IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 13, Issue 4, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.317

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317|| A Monthly Peer Reviewed & Referred Journal |

||Volume 13, Issue 4, April 2024||

| DOI:10.15662/IJAREEIE.2024.1304072 |

Static Wireless Charging System for EV

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ABSTRACT: The aim of this research is to develop a wireless charging solution for electric vehicles (EVs) in order to address the drawbacks of traditional plug-in charging systems. The wireless charging system uses inductive power transfer technology to transfer energy wirelessly between the EV battery and the charging station. The mechanism transfers power efficiently through mutual induction. In addition, a control system is included for stable and secure operation. Fault detection, thermal management, automatic alignment, and power transfer control are the main features of the system. The study also evaluates the system's effectiveness, electromagnetic compatibility, and electromagnetic interference. Electric vehicles (EVs) can now be simply and safely charged without having a physical connection between the car and the charger. This allows for efficient charging while on the go.

KEYWORDS: Mutual induction, Electric vehicles, Static wireless charging.

I. INTRODUCTION

Electricity is necessary for many everyday items, including cell phones, laptops, cameras, sensors, bionic implants, and satellites. and oil platforms. Nikola Tesla introduced the concept of wireless power transfer and unveiled the first wireless power transmission apparatus for illumination in 1891. When there are too many cables attached, using small power outlets could be risky and challenging. Thomas Parker essentially created the first electric car in 1884. Rechargeable batteries were not a viable option for power storage before 1859. French physicist Gaston Plant invented the lead-acid battery as a solution to this problem. In several nations, the number of electric car users is increasing. These vehicles might be tiny or enormous, and they include buses, big cars, and two-wheelers. As more and more people use electric vehicles. The available wireless charging technologies are near-field charging (i.e., inductive charging

The WCS is a proven technology that provides an exciting alternative charging system, which has been used in several projects for city battery-powered buses

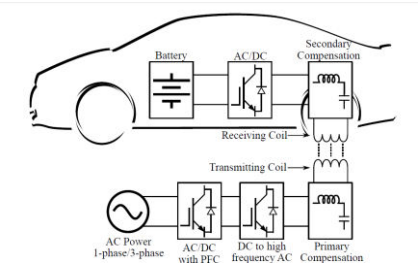

Fig.1. Wireless Charging system

Section I discusses introduction ,section II methodology,section III working principle section IV experimental results section V conclusion

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II. METHODOLOGY

system for charging an electric car's battery remotely. Three components make up this device: an AC signal generator (transmitter), a wireless power transfer coil (transmitter and receiver coil), and a receiver (which transforms the AC signal into DC voltage to charge an electric car's battery). The strategy is to provide a wireless power delivery system prototype in order to prevent energy loss and recharge an electric car's battery.

Wireless charging technologies:

SWC charges the vehicle when the vehicle is stationary

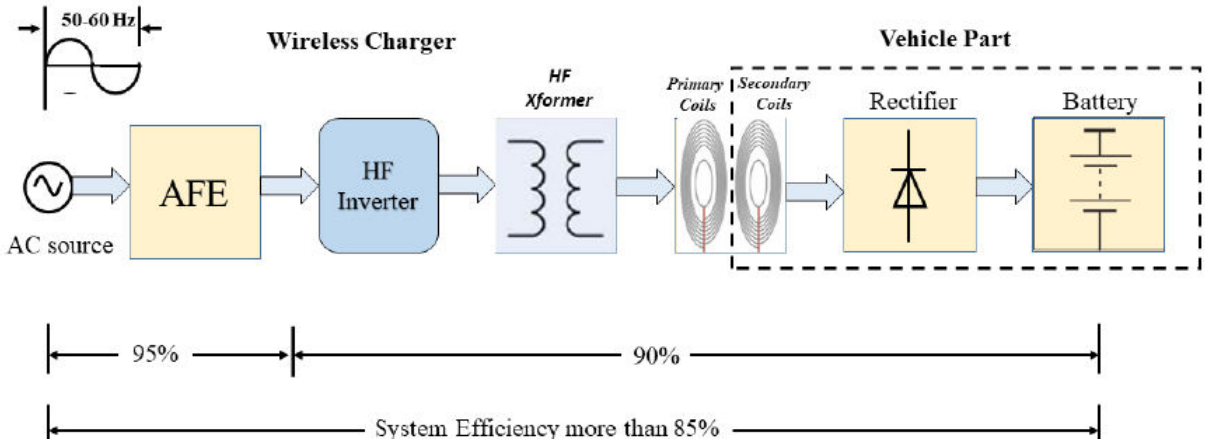

Fig.2 Block diagram of wireless charging

III. WORKING PRINCIPLE

A static wireless charging system for electric cars operates on the principle of inductive power transfer.The system consists of two primary components: the charging pad, also known as the ground pad, and the receiving pad, also known as the vehicle pad.The grid or a renewable energy system is the power source connected to the ground-mounted charging pad. On the underside of the electric car, directly over the charging station, is installed the receiving pad.When the two pads are close to one another, the charging pad produces an alternating magnetic field, which causes the receiving pad to experience an alternating current (AC). The receiver pad is then used to convert the AC to direct current (DC).

Transmitter system for charging an electric car's battery remotely. Three components make up this device: an AC signal generator (transmitter), a wireless power transfer coil (transmitter and receiver coil), and a receiver (which transforms the AC signal into DC voltage to charge an electric car's battery). The strategy is to provide a wireless power delivery system prototype in order to prevent energy loss and recharge an electric car's battery.

Receiver

In an electric vehicle (EV) static wireless charging system, the receiver is sometimes called the vehicle pad or receiver. The receiving pad, which is mounted on the underside of the EV, is in charge of taking in and transforming the alternating magnetic field produced by the ground pad into a direct current (DC) in order to charge the battery of the EV.

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Schematic Diagram

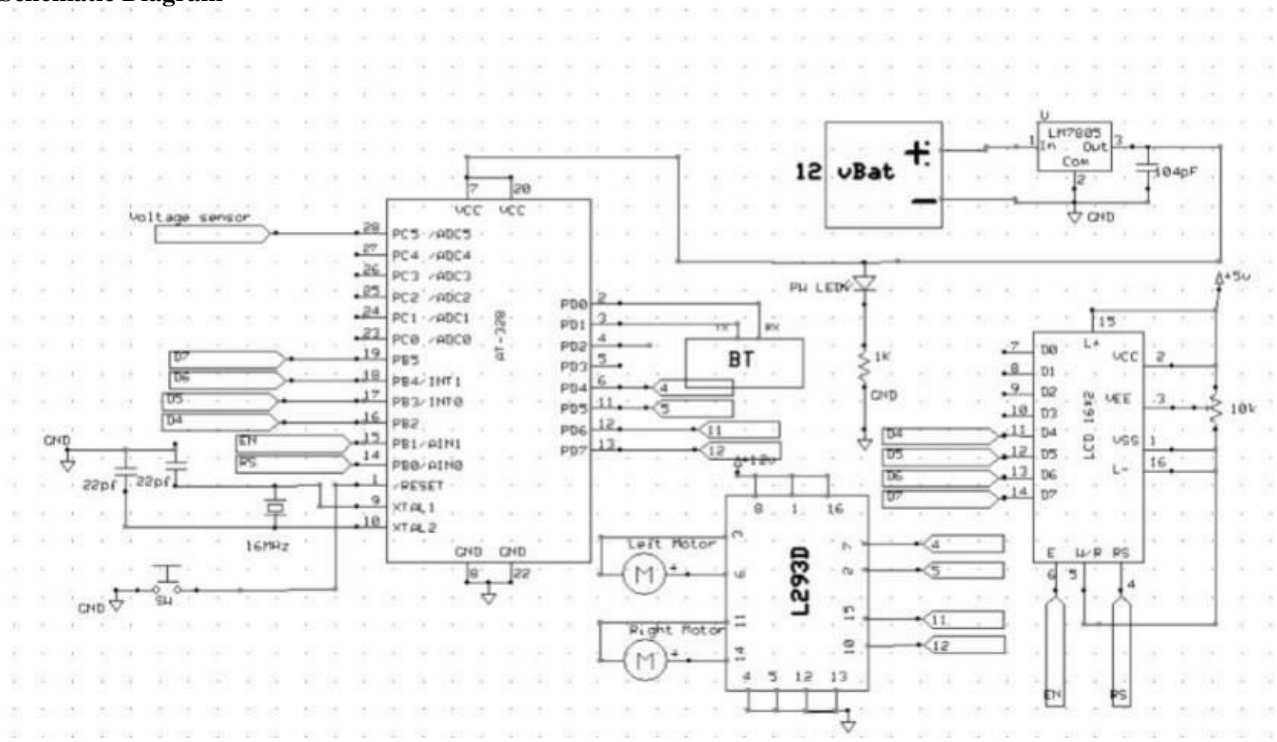

Fig.3 .Schematic diagram

IV. EXPERIMENTAL RESULTS

The Arduino Nano :microcontroller board is built around the ATmega328P microcontroller, which can run a wide range of programs and regulate a number of sensors and devices. Pin 30 on an unregulated external power supply, Pin 27 on a regulated external power supply, or Pin 6-B USB connections provide the power. This small board is simple to include into a range of electronic applications. Normally, pins are used to connect an LCD display to the Arduino Nano board in order to show data on it. Depending on the needs of the project, the display may be a graphical LCD or a character LCD. An electrical device known as a voltage regulator keeps its output voltage steady in the face of fluctuations in the input voltage or load. It is frequently used in electrical circuits to supply a steady DC voltage for powering different parts and appliances. IC7805 regulator, which steps down a high DC voltage to 5 DC. It can generally tolerate voltages between 7.2 and 35 volts.

Motor Drive : Autonomous robots usually employ an integrated circuit chip called a motor driver IC to control their motors. Motor driver integrated circuits (ICs) connect robotic motors to microprocessors. The most popular motor driver integrated circuits (ICs) are those in the L293 series, which includes the L293D, L293NE, and others. These ICs are designed to control two DC motors simultaneously. L293D is composed of two H-bridges. An H-bridge is the most basic circuit for controlling a motor with a low current rating. The motor driver IC in this tutorial will be simply called L293D. L293D has 16 pins.

LCDdisplay: :
Because LCDs have a parallel interface, controlling the display requires the microcontroller to simultaneously manipula te a large number of interface pins.The interface is composed of the following pins:a register select (RS) pin that contro ls the memory location of data written to the LCD.The LCD controller has two options: either use a data register, which holds the information displayed on the screen, or an instruction register, which is where it looks for instructions on wh at to do next.a pin that switches between reading and writing mode called Read/Write (R/W)An enable pin allows writi ng to the register's eight data pins (D0–D7). These pins' states (high or low) while writing to a register match the the values or fragments you are writing. For the 4-bit mode, the Arduino requires seven I/O pins; for www.ijcrt.org, it requires eleven. © 2023 The 8-bit form of the International Journal of Creative Research Thoughts (IJCRT) is available

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at www.ijcrt.org. Volume 11, Issue 5, May 2023 | ISSN: 2320-2882 IJCRT2305523. Since almost anything that displays text on the screen may be done in 4-bit format, the example shows how to control a 16x2 LCD.

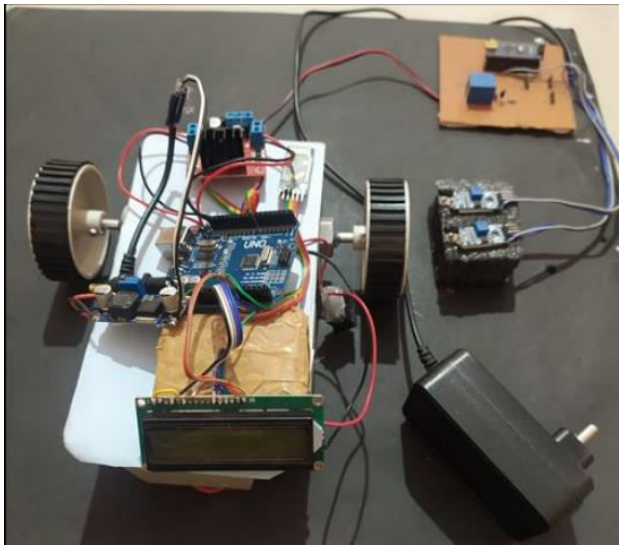

FIG 4– PHOTOGRAPH OF PROTOTYPE STATIC WIRELESS CHARGING SYSTEM FOR EV

Table 1 – Parameters

1	Transmitter coil voltage	12 V
2	Receiver coil voltage	10V
3	Distance between coils	6CM

V. CONCLUSION

For electric automobiles, a static wireless charging station has various advantages, including ease of use, security, and less environmental effect. Because the technique does not require wires or connectors, charging is easier and more effective. It also removes the need for handling cables by hand and lowers the chance of electrical shock. Additionally, as EVs have no tailpipe emissions, using wireless charging stations for them lowers greenhouse gas emissions and enhances air quality. Everyone benefits from a cleaner and healthier environment as a result of this. Voltage of transmitter coil: 12 V 10V is the voltage of the receiver coil. Six centimeters separates each coil. The mutual induction principle, which involves energy being wirelessly transferred from a transmitter coil to a receiver, is the foundation of the static wireless charging method for electric vehicles. Power transfer, process monitoring and management, and system disconnection after the battery is fully charged are all part of the charging process. All things considered, a static wireless charging system for EVs is a potential technological advancement for the transportation industry, providing an easy, effective, and environmentally friendly means of recharging electric cars. We measured the efficiency of magnetic resonance-based wireless EV charging across extended distances and discovered that it was 97.2% at a distance of 6 cm. After the battery is fully charged, the charging equipment is disconnected. All things considered, a static wireless charging system for EVs is a potential technological advancement for the transportation industry, providing an easy, effective, and environmentally friendly means of recharging electric cars.The effectiveness of magnetic resonance-based wireless EV charging over extended and we found the efficiency to be 97.2% for a distance of 6cm.

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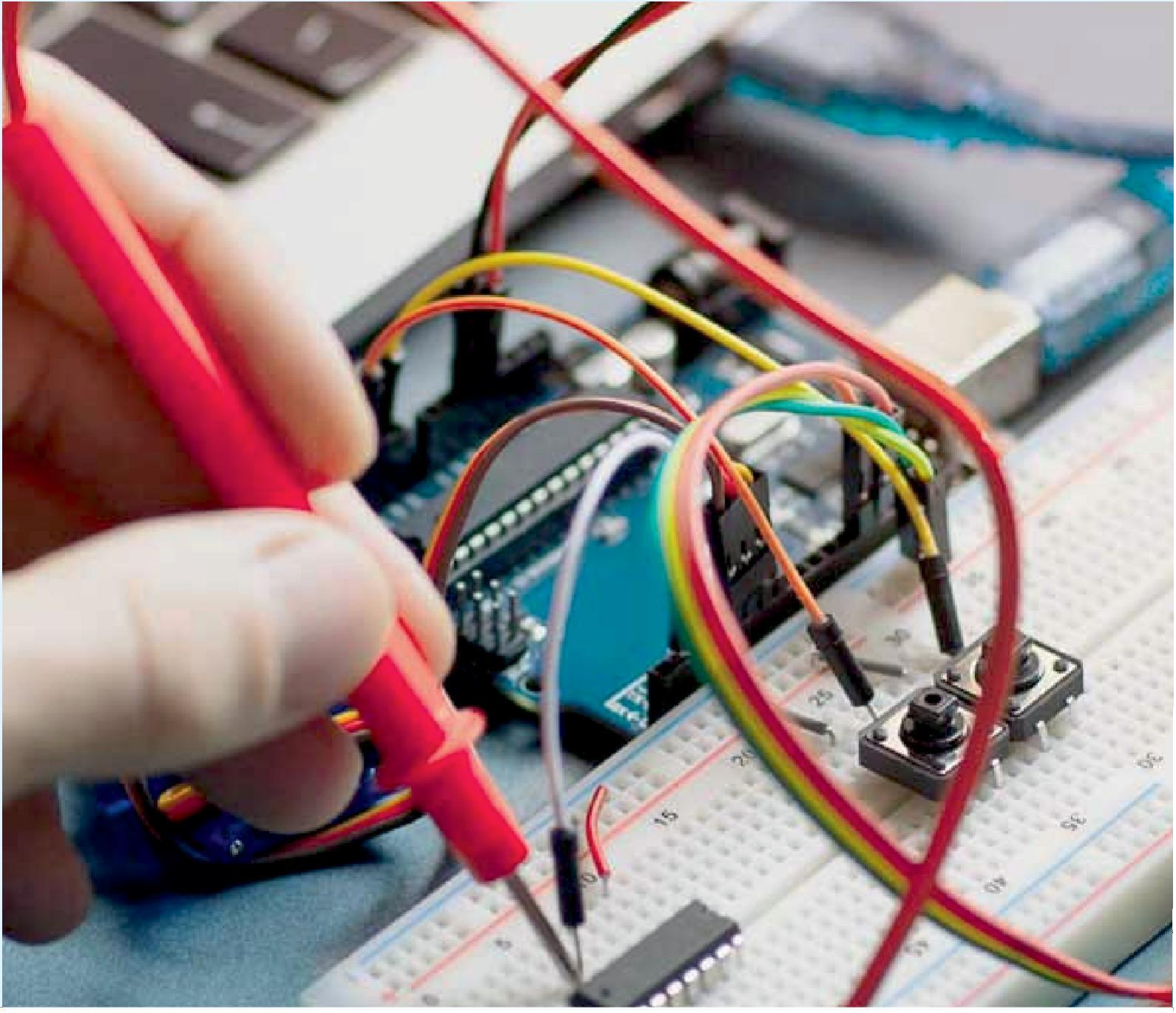

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