

# RFID Based EV Charging Station Using Renewable Energy Source

Miss. Nandini Beldar, Miss. Shravani Shinde, Prof. G. M. Kulkarni

Department of Electrical Engineering  
Guru Gobind Singh Polytechnic, Nashik, India

**Abstract:** *An electric vehicle is a new and upcoming technology in the transportation and power sector that have many benefits in terms of economic and environmental. A comprehensive review and evaluation of various types of electric vehicles and its associated equipment in particular battery charger and charging station is presented. A comparison is made on the commercial and prototype electric vehicles in terms of electric range, battery size, charger power and charging time. The various types of charging stations and standards used for charging electric vehicles have been outlined and the impact of electric vehicle.*

**Keywords:** electric vehicle

## I. INTRODUCTION

Energy in the form of electricity plays a very important role in our day to day life. Electricity is one of the greatest wonders of science. Next to man, it is the most important and revolutionary creation in this world of ours. The gradual but excessive use of electricity has come to bring about remarkable changes in industry. Computers as calculators sum up totals and make other calculations with the utmost accuracy. Newspapers and books are printed in millions overnight. There is not a single phase of human life that is not indebted to electricity for its progress. The modern age has, therefore, been truly called the “age of electricity.”

The infrastructure element that provides the crucial link between an Electric Vehicle charging on utility distribution system is also discussed. This project explains the system which is capable of automatically deducing the dispensed amount to charge a vehicle battery from user prepaid card (i.e., RFID card) and that deduced amount information and remaining balance of the card is send to the Google sheet of costumers laptop or mobile IOT technology and even that deduced amount information is send to the web server using Wi-Fi technology



(EV) with a depleted battery and the electrical source that will recharge those batteries is the Electric Vehicle Supply Equipment or EVSE. An electrical vehicle battery recharging system composed of photovoltaic solar panel connected to the electrical power grid. With the help of Solar panel, energy will be stored into the battery. Here we are providing RFID card to each customer with which customer can access petrol at the charging stations. Before using this card we have to recharge it like a prepaid card. Whenever we want to charge the vehicle battery, just we have to enter required amount and place the RFID card near the RFID reader. Then microcontroller reads the data from the RFID reader and performs the action according to the customer. This system also provides the security for the customers for vehicle battery charging at the EV charging stations by avoiding the involvement of human beings, so to avoid the risk of

carrying money every time and charge the battery on hours basis as well whenever required. All the data is display on OLED and saved in Google sheet. When vehicle is parked at the charging station, vehicle battery will be charged by charging station battery.

## II. BLOCK DIAGRAM

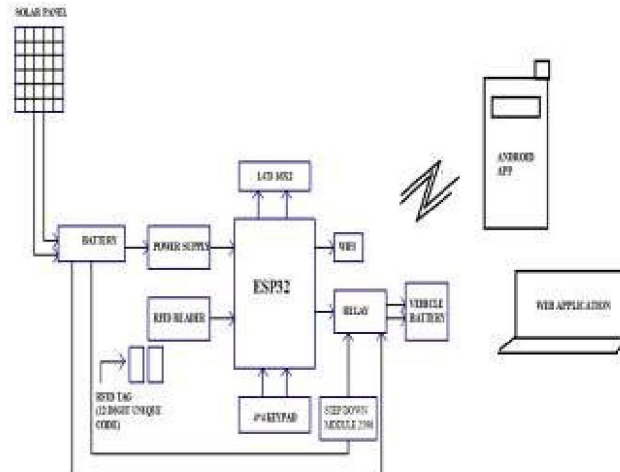


Figure2-Block diagram

## III. HARDWARE REQUIREMENTS

### ESP32 Microcontroller

This module is the ESP32 chip, which is designed to be scalable and adaptive. ESP32 integrates a rich set of peripherals, ranging from capacitive touch sensors, Hall sensors, low-noise sense amplifiers, SD card interface, Ethernet, high-speed SDIO/SPI, UART, and I<sup>2</sup>C.



Figure 3- HARDWARE REQUIREMENTS

### LCD 16X2



Figure4- LCD 16X2

It is 16 character by 2 line display has a very clear and high contrast white text upon a blue background/backlight. It also includes a serial I2C/IIC adaptor board pre-soldered to the back of the LCD

### Keypad

- This is a Low cost 4X4 Matrix Keypad with 16 Membrane Switches 4 x 4 Matrix Membrane Keypad
- 8 pin connector

- Adhesive mounting (sticker on the back side)
- Operation Temperature: 0 to +60 centigrade

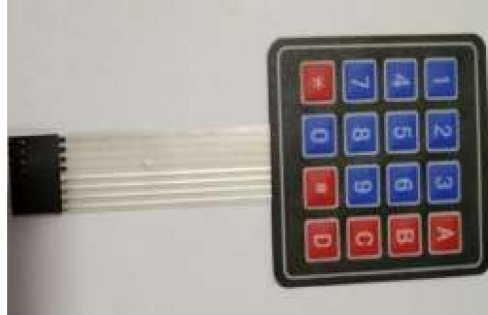


Figure- Keypad

### RFID Card

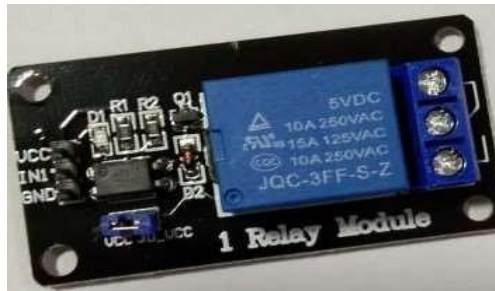


Figure- RFID Card

This basic RFID tag works in the 125kHz RF range and comes with a unique 32-bit ID. It is not re-programmable. This blank, smooth, and mildly flexible RFID tag, is ready for your logo.

### Relay

This relay board module can control both AC and DC appliances such as Solenoids, Motors, lights, fans, etc.

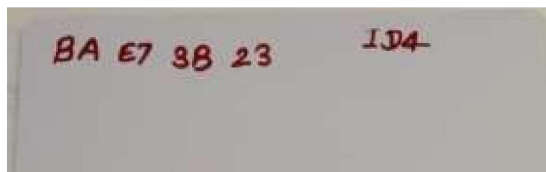


Figure-Relay

### RFID Reader

RFID is useful for sensing and identifying tagged people and objects for access control, automation, and a whole range of different applications.



Figure- RFID Reader

**IV. CIRCUIT CONNECTION**

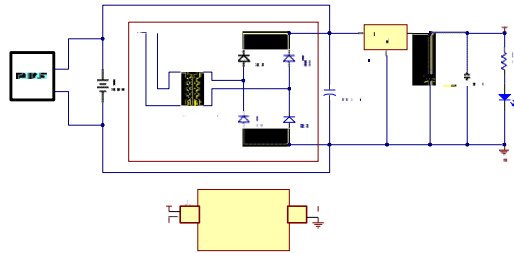


Figure - CIRCUIT CONNECTION

**V. MICROCONTROLLER DETAILS**

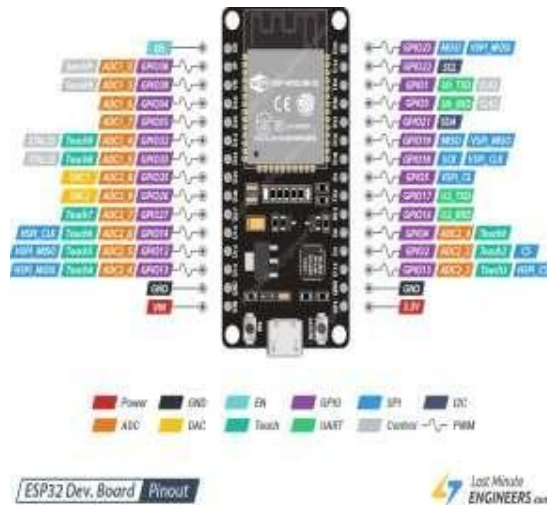


Figure- MICROCONTROLLER DETAILS

**VI. PROBLEM STATEMENT**

- Time required for charging the vehicle is more. Therefore charging station required large area.
- The related problems such as the vehicle routing problem(VRP) are being focus on.

**VII. OBJECTIVES**

- To provides a cost-efficient solution to identify and authorized vehicle.
- To avoid air pollution, noise pollution.
- To provide smart charging grid connection.
- To avoid theft.
- To use renewable energy source for energy consumption.
- To focus on increasing demand of Electric Vehicles (EV).
- To have simple and easiest way to charge the EV at various locations.
- To have customized support using RFID tags and keypad.

**VIII. CONCEPT**

An electrical vehicle battery recharging system composed of photovoltaic solar panel connected to the electrical power grid. With the help of Solar panel, energy will be stored into the battery. Here we are providing RFID card to each

customer with which customer can access petrol at the charging stations. Before using this card we have to recharge it like a prepaid card. Whenever we want to charge the vehicle battery, just we have to enter required amount and place the RFID card near the RFID reader. Then microcontroller reads the data from the RFID reader and performs the action according to the customer. This system also provides the security for the customers for vehicle battery charging at the EV charging stations by avoiding the involvement of human beings, so to avoid the risk of carrying money every time and charge the battery on hours basis as well whenever required. All the data is display on LCD and Android application, Web application. When vehicle is parked at the charging station, vehicle battery will be charged by charging station battery.

#### **IX. ADVANTAGES**

- Man Less.
- Charging Station Work 24 Hours.
- No Robbery Issues.

#### **X. DISADVANTAGES**

- At a time only one vehicle is charge because of one relay is used.

#### **XI. CONCLUSION**

Unda Standin IOT System For Interface RFID Card and ESP32 and undastanding the concept of IOT system.

#### **XII. FUTURE SCOPE**

- We Will Provide Multiple Charging System With The Help Of Multiple Relay.
- Also In Future We Can provide Fast & Slow Charging For Vehicle.
- In future We Can modify The Charging System By Using Wireless Charging.