

# “ELECTRIC CAR CHARGING STATION”: A REVIEW

Prof. P. S. Magdum<sup>1</sup>, Mrunal Sawant<sup>2</sup>, Mane Shraddha<sup>3</sup>, Sangar Shivani<sup>4</sup>, Kamble Sneha<sup>5</sup>, Patil Sumitra<sup>6</sup>

<sup>2,3,4,5,6</sup> Students, EEE Department, Sanjay Ghodawat Group of institutes, Kolhapur.

**Abstract** - A electric battery charging station (model) is designed in this paper, and its performance is analyzed subsequently. This paper also contain a brief summary of various electronic parts used for service of electric distribution network, and analysis of electric car industry growth hence charging of battery is shown using various voltage level and protection circuit.

**Key Words:** EV, HV, LV, LCD etc

## 1. INTRODUCTION

This is a modern age. In this age Electrical Vehicles (EV) are a recent technology that is seeking for its place in the market. It has several advantages, such as it's easy of use, saving of fuel and reduced greenhouse emissions. In future life, the demand for electric cars will be increased due to shortage of fossils fuels and also increasing pollution. Therefore demand for charging station will also increase.

## 2. CIRCUIT DIAGRAM

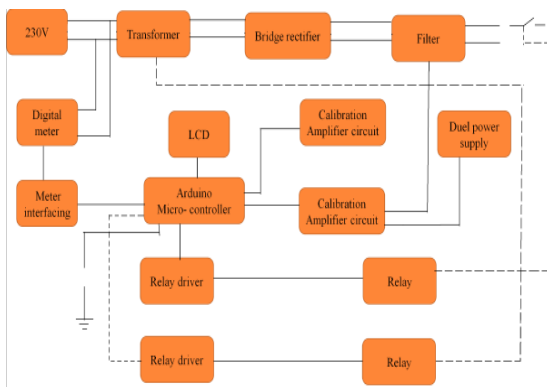


Fig.1

## 3. REQUIRED COMPONENTS

### 3.1 TRANSFORMER:

The transformer is a static device, which is used to convert the voltage level. The Step down transformer is used to converts 230V into 48V and current rating is 10A. The step-down transformer converts the high voltage (HV) from the primary side to the low voltage (LV) on the secondary side. This transformer type has number of applications in electronic devices and electrical systems. The step down transformer is used to provide this low voltage value for electronics components. It transforms (230/120 V) from

primary to a low voltage on the secondary side which is used for the electronic supplying. Transformer with higher operating frequency (KHz-Hz) are used if we use the high nominal power electronic device. For electronic devices higher nominal frequency of transformer value (50/60) becomes too large.

### 3.2 BRIDGE RECTIFIER:

The bridge rectifier is use to convert the AC supply into DC supply. The output of the step-down transformer is given to the rectifier circuit. The 57V AC supply is given to the bridge rectifier, this rectifier converts 57V AC supply into 51.31V DC supply, according to formula  $2v_m/\pi$ .

Output of this converts there are two tapings are provided which is 24V and 48V .which is actual use to charging the battery.

### 3.3 ARDUINO:

Arduino is an open source electronics platform based on easy to use hardware and software. It is easy to use, connects to computer via USB and communicates using standard serial protocol, runs in standalone mode and as interface connected to PC/Macintosh computers.

Arduino is great tool for developing interactive objects, taking inputs from a variety of switches or sensors and controlling variety of lights, motors and other outputs. Arduino project can be stand alone or they can be connected to computer USB. The arduino board is a microcontroller board, which is small circuit that contains a whole computer on a small chip. There are different versions of the arduino board. They are different in components, aim and size, etc. Some examples of arduino boards are: Arduino Diecimila.

### 3.4 DUAL POWER SUPPLY:

Arduino Duemilanove, freeduino, Arduino NG and lot more. Arduino schematics are distribute using an open licese so anyone is free to build his own arduino compatible board. The arduino name is registered trademark so you wan't to be able to call your hacked board arduino.

### 3.5 AMPLIFIER:

Amplifier means an electronic device for increasing the amplitude of electrical signals, used chiefly in sound reproduction. It has two types inverting and non-inverting

**amplifiers. It is two port electronic circuit which** is use to electric power to increase the amplitude of a signal applied signal . It has power gain greater than one.

The dual power supply is named because we get positive and negative 12V power supply at same time .They supply positive polarity(+Vcc) as well as (-Vcc) and ground potential. The main objective of the dual power supply is to convert 220V AC supply into +12V and -12V DC supply.

### 3.6 RELAY:

A relay is electrical operating switch. The current flowing through the coil of the relay which creates the magnetic field this attracts a lever and changes the positions of the switch contacts. The coil current can be on or off state therefor relays have two switch positions and they are double throw (changeover) switches. Relays provides signal to switch a second circuit which can be completely separate from the first one. For e.g. a low voltage battery circuit can use a relay to switch a 230V AC circuit. There is no electrical connection inside the relay in between the two circuits, magnetic and mechanical link is present

### 3.7 RELAY DRIVER:

A relay driver IC is an electro-magnetic switch that will be used whenever we want to us a low voltage circuit switch light bulb ON and OFF which is connected to 220V mains supply. While designing electronics projects the loads are controlled using microcontroller block. But, for this purpose the circuit requires relay is a acting as controlled switches.

### 3.8 BATTERY:

The Battery is a container which consisting of a one or more cells, in which chemical energy is converted into electricity and used as a source of power. In this project we are using lithium ion battery which is a type of rechargeable battery. In this battery the lithium ions move from negative electrode to the positive electrode during discharge and back when charging.

### 3.9 ENERGY METER:

An energy meter is a device which measures the amount of electrical energy consumed by consumer. Electricity utilities use electrical meters installed at customer's premises for billing purposes. They are typically calibrated in billing units, the most common one is the kilowatt hour (kWh).

### 3.10 SCR DIMMER:

The SCR dimmer is the most useful, static and popular method. A SCR is four-layer solid state device that controls current. The SCR dimmer in the normal "off" state, SCR restricts current to the leakage current. When the gate-

to-cathode voltage is exceeds a certain threshold, SCR turns "on" and conducts current.

### 3.11 BILLING:

In billing section for the charging percent some amount is fixed. The cost or billing is depend on the how much percent charging is done and this can be calculated by the unit displayed on energy meter.

### 3.12 16\*4 LCD:

We come across LCD displays everywhere around us. Now a days in the calculators, computers, televisions, mobile phones, digital watches use some types of display are to be used. The LCD is an electronic display which uses liquid crystal to produce a visible image. In 16\*4 LCD it contains 16 characters per line with four lines so it is called 16\*4 LCD.This is operated with the help of microcontroller.

## 4. CONCLUSION

Due to the increase in demand for private vehicles carbon emission is also increasing which leads to air pollution and global warming also demand of consumer for fossil fuel like petrol and diesel has increased. Therefore to overcome these problems alternative source name electricity is used to run the vehicles. Considering these points demand of electric vehicles increased and because of that demand of electric car charging station also increases.

## 5. REFERENCES:

1. Power up electric vehicles charging station (DC charging manual)
2. Bengner, R., Heyne, R., Haubrock, A., Beck, HP: Sustainable Fast Charging Stations for Electric Vehicles. In 5th, International Renewable Energy Storage Conference (IRES 2010), Berlin, Germany.
3. <http://www.hybrid.cz/clanky/rychlonaobjeci-stanice-pro-elektromobily>
4. <http://www.mvcr.cz/clanek/centralni-registr-vozidel-865510.aspx><https://circuitdigest.com/electronic-circuits/12v-dual-power-supply-circuit>
5. [https://www.electronicstutorials.ws/diode/diode\\_6.html](https://www.electronicstutorials.ws/diode/diode_6.html)
6. <https://circuitglobe.com/energy-meter.html>
7. <https://en.wikipedia.org/wiki/Amplifier>
8. <https://en.wikipedia.org/wiki/Relay>
9. <https://www.winstar.com.tw/products/character-lcd-display-module/lcd-16x4.html>