International Research Journal of Engineering and Management Studies (IRJEMS)
Volume: 03 Issue: 03 | March -2019 e-ISSN: 2395-0126

Electric Car Charging Station On Roadside

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Abstract- Electrical Vehicles are becoming increasingly popular in United States Of America. This paper presents a comprehensive analysis of EV charging station usage at the University of Georgia (UGA) in Athens, Georgia. Three Charge Point EV charging stations at UGA were used to collect data about each of 3204 charging events that occurred from 10 April 2014 to 20 June 2017.

Key Words - Slow charging, Fast charging, Multiple charging.

I. INTRODUCTION

India is one of the top ten automotive markets in the world today and having highly increasing middle class population with buying potential and the steady economic growth. But petrol price has increased more than 50% in 13 different steps in last two years. Here comes the potential need for alternative technologies in automobiles such as electric vehicles (EV) in India.

II.LITERATURE REVIEW

- Currently in India, the Bharat EV AC Charger (BEVC-AC001) for AC charging with less than 3.3 KV power rating and Bharat EV DC charger (BEVC-DC001) with less than 15KW Power rating are expected to notify for both 48V and 72V charging system.
- Hence growth of charging infrastructure is lagging because of undefined standards.
- Meanwhile the Automative Research Authority Of India (ARAI) also published AIS138 part 1 (Electric Vehicle Conductive Charging System) AC Charging standard in May-2017and the AIS138 part 2 DC charging standards is still in drafts stage.
- At present the EV Charging Station are installed in Delhi, Mumbai and Pune.

III.DESCRIPTION

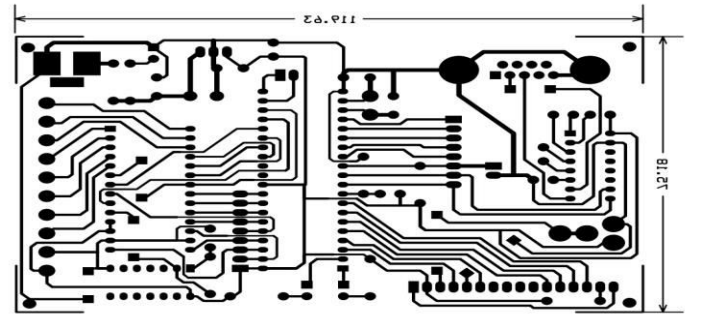

Fig.1 PCB Layout & circuit diagram

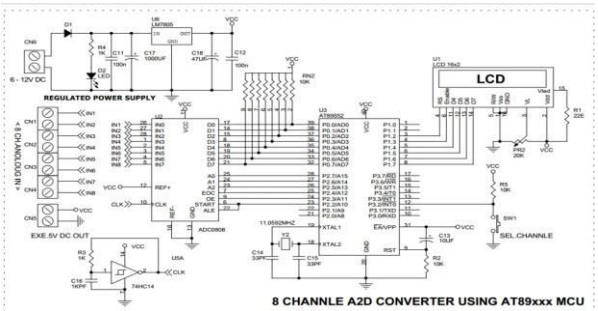

Fig.2 MICRO CONTROLLER 8051 -

One of the most important applications of MICRO control is to control voltage and maintain it to desired value current. In order to meet the desgine application one must employ certain control charging. The MC8051 series of three terminal positive regulateres are available in the TO-220/D-PAK package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indeustructuible .If adequate heat sinking is provided ,they can deliver over 1A output current. Although designed primarily as fixed voltage regulators ,these devices can be used with external components to obtain adjustable voltages and currents.

TABLE 1. energy sampling intensity in terms of charging electrical vehicles in selected categories for a singal driving cycle

Category of vehicle	Stored energy of the vehicle (range 120 km)	Charging current		
		T=8 hours	T=4 hours	T=0.5 hours
A	13.3 k Wh	5.1A	10.2A	81.6A
B	30.0 kWh	10.2A	20.4A	163.2A
C	41.1 kwh	14.2A	28.4A	227.2A

In similar way, was calculated charging current for the stored energy and the expected nominal voltage of 350V battery, for three different charging times. These times have been sat probable modes.

- T=8 hours – long term (e.g night) charging electric vehicles by low current at full capacity battery,
- T=4 hours – charging electrical vehicle during the day (e.g a vehicle parked during working hours around lunch breaks or business meetings),
- T=0.5 hours – so called fast charging during as long journey stops.

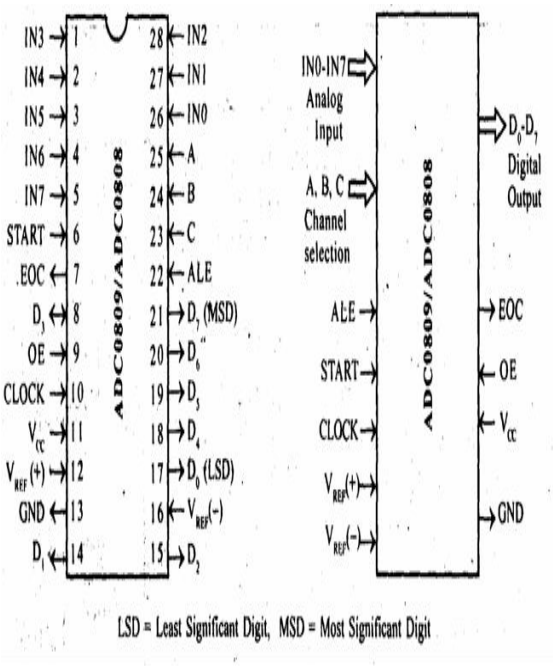

Fig.3 Micro Controller

Method 1: Trial and Error

Trial and error method is fundamental method of problem solving. Closed loop system is important for trial and error method. In This method first find the rough solution to get best response. Transformer have four out put at 12v,24v,36v,and 48v. At starting, the transformer is set at particular value zero. The component of proportional is considered as to be increasing its value till a steady oscillation is not obtained. Second step is selecting voltage level by Bluetooth or manually, first set the voltage at 48v,at 7A current for slow charging .charging done into six to eight hour period. Similarly step by step we set the voltage and current and we get the result as showen in below table2

TABLE-2
Results of fast and slow charging

- Slow Charging - 5A

Battery Capacity	Current	Charging time (in hour)
12V/24V/36V/48V - 7AH	5A	1.4 hours
12V/24V/36V/48V - 8AH	5A	1.6 hours
12V/24V/36V/48V - 10AH	5A	2 hours
12V/24V/36V/48V - 20AH	5A	4 hours

- Fast Charging

Battery Capacity	Current	Charging Time (in hour)
12V/24V/36V/48V – 7AH	10A	0.7(42min)
12V/24V/36V/48V -8AH	10A	0.8(48min)
12V/24V/36V/48V -10AH	10A	1 hours
12V/24V/36V/48V -20AH	10A	2 hours

- Error

For fast charging ,charging component more hitting due to during charging time charging current is more, therefore power loss is more .

CONCLUSIONS

The project deals with multiple charging station for electric vehicles in the event of mass deployment. These type of charging stations is not used by us, so it's no experience of operation & impact on power grid. The purpose is to get multiple charging station which is equilibrium, the opportunities and need of daily load diagram at site. One important result of this project analysis is to obtain output voltage of 12v, 24v, 36v, & 48v DC up to 10 Amp respectively. For 1st project phase we have designed the circuit for 12v & 24v DC up to 3Amp respectively. The further charger is designed for likely to be implemented as soon as possible to overcome the objective need of our project.

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