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WIRELESS CHARGING STATION FOR ELECTRIC VEHICLE

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Abstract- In upcoming day the availability of non-renewable sources should be decreasing so we can used the renewable source in the form of sunlight. The world population growing continuously that reason to increment the number of vehicle they can cause the more pollution to reduce this air pollution we can create the module, "ELECTRIC VEHICLE CHARGING STATION". The 75% of pollution will be created due to use of petroleum vehicle per year. The availability of non-renewable resources like, petrol, diesel will create a problem in our daily life style, therefore the vehicle manufactures will focus on production of electric vehicle. In this project we discuss the concept of transmission of electric power wirelessly using renewable source (solar panel). The transfer of power takes place by electromagnetic coupling. The solar panel convert light energy into electrical energy and is stored in battery. This energy passed to transmitter coil(primary coil) in the form of electromagnetic coupling with the receiver coil(secondary coil). In this two coili.e., primary and secondary coil the flux is produce and EMF is generated.

Keywords- Solar panel, Battery charger, Electric vehicle, RFID, Inductive power transfer

1. *INTRODUCTION*

We are living in 21st century so we fully dependent on a renewable sources like fossil fuel, which are more expensive and the availability of this source decreasing day by day. This conference will be fully based on the wireless transfer of an electric power. In wireless charging the generation of power should be eco-friendly, safe and non-hazards and to purchase this energy we can`t pay any type of fund to the government. On the basis of resonant magnetic coupling we can transfer the electric power to the electric vehicle. The inductive coil which is work as transformer. The construction in based on two inductive coili.e. transmitter coil (primary coil) and another is receiver coil (secondary coil) in which the electromagnetic coupling which can produces flux and EMFis generated. Then the power is passed wirelessly to the electric vehicle and the vehicle will charge.

2. PROPOSED WORKED

The basic principle of wireless charging is same as transformer working principle. There are the two coil is used that is the transmitter coil and receiver coil. The DC supply is converted into high frequency alternating current and this high frequency AC is supplied to transmitter coil. Then it creates alternating magnetic field that cuts the receiver coil and causes the production of AC power output in receiver coil. But the important thing for efficient wireless charging is to maintain the resonance frequency between transmitter and receiver coil. To maintain this resonant frequency between two coil i.e.transmitter coil and receiver coil. Then to maintain the resonant frequency compensation network is added at both sides. Then finally this power at receiver side fed to the battery for the charging. In this the arduinonano ATmega328 is a programmed for the radio frequency identification device [RFID] tag reader. When the radio frequency identification device [RFID] tag show to the reader then the reader send ID data to arduino. The ID data is compared with the stored ID in the program then it show timer on liquid crystal display [LCD] and then the relay will switch ON. When the relay is ON the charging transmitter coil is ON. Then the receiver coils gets energized and the electromagnetic flux will be produced and charging will start. For the demo we are using LED light on the receiver coil to see the signal is receiving from transmitter coil. When the timer is over the relay is OFF and the transmitter coil is OFF.

3. BLOCK DIAGRAM AND COMPONENT DETAIL

- Block Diagram

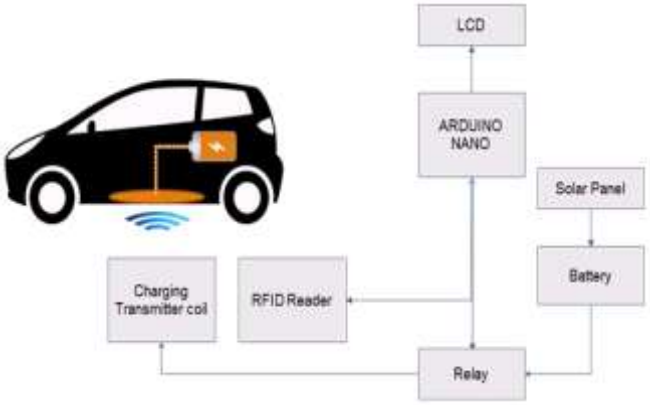


Fig.III.1. Block Diagram ofEV Charging Station.

A. Solar Panel

Photovoltaic (PV) cell is an electrical device that converts light energy into electrical energy.

Solar panel is suitable for 6V battery charging.

The solar panel DC output voltage is 5v and the output current is 100mA.

The maximum output power from this solar panel is 0.5W.

Fig. A. Solar Panel

B. Battery

The one or more electrochemical cell is combined together to form a device which is called as battery.

Electric power is supplied to battery its positive terminal iscathode and negative terminal is anode.

The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal.

A battery is a device consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones and electric cars.

C. Relay

By opening and closing it is a controlled device which can make ON/OFFan electrically operated switch is called as relay.

A relay which can consist set of input terminal for a single or a multiple control signal and set of operating contact terminal.

A relay may have any number of contact in multiple form that contact are make contact, break contact and combination contact.

The circuit can be controlled by relay which having low pass signal or one signal can controlled by several circuit.

The used of relay as a signal repeater along long distance telegraph, relay can receive signal from one circuit and transmitted to other circuit.

Fig. C. Relay

D. 2N2222 Transistor

2N2222 transistor is an NPN type transistor in which the collector and emitter will be left open i.e. reverse biased

When the base pinisheld at ground and will be remainin closedi.e., forward biased. When the signal is provided to base pin

It is common NPN bi-polar junction transistors used for general purpose low power amplifying is switching application.

Fig. D. 2N2222 Transistor

E. Arduino Nano

Arduino circuit board with arduino IDE are capable of reading analog or digital input signal from different sensor, activity the motor, turning LED ON/OFF and do many other such activities.

The arduino Nano is all the functionalities is performed by sending a set of instructions to the ATmega328 main microcontroller can the board via arduino IDE.

The arduino board also includes power USB, Voltage regulator, crystal oscillator, The voltage Pin (3.3v,5v,gnd,Vin),A0 to A5 analog pins ices pin, power led indicator, Tx& Rx led's , 14 digital input/output pins, Aref, and Arduino reset.

The arduino project started in 2003 as program.

F. LCD (Liquid Crystal Display)

LCD(Liquid crystal display)screen is an electronic display module and find wide range of applications.

A 16*2 LCD display is a very basic module that has two controllers into 16 pin device.

Easy to program with arduino IDE software single led backlight included can be dimmed easily with a resistor supply voltage is 5V.

The display is a 5*7 pixel are two resistor namely, command and data the command is stored the instruction and data is stored is display in LED.

The LCD is 16*2 is the 16 column and 2 rows. It works as the 4-bit and 8-bit mode. The availability of LCD display in colour are green and blue backlight.

The without backlight LCD is 1mA current consume.

Fig. F.Light Crystal Diode

G. RFID (Radio Frequency Identification Device)

Wireless non conduct use of radio frequency electromagnetic field to transfer data for the automatically identifying and tracking TAG attached to objects.

The tags contain electronically stored information. This RFID reader is a tiny, simple to use RFID reader module.With a built in antenna the only hold up is the 2mm pin spacing. Power the module, hold up a car and get a serial string output containing the unique ID of the card. It has TTL output.

Featuresof RFID module

Operating voltage 5V.

Reading distance 6-10cm (up to 100mm depending on TAG)

Read frequency 125 kHz

EM400164-bit RFID tag compatible

9600bps ASCII output

Size (L*W*H)-32*32*8mm

Current conjunction- 50mA<10Ma

The EM-18 RFID reader module operating at 125 KHz is an expensive solution for yourRFID based application.

The reader module comes with an on-chip antenna can be powered up with 5v power supply the power up module and connect the transmit pin of the module to receive pinof your microcontroller.

Show your card within the reading distance and the card number is thrown at the output optionally the module can be configured for also a weigand output.

Fig.G. Radio Frequency Identification Device

H. Inductive Coil

There are two types of coil present in inductive coil one is transmitter coil and another is receiver coil.

The electric current passing through primary coil, create the magnetic field is couple to secondary coil.

The primary coil act as a inductor, it can stored energy associated magnetic field.

The primary coil consist primary current is immediately interrupt, then magnetic field collapse rapidly, high voltage pulse is created is secondary coil due to electromagnetic induction. The distance between primary coil and secondary coil is 1.5mm.

Fig. H. Transmitter & Receiver Coil

I. Electric vehicle

The first electric vehicle produced by AMERICA in mid-19th century.

The electric vehicle can be recharge from external source of electricity.The number of electric vehicle increased from 2% of global share in 2016 to 22% in 2030.

The electric drive vehicle is based on one or multiple motor.

That is why the current generation has change to look at increasing global warming, pollution, natural resources and so on.

J. LED

A device which can produced light on electrical and electronics equipment.

LED is a semiconductor device.

It is a combination of electron and holes.

4. CONNECTION DIAGRAM AND DETAIL WITH FLOWCHART

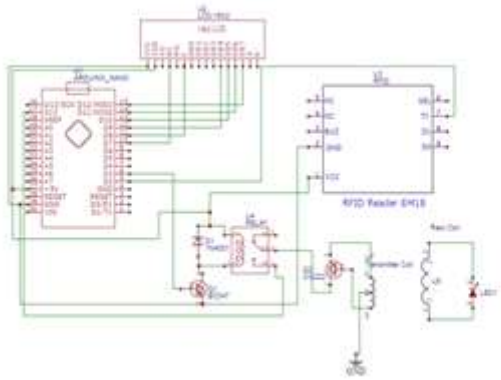


Fig. IV. Connection Diagram

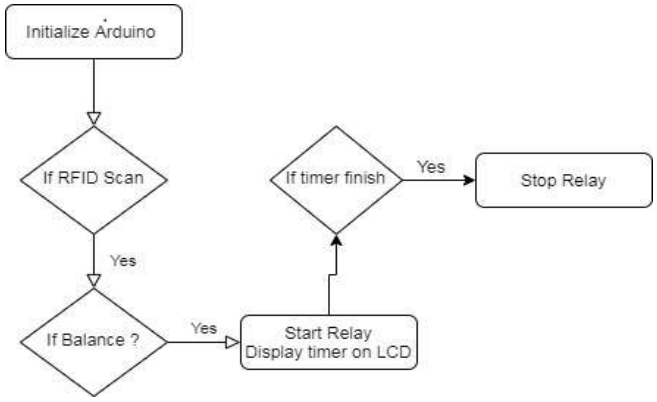
Arduino pin 12, 11, 10,9,8,7 is connected to LCD - RS E D4 D5 D6 D7.

Arduino pin 2 is connected to relay transistor BC547.

RFID EM18 receiver module Transmitter pin is connected to Arduino Receiver Pin.

Transmitter coil is centre tap 30 turns copper coil one end of coil is connected to Emitter of Transistor 2N2222 other end is connected to Base of Transistor and centre is connected to battery negative. The Collector is connected to Battery positive.

Flowchart



5. ADVANTAGE

It makes device more sufficient and thus desirable acquire by removing requirement for a power part chord a battery replacement.

Wireless charging offers no corrosion as the electronics are surrounded away from water or oxygen in the atmosphere.

Decrease of E-waste by reducing requirement of power chord.

6. CONCLUSION

Consideration of wireless electric vehicle battery charger operating the variable frequency control power supply the goal of project are the wireless transfer of electric vehicle that is inductive coupling.

The design of primary compensation is presented the coupling effect and dependent the secondary is quality factor of the primary and secondary resonant circuit.

The advantage of project is renewable energy in the form of solar energy.

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