



SOLAR WIRELESS CHARGING SYSTEM FOR ELECTRIC VEHICLE USING TIMER CIRCUIT

B. T. Ramakrishna Rao, Associate Prof., Dept. of Electrical and Electronics Engineering, Vignan's Institute of Engineering for Women, Visakhapatnam.

G. Geethanjali², A. Siva Nirmitha², Ch. Jayasri², L. Saranya², T. Balajyothi².

²U.G Students, Dept. of Electrical and Electronics Engineering, Vignan's Institute of Engineering for Women, Visakhapatnam. e-mail: btrk Rao2002@gmail.com

ABSTRACT

Electric vehicles (EVs) are necessary due to the severely worsened environment of today. The government of India wants all cars to be electric by 2030. The main barrier to EV adoption is charging time, therefore fast charging and charging infrastructure are necessary to make EVs generally available. An essential part of this transformation is having a reliable charging infrastructure. Electric vehicle adoption will likely increase, which could cause severe instability in the current power grid. Technology for renewable energy is used in the "solar-based wireless EV charger" project. Solar energy is converted to electrical energy and then it gets charged. With renewable energy sources, a wireless charging system will be established.

KEYWORDS:

EV and their charging, Solar panel, Wireless charging system, Arduino.

INTRODUCTION

Electric vehicles will be the transportation of the future, with charging station efficiency being improved [3]. The market's desire for electric vehicles will be significantly increased by charging infrastructure; now, the main deterrent to buying an EV is the dearth of available charging stations. Utilizing renewable energy to shorten the charging time for portable EV chargers, we conducted research [5]. A hybrid power system is used in the vehicle battery charging station created in this study to provide a special service to road users who want to drive long distances in an electric car. Such customers cannot refuel their automobiles at any EV charging points that are located between highways [6]. The wireless EV charger is the best option for people who want to charge their electric vehicles. The development of smart systems depends heavily on microcontrollers because they act as the system's brain. Microcontrollers are now at the centre of the new technologies that are being introduced every day. A microcontroller is primarily a single-chip microprocessor that is ideal for automating and controlling machines and processes. For automating tasks to be completed specifically today, micro controllers are used in many different fields of life [9].

Electric Vehicles (EV) had a great deal of potential when they were first launched 120 years ago and were more widely used than gasoline-powered vehicles [8].

EV and their Charging

An EV is a shortened acronym for an electric vehicle. EVs are vehicles that are either partially or fully powered on electric power. Electric vehicles have low running costs as they have less moving parts for maintaining and are also very environmentally friendly as they use little or no fossil fuels (petrol or diesel). EV charging involves supply of direct current (DC) to the battery pack. As electricity distribution systems supply alternate current (AC) power, a converter is required to provide DC power to the battery. Conductive charging can be AC or DC. The combination of solar energy and electric vehicle (EV) charging is the key in drastically reducing our dependence on fossil fuels [5]. Electricity comes from a variety of sources and it's crucial that electric vehicles will be powered by renewables. Electric



cars are becoming immensely popular and coming years we expect nearly anyone who owns a solar energy system will install a solar charging station at its home. For this to happen we'll need a fundamental change in how we think about refueling our cars and a natural evolution of our energy infrastructure. Renewable energy must be used to power electric vehicles because electricity comes from many different sources. As the popularity of electric vehicles soars, we believe that almost everyone with a solar energy system will install a solar charging station at their residence in the coming years[4]. To make this happen, we must fundamentally alter the way we think about fueling our cars and allow our energy infrastructure to develop naturally.

Wireless power system

Wireless power transfer module (WPT): Battery charging with a charger and wire is difficult, risky, and expensive for electric vehicles. The current generation of gasoline- powered automobiles contributes to greenhouse gas emissions as well as air and noise pollution. the wireless battery charging solution for electric vehicles.

In this study, the inductive coupling method has been examined with regard to cars. It uses the transmitting circuit. This Wireless Power Transfer Module is simple to operate. Both a transmitter section and a receiver section make up this module.

A coil that serves as a transmitting and receiving antenna is present in both parts. Mobile phones and other small electronic devices can wirelessly charge using this gadget. It has a very compact form factor and is incredibly simple, effective, and inexpensive to use. It may be used to wirelessly charge your goods, making it totally sealed, dustproof, and waterproof, extending the life of your product.

Solar Panel:

Solar panels are equipment used to collect solar energy and transform it into power or heat. A solar panel is essentially a group of solar (or photovoltaic) cells that can produce electricity thanks to the photo voltaic effect. With the help of an internal electrical field within the cell, this energy generates electrical charges that move, which in turn causes electricity to flow. An environmentally friendly solar charging station is intended to ensure that automobiles are fully charged. This process converts solar energy to electricity and stores it in a battery bank. This particular sort of EV charging station will receive all (or some) of its power from solar energy.

PROPOSED SYSYTEM

Solar power has increasingly become popular over the past year. With its uncountable improvement and cost-effective ways, more and more people are opting to switch over to solar energy rather than their regular form of energy. Solar charging is based on the use of solar panels for converting light energy into electrical energy (DC). The DC voltage can be stored battery bank. There is Reverse charging protection circuit is provided for the backflow of energy from the battery to a solar panel. The transfer coil is located at charger side and receiver coil is placed on vehicle side[1]. A wireless power transfer module is used for transferring electric power which is generated from the solar panel to the Electric vehicle by using the principle of Electromagnetic Induction. The battery voltage will be measured by microcontroller & time taken to charge is showed on a 16x2 LCD. It will also display battery low status, when ever battery voltage falls below a certain level.

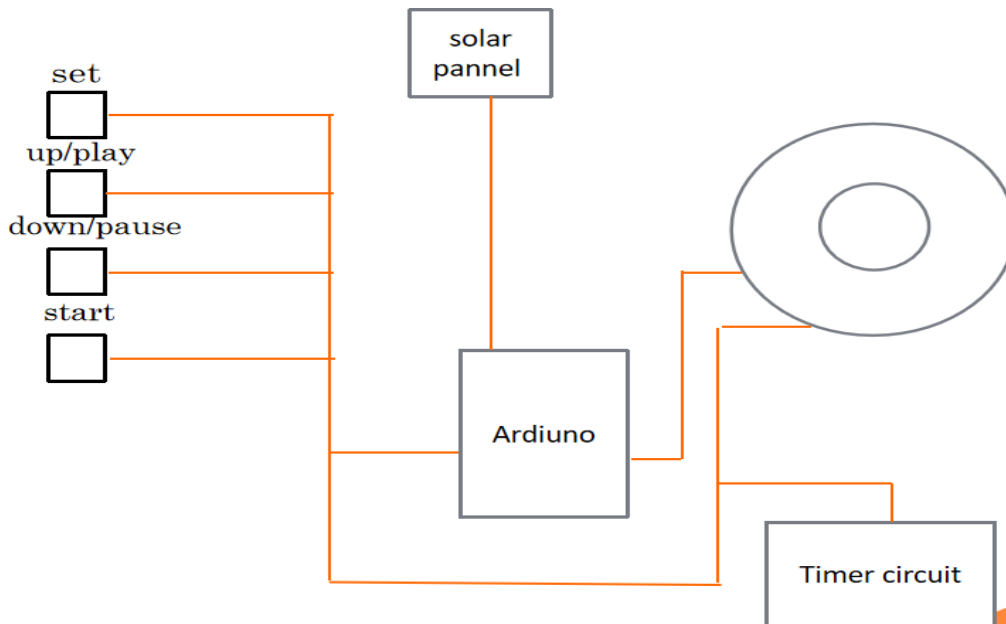
When a system is charged and a timer is set, the system continues to charge until the timer expires. When the timer reaches 0, which is displayed on an LCD display, the system automatically switches to the "OFF" position, meaning it will not charge any longer.

When the system is turned on, the relay is connected to the NC terminal. When the led indicates that the time is 0 or when the time has expired, the relay is attached to the normally open terminal, andthe charging process is stopped.

SPECIFICATIONS:

Microcontroller : AT mega328
 Operating Voltage : 5v Input Voltage (recommended) :7-12V
 Digital I/O Pins : 14(ofwhich6providePWMoutput)

BLOCK DIAGRAM:



Block diagram for solar wireless charging for EV system using timer circuit

OUTPUT

The push buttons are used to schedule the time charging for the electrical car, which is displayed on the 16*2 LCD. The potentiometer can be used to change the brightness of the liquid crystal display. Magnetic flux is produced in a phase splitter portion that consists of a transistor and a resistor. based on the magnetic coupling theory, which transmits flux from the primary coil to the secondary coil and vice versa by means of a magnetic field rather than a physical mechanical connection. The secondary coil's flux produces voltage, which in turn charges the battery of the electric car.

CONCLUSION

Any country's development must take transportation into consideration. The future of the transportation sector is the electric vehicle, though. The past ten years have seen a lot of research on this subject, but much more has to be discovered. Our project leads us to the conclusion that our team has created a wireless charging mechanism. The microprocessor measures the battery voltage and outputs the results to a 16x2 LCD. Inductive coupling technology has been utilized for wireless power transfer, however it is only practical for low power applications and in locations where the distance between the receiving and transmitting coils is close [6].

However, for practical applications, a greater distance should be put between the receiving and transmitting coils because to the high power consumption. Therefore, Magnetic Resonant Coupling technology is appropriate and suitable for this use. We also come to the conclusion that the wireless charging method takes longer to charge a battery than the other kinds of charging methods. The automation in wireless charging for electric vehicles is only a prototype in our project.

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