IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)
e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 19, Issue 2, Ser. 2 (Mar. – Apr. 2024), PP 29-31
www.iosrjournals.org

Developing Wireless Electronic Vehicle Charging System

Mrunal Dilip Rinait[#1], Nikhil Chore[#2], Prajwal Dilip Wadibhasme[#3], Harshal J Fasate[#4], Prof. Dipak B. Bhongade[#5],

[#1, 2, 3, 4] *Research Scholars, Department Electronics & Telecommunication, Govindrao Wanjari College Of Engineering And Technology, Nagpur, Maharashtra, India*

[#5] *Assistant Professor, Department Electronics & Telecommunication, Govindrao Wanjari College Of Engineering And Technology, Nagpur, Maharashtra, India*

Abstract

In our contemporary era, a noticeable shift towards electric vehicles is taking place, driven by the urgent need to curb pollution originating from conventional fossil fuel automobiles and to offer a viable solution to the escalating costs of transportation. Nowadays, the convenience of electric vehicles extends beyond mere functionality; with designated charging stations or the ease of home charging, refuelling becomes an effortless part of daily life. The concept of wireless transmission, already familiar in the realms of data, sound, and video signals, now extends to the transfer of power without physical connections. Credit for pioneering wireless power transfer goes to the visionary inventor Nikola Tesla, whose ground-breaking work dates back to 1891 when he commenced experiments on wireless power transmission, eventually leading to the development of the Tesla coil. Tesla's visionary spirit culminated in the construction of the Wardenclyffe Tower

---

Date of Submission: 21-04-2024 Date of Acceptance: 01-05-2024

I. INTRODUCTION

The discussion with dual source Solar and Grid. The system is RFID-enabled. A person having a valid card can only charge the vehicle battery. The wireless charging system is of two types. Wireless charging, both static and dynamic, is determined by the application at hand. Wireless charging systems for EVs can be distinguished into two categories.

1. (SWC)Static Wireless Charging
2. (DWC)Dynamic Wireless Charging

1. Static Wireless Charging

As indicated by its title, the charging process for the vehicle occurs during periods of inactivity. Essentially, the electric vehicle is brought to a halt at designated spots or within a carport equipped with a Wireless Charging System (WCS). The transmitter unit is discreetly installed beneath the ground, while the receiver is strategically placed underneath the vehicles. To initiate the charging process, align the transmitter and receiver, and then leave the vehicle to charge. The duration of charging depends on factors such as the level of AC power supply, the distance between the transmitter and receiver, and the dimensions of their respective pads. This innovative Static Wireless Charging System (SWCS) is most suitable for implementation in areas where electric vehicles are parked for extended periods.

2. Dynamic Wireless Charging System (DWCS):

As indicated by its title, this system facilitates charging while the vehicle is in motion. The power seamlessly transitions from a stationary transmitter to the recipient coil within the moving vehicle. Through the utilization of a Dynamic Wireless Charging System (DWCS), electric vehicles can significantly enhance their travel range by continuously replenishing their batteries while driving along roads and highways. This approach mitigates the necessity for large-scale energy storage, thereby contributing to the overall reduction in vehicle weight.

II. LITERATURE REVIEW

Remote charging makes EV to charge without any require of plug in. In the event that each company makes it’s possess measures for remote charging frame works that won’t consistent with other frameworks at that point it won’t be a great thing. So to form remote EV charging more clients neighborly numerous worldwide organizations like Universal Electro Specialized Commission (IEC), the Society of Car Engineers

(SAE), Guarantors Research facilities (UL) Established of Electrical and Hardware Engineers (IEEE) are working on benchmarks.

SAE J2954 characterizes WPT for Light-Duty Plug-In EVs and Arrangement Strategy. Concurring to this standard, level 1 offers greatest input control of 3.7 Kw, level2 offers 7.7Kw, level 3 offers 11Kw and level4 offers 22Kw. And the least target proficiency must be more prominent than 85% when adjusted.

Admissible ground clearance ought to be up to 10 inches and side to side resilience is up to 4 inches. The foremost best arrangement strategy is attractive triangulation that helps to remain inside charge run in manual stopping and helps to discover stopping spots for independent vehicles.

SAE J1772 standard characterizes EV/PHEV Conductive Charge Coupler.

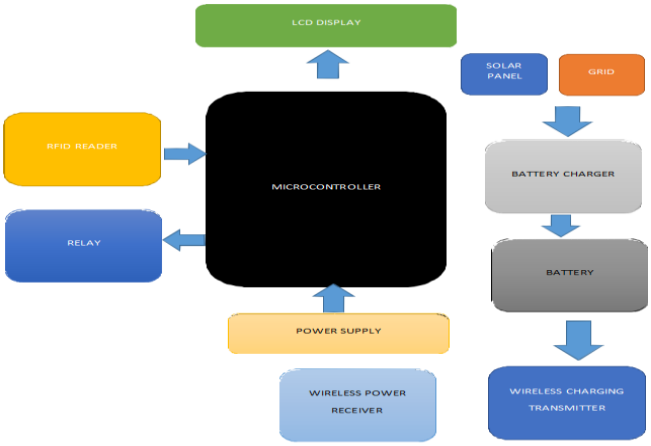
SAE J2847/6 standard defines Communication between Remote Charged Vehicles and Remote EV Chargers. •SAE J1773 standard characterizes EV Inductively Coupled Charging. •SAE J2836/6 standard defines Use Cases for Wireless Charging Communication for PEV. •UL subject 2750 characterizes the Layout of the Examination, for WEVCS.IEC 61980-1 Cor.1 Ed.1.0 defines EV WPT IEC.PROPOSED WORK

III. PROPOSED SYSTEM

How does wireless EV charging technology work?

In inaccessible charging, control is traded by alluring zones utilizing inductive coupling between coils of wire (inductive charging), or by electric zones utilizing capacitive coupling between metal anodes (capacitive charging). Inductive charging is the first broadly utilized farther advancement. Alluring reverberating inaccessible charging will overpower the publicize and is the current standard generally for EVs. For EVs with inaccessible charging, the car batteries can be charged when halted over the charging pad without being halted in. It appears gotten to be a fundamental component to future free vehicle natural frameworks.

Block Diagram



Circuit Description

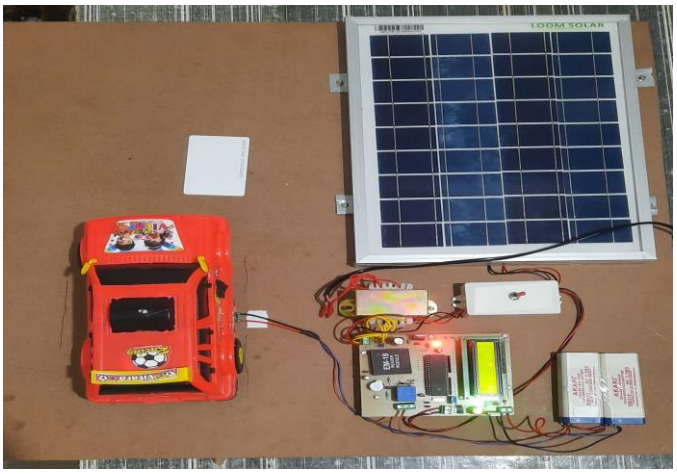
The circuit diagram of EV charging system is shown in the figure. Microcontroller W78e052DDG is the brain of the project. Data Lines of the LCD DB0 – DB7 are connected to Port 0 of the microcontroller. Control lines RS, RW and EN are connected with P2.5, P2.6, and P2.7 respectively.9 Pin 10K Pull-up resistors are connected with all the IO lines of the Microcontroller. The reset circuit is built using a 10uF capacitor and 10Kresistor. An 11.0592MHz crystal oscillator is used and connected to pin no18 and pin no 19 of the microcontrollers. RFID reader module gives output in TTL format, so its TX pin is connected to the RXD pin of the microcontroller. Relay is controlled through a P3. 2 and it is driving using a BC548 transistor. The power supply section is designed using Rectifier, Filter, and Voltage Regulator IC. LM7805 fixed voltage regulator IC is used and LED indication also provided in it.

Charger circuit also consist of Rectifier, Filter and Variable Voltage Regulator IC LM317. 10K pot is used to adjust the output of LM317.Battery is directly connected to the output of the charger circuit. 12 Volt Solar panel and 12 Volt transformer is used for charging the battery and to run the control circuit.

Working

When we exchanged on the control supply of the venture, LCD appears the Welcome message. +At first the hand-off is in OFF condition in this manner the remote charger circuit moreover remains OFF. Microcontroller holding up for the RFID code. At whatever point any client checks the RFID card at that point RFID peruse gives its interesting code to microcontroller. Microcontroller at that point compares the unused

code with the information base of it. In the event that the code matches at that point it instantly switches ON the hand-off and eventually remote charger circuit too enacted. At the same time Vehicle Number too shows on the LCD. After a few time transfer get exchanged OFF and remote charger circuit too deactivated. LCD too appears the status of charging. In case the RFID code not matches with the inside database at that point no activity will perform. Primary Battery remains in charging mode all the time, client can select the charging source either Sun powered Board or Framework utilizing one selector switch.



REFERENCES

[1] G. Covic And J. Boys, "Inductive Power Transfer," Proc. Ieee, Vol. 101, No. 6, Pp. 1276–1289, Jun. 2013.
[2] A. W. Green And J. T. Boys, "10 Khz Inductively Coupled Power Transferconcept And Control," In Proc. 5th Int. Conf. Power Electron. Variablespeed Drives, Oct. 1994, Pp. 694–699.
[3] G. A. Covic, G. Elliott, O. Stielau, R. M. Green, And J. T. Boys, "The Design Of A Contact-Less Energy Transfer System For A People Mover System," In Proc. Power Syst. Technol., Int. Conf., 2000, Vol. 1, Pp. 79–84.
[4] O. Stielau And G. A. Covic, "Design Of Loosely Coupled Inductive Power Transfer Systems," In Proc. Power Syst. Technol., Int. Conf., 2000, Vol. 1, Pp. 85–90.
[5] J. Boys And A. Green. (1994, Mar. 8). Inductive Power Distribution System. U.S. Patent 5 293 308.
[6] C.-H. Hu, C.-M. Chen, Y.-S. Shiao, T.-J. Chan, And L.-R. Chen, "Development Of A Universal Contactless Charger For Handheld Devices," In Proc. Ieee Ind. Electron., Int. Symp., Jun. 2008, Pp. 99–104.
[7] S. Hui And W. C. Ho, "A New Generation Of Universal Contactless Battery Charging Platform For Portable Consumer Electronic Equipment," In Proc. Ieee 35th Annu. Power Electron. Spec. Conf., Jun. 2004, Vol. 1, Pp. 638–644.
[8] C.-G. Kim, D.-H. Seo, J.-S. You, J.-H. Park, And B.-H. Cho, "Design Of A Contactless Battery Charger For Cellular Phone," In Proc. Ieee 15th Annu. Appl. Power Electron. Conf. Expo., 2000, Vol. 2, Pp. 769–773.
[9] A. Sample, D. Meyer, And J. Smith, "Analysis, Experimental Results, And Range Adaptation Of Magnetically Coupled Resonators For Wireless Power Transfer," Ieee Trans. Ind. Electron., Vol. 58, No. 2, Pp. 544–554, Feb. 2011.
[10] G. Covic And J. Boys, "Modern Trends In Inductive Power Transfer For Transportation Applications," Ieee J. Emerg. Sel. Topics Power Electron., Vol. 1, No. 1, Pp. 28–41, Mar. 2013.
[11] C.-S. Wang, O. Stielau, And G. Covic, "Design Considerations For A Contactless Electric Vehicle Battery Charger," Ieee Trans. Ind. Electron., Vol. 52, No. 5, Pp. 1308–1314, Oct. 2005.
[12] C.-Y. Huang, J. Boys, G. Covic, And M. Budhia, "Practical Considerations For Designing Ipt System For Ev Battery Charging," In Proc. Ieee Veh. Power Propul. Conf., Sep. 2009, Pp. 402–407.