are learns about the charging of clinical items like pacemaker while inside the body.
- LED-With utilizing wireless power transmission in LED (Light Emitting Diode) lights, we can re-energize our gadgets utilizing wireless power to such an extent that it might diminish the necessities for batteries in under-bureau task lighting.

CONCLUSION

The model design will intend to deal with the difficulties looked by clients in such some manner. The idea of wireless power transmission might be a main advancement on the planet. This could change the period of squandering part of copper for utilizing it for home wiring. The WPT saves the recoveries the energy utilization and transmission misfortunes when contrasted with the traditional wired moving wireless exchange. With the assistance of wireless power method further more uses that are in under scrutiny like power charging wirelessly and inside the field of advanced mechanics are in everyday practice.

REFERENCES

1. Liguang Xie; Yi Shi; Hou, Y.T.; Lou, A., "Wireless power transfer and applications to sensor networks," *Wireless Communications, IEEE* , vol.20, no.4, pp.140,145, August 2013.
2. Nikola Tesla, My Inventions, Ben Johnston, Ed., Austin, Hart Brothers, p. 91, 1982. 8.
3. Nikola Tesla, "The Transmission of Electrical Energy Without Wires as a Means for Furthering Peace," Electrical World and Engineer. Jan.7, p. 21-24, 1905,
4. P.P.Titarmare, Naresh Tarte, Jayati Shrivastav, Anjali Yadav, Kartik Sahare, "Improve the Industrial Fault Detecting Process by using Microcontroller and GSM Technology", International Journal of Management (IJMTE), Technology And Engineering Page No: 5589-5592
5. Schneider, D., "Wireless power at a distance is still far away [Electrons Unplugged]," Spectrum, IEEE, vol.47, no.5, pp.34,39, May 2010.
6. Vyawahare Nikita, P. Titarmare, Bhajikhaye Darshana, "Microprocessor based slip power recovery in Induction motor", (IJARIIE), Volume 3, Issue 2, 2017
7. W.C Brown, J.R Mims and N. I Heenan, "An Experimental Microwave-Powered Helicopter" 965 IEEE International Convention Record Vo. 13, Part 5, Pp. 225-235
8. Ashish Shastrakar, Prof. P. Titarmare, Abhishek Bhoyte, Sandhya Dhone, Jaya Masram, "Multi-Power Supply Control By Usins Four Different Sources To Avoid Supply Interruption", IOSR Journal of Engineering (IOSRJEN), Volume-6,Issue Dec. 2019, Pages 16-18.

[9] Rahul Dekate '"Smart Fuel Flow Measuring System for Vehicles by using Dynamo Power Generation" IOSR Journal of Engineering (IOSRJEN) ISSN (e): 2250-3021, ISSN (p): 2278-8719 Special Issue || Dec. 2019 || PP 35-37

[10] Rahul Dekate, "Adaptive PI controller using STATCOM for voltage Regulation." E-Journal volume 4, issue 2,2018

[11] Prof. Rahul. Dekate, Kamesh Turkar, Rahul Mengre, Supriya Chandankhede, Minakshi Katare "Wireless Power Monitoring System for Electrical Protection & Power Quality Analysis" International Conference on Tech Trends in Science & Engineering" organized by Suryodaya College of Engineering, Nagpur on 7th & 8th March 2019