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Smart Charging of EV by Magnetic Resonance Coupling With Dual Substantiation

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ABSTRACT: In this paper we have proposed a hybrid charging of electric vehicle and dual substantiation of electric vehicle. In future generation we are using electric vehicle, but the major drawback of electric vehicle is we are couldn't use for long driving range and it also takes more timing for charging of battery through charging cable. To overcome this drawback we are providing wireless power charging by magnetic resonance coupling and also the solar power charging with DC-DC Converter. This paper also gives importance to protection of electrical vehicle by dual substantiation. It is done by either biometric and keypad or RF reader and keypad if any burglary activities are takes place the message will be sent to user through GSM.

KEYWORDS: Battery, DC-DC converter, Biometric, Keypad, RF reader, GSM.

I.INTRODUCTION

In today world the technology development is increasing day by day and the people needs also. Nowadays the people needs individual vehicle for their own needs. So these increasing of vehicles which will make more pollution in environment. To overcome this in future generation we go for electrical vehicle. The ordinary fuel vehicle uses more fuels and emits CO₂ gases. It leads to air pollution and other greenhouse gases. These emissions are widely accepted as a trigger for global warming and legislation such as climate change. In one to two decades the fuel availability is less and it leads to increasing of cost of the fuel. The electric vehicles are not required oil or gas and it doesn't cause air and noise pollution. The electric vehicle is entirely charged by the electricity you provide. This car can be fuelled by very cheap prices. Electric vehicle 100% eco- friendly as they run on electrically powered engines and there is no need to lubricate the engines therefore maintenance cost of these cars has come down. It does not any toxic gases or smoke in the environment as it on clean energy source



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WIRELESS POWER CHARGING

The charging of electrical vehicle through the charging cable takes time for 4 to 5 hours. So we have to waste more time for recharging. To overcome this disadvantage we have to go wireless power charging. In this method the battery is charged by Magnetic resonance coupling. In this method we charge the battery within 1 to 1 and 1/2 hours.

SOLAR POWER CHARGING

The major problem of electrical vehicle is we cannot use this vehicle for long driving range. It runs only 50 to 100 miles and also we never have a charging station near to near for charging the electrical vehicle. So we are providing solar panel at the top roof of the electrical vehicle with DC to DC Converter. It maintains the amps rating is constant and increasing the Watts rating. So we can reduce number of arrays used in solar panel and the cost also reduces. It provides the electrical vehicle can run at long driving range.

DUAL SUBSTANTIATION

On the other hand the vehicle theft is also increased. This paper represents protection of vehicles against theft by using biometric, RF reader and keypad substantiation. When we are giving two authentications simultaneously then only the vehicle will be start. If any burglary activities are takes place the message will be sent to user through GSM. In existing system the vehicle will be accessed if give only one authentication only. In proposed system we give two authentications simultaneously so the security will be increased. In existing system the third person cannot access the vehicle but in proposed system the third person also access the vehicle with our knowledge by the help of keypad and RF reader.

II. PROPOSED SYSTEM BLOCK DIAGRAM OF TRANSMITTER

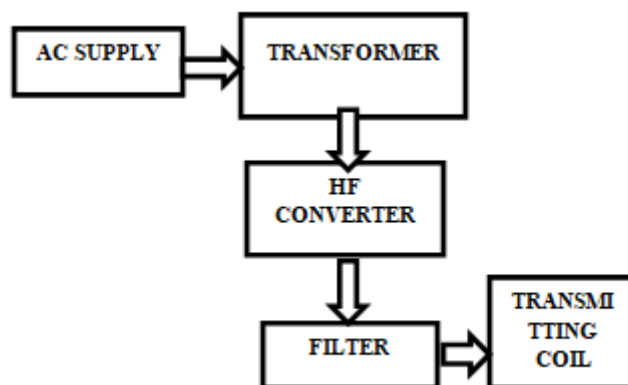


Figure 1: Block Diagram

The fig.1: block diagram explains about transmitter part of the system. The 230V/50HZ ac supply is given to the step down transformer. The step down transformer step downs the 230V ac into 12V ac. The 12V ac is given to HF converter, it increase the frequency range from 60 to 70HZ for efficient transfer of the power. The output of HF converter is given to filter to reduce the harmonics and output is given to transmitting coil.

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III. BLOCK DIAGRAM OF RECEIVER

The fig.2 explains about receiver of the system. The receiving coil receives the 12V ac from transmitting coil. The charging unit contains voltage regulator for converting 12V ac into 12V dc this 12V dc supply is charged to battery and the other hand the 12V dc supply is get from solar panel through dc-dc converter. The 12V dc supply from battery is given to the voltage regulator. In voltage regulator the 12V dc is split into 5V and 12V. The 5V dc is given to microcontroller. When we give either finger print and keypad substantiation or RF reader and keypad substantiation the relay will sense the substantiation and actuate the dc driver through microcontroller. The dc driver drives the dc motor. When any burglary activities are takes place the message will be send to user through GSM.

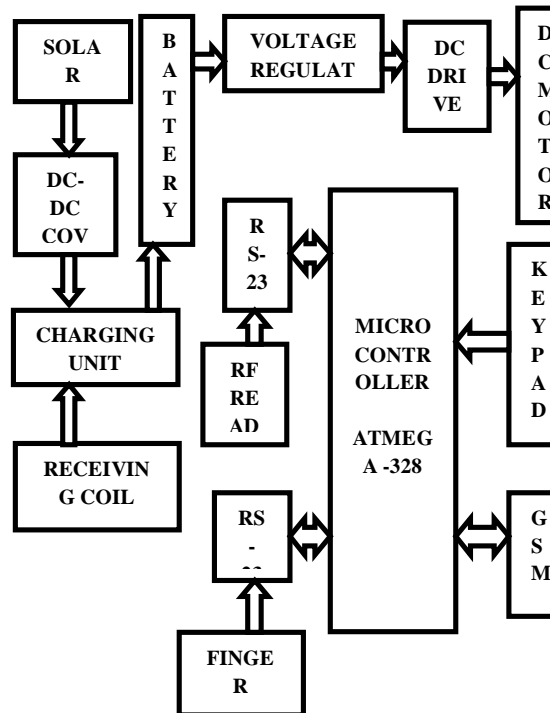


Figure 2: Block Diagram

The block diagram consists of following components

- Transformer
- Filter
- Solar panel
- Battery
- Voltage regulator
- Microcontroller
- Finger print
- RF Reader
- GSM



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A. TRANSFORMER



In this project we are using 230v/12v, 50HZ step transformer is used .The 230V, 50HZ ac supply is given to the transformer. It stepdowned to 12V and given to HF converter. The HF converter increases the frequency level up to 60-70HZ for to transmit the power efficiently.

B. FILTER

The 12V, 60HZ ac supply is given to the filter from HF converter. It reduces the harmonics and ripples. Here the 25 micro farad capacitor is act as a filter. The output from filter is given to transmitting coil. The power is transferred to receiving coil from transmitting coil. In the charging unit the 12V ac supply is converted to 12V dc supply and charge the battery.



C. SOLAR PANEL



In this project we are using 12V, 0.25A, 3W solar panel.Solar panel is composed of individual PV cells .This crystalline silicon panel has an aluminum frame and the glass on the front. Because compared to other type of PV panel it has high efficiency. The output is given to the DC-DC converter. This converter gives 12V, 3A supply to battery through charging unit.



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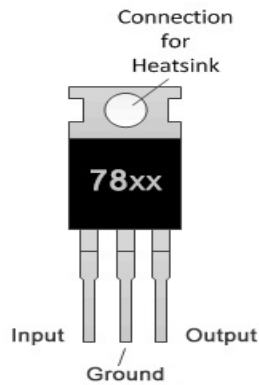
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D.BATTERY



We are using 12V, 5A lead-acid battery. It is an oldest type of rechargeable battery despite having a very low energy-weight ratio and a low energy –volume ratio. Its abilities to supply high surge current means that the cells have a relatively large power-weight ratio. These feature along with their low cost make them attractive for use in motor vehicle to provide the high current required by automobiles as they are inexpensive compared to new technologies.

E.VOLTAGE REGULATOR



Here we are using two types of voltage regulators are 7805 and 7812. The 12V from battery splitted into two voltages like 5V and 12V by voltage regulator. The 5V is given to the microcontroller and 12V is given to the DC driver to actuate the DC motor.

F.MICROCONTROLLER

Atmega328 IC





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The 5V from voltage regulator is given to microcontroller. In existing system the arduino-uno are used. It can be automatically off when high power supply is drawn. To overcome this disadvantage we are using atmega328 microcontroller in proposed system. It is basically an Advanced Virtual RISC (AVR) microcontroller. It supports data up to eight bits. It has 32KB internal built in memory. It has 1KB EEPROM .It consumes low power and it has 28 pins

G.FINGER PRINT



We are using finger print reader for vehicle authentication. When we are giving finger print and keypad authentication simultaneously the vehicle will be started. It is a first authentication for start the vehicle.

H.RF READER



In this project the radio frequency reader is used for authentication purpose. When we are giving keypad and RF reader authentication simultaneously the vehicle will be started. Through this the third person also accesses the vehicle with our knowledge. It is a second authentication for our vehicle. The relay will be sense the authentication and actuates the DC motor through DC driver.

F.GSM





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In this project we are using GSM (Global System Monitoring) for alerting purpose. If any burglary activities are takes place the message will be send to user through GSM.

IV.CONCLUSION

The main intent of tis paper is efficient charging of EV to provide long driving range and time saving by the use of magnetic resonance coupling and solar power charging. This paper also gives the equal importance for protection of vehicle by dual substantiation. This dual substantiation is either keypad and fingerprint or keypad and RF reader .It provides high security to vehicle and the third person also accesses the vehicle with our knowledge.

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