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Electric Vehicle Charging System

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ABSTRACT

Electric vehicles are a new and upcoming technology in the transportation and power sector that have many benefits in terms of economic and environmental. This study presents a comprehensive review and evaluation of various types of electric vehicles and its associated equipment in particular battery charger and charging station. 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 charging on utility distribution system is also discussed. In this project, vehicle charger is designed for 12V sealed lead-acid batteries. With the lack of centralized power grids, lead acid batteries have taken the place of one of the main energy sources available in developing countries. With this in mind, our objective was to design a cheap, versatile and efficient lead acid car battery charger which will interest and appeal to the "cost-minded" customer. Lead-acid batteries are finding considerable use as both primary and backup power sources. For complete battery utilization, the charger circuit must charge the battery to full capacity, while minimizing over-charging for extended battery life. In our circuit we have used a voltage regulator and comparator to regulate the voltage supply to the battery for effective charging.

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I. INTRODUCTION

A vehicle battery charger is a device used to put energy into a cell or (rechargeable) battery by forcing an electric current through it. Lead-acid battery chargers typically have two tasks to accomplish. The first is to restore capacity, often as quickly as practical. The second is to maintain capacity by compensating for self discharge. In both instances optimum operation requires accurate sensing of battery voltage. When a typical lead-acid cell is charged, lead sulphate is converted to lead on the battery's negative plate and lead dioxide on the positive plate. Over-charge reactions begin when the majority of lead sulphate has been converted, typically resulting in the generation of hydrogen and oxygen gas. At moderate charge rates, most of the hydrogen and oxygen will recombine in sealed batteries. In unsealed batteries however, dehydration will occur.

The onset of over-charge can be detected by monitoring battery voltage. The figure on the next page shows battery voltage verses percent of previous discharge capacity returned at various charge rates. Over charge reactions are indicated by the sharp rise in cell voltage. The point at which over-charge reactions begin is dependent on charge rate, and as charge rate is increased, the percentage of returned capacity at the onset of over-charge diminishes. For overcharge to coincide with 100% return of capacity, the charge rate must typically be less than C/100 (1/100 amps of its amp- hour capacity). At high charge rates, controlled over-charging is typically as quickly as possible. To maintain capacity on a fully charged battery, a constant voltage is applied. The voltage must be high enough to compensate for self discharge, yet not too high as to cause excessive over-charging.

II. LITERATURE SURVEY

Seyed Mohsen HOSEINI, Seyed Mohammad SADEGHZADEH2 The applications of AC/DC switch-mode converters, such as computer power supplies, battery chargers, and other electronic equipment, are rapidly growing and result in some power quality problems. This equipment consists of semiconductor devices that show nonlinear behavior and work at high frequencies. Thus, these devices inject many harmonic disturbances into the network and reduce the power factor. In order to meet the current harmonic limitation standards, such as IEC 1000-3-2

in Europe and IEEE 519 in the United States, many power factor correction methods in switch-mode power supplies have been explored .

Elsevier B.V. LED lamps controlled by AC–DC converter, without using a current sensor. Only two ADCs are used for measuring the input and output voltages. This technique achieves isolation between power circuit and controller; it can be implemented by using a zero-crossing processing, which has a greater accuracy than other techniques.

P. L. Gawade1, A .N. Jadhav2, T. B. Mohite-Patil, Supply of controlled Electric power is the heart of industry. Conversion efficiency and control techniques are the most important aspects of converters. The solid state ac-dc converters and dc – dc converters are used in uninterrupted power supplies (UPS), switch mode power supplies (SMPS), battery chargers, power supplies for telecommunication systems, and test equipments etc.

III. METHODOLOGY

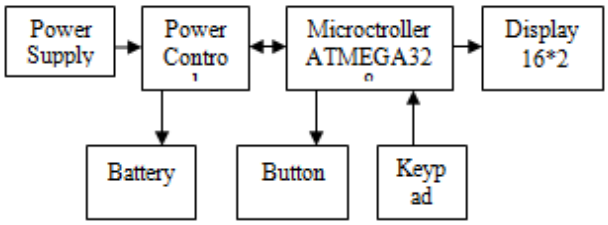

Fig. block diagram

The working of System:
1. Power supply is a device that supplies electrical energy to one or more electric loads.
2. The term is most commonly applied to devices that convert one form of electrical energy to another, though it may also refer to devices that convert another form of energy (e.g., mechanical, chemical, solar) to electrical energy
3. Simplest supply is a dc battery. It is not an ideal one as its terminal voltage changes in accordance with load due to its internal resistance.
4. Electronic components require a DC supply that is well regulated, has low noise characteristics and provides a fast response to load changes.
5. In this report we will see how to use such special purpose voltage regulator IC`s to construct stable power supplies.

IV. CONCLUSION

A simple lead acid battery charger system was designed successfully. The proposed charger can work in constant voltage or constant current mode although constant voltage mode is the most preferred. The battery charger has many advantages like successful 3-stage charging, over charge protection, battery discharge protection and a simple design. However the battery charger would be difficult to operate in hotter temperatures. Further we can improve the heatsink to dissipate the heat better and also indicators can be designed to indicate bulk charge and float charge states.

V. REFERENCES

[1] Dick White., Roger Doering, Electrical Engineering Uncovered Prentice Hall, NewJersey, 2001

[2] Jmaes W. Nilsson, Susan A. Riedel, Electric Circuits, International Edition, 2005

[3] Seyed Mohsen HOSEINI, Seyed Mohammad SADEGHZADEH2,A new method for active power factor correction using a dual-purpose inverter in a flyback converter,2015

[4]BatteryMart:http://www.batterymart.com/battery.mv?p=ACC-12103

[5] http://www.mpoweruk.com/leadacid.htm

