

Prototype Electric Vehicle Charging Station

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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. A comparison is made in terms of electric range, battery size, charger power and charging time. The proposed system in this paper purely man less and fully automatic. Here, included a microcontroller ATMEGA 328P-PU which is heart of system. A 20X4 LCD screen is used as human machine interface. The system has current and voltage sensor to show/calculate power outlet. Membrane keypad help the user to input data into system. also included card swipe facility and the RFID tag input for faster login into the system. for demonstration purpose one electric car along with AC to DC SMPS, BMS (Battery Management System) and 3S li-ion battery pack and voltmeter.

Keywords- ATMEGA 328P-PU, 20X 4 LCD screen, Membrane keypad, RFID tag, SMPS, BMS.

I. INTRODUCTION

Electricity is the most suitable energy carrier for transportation in the next 30 years when considering risk, emissions, availability, maintainability, efficiency and reliability. Electric drive vehicles are very attractive due to low road emissions, can potentially strengthen the power system by providing ancillary services; have a lower operating cost compared to fossil fuels and are more energy efficient. Now days the Electric vehicles are growing and there is a need such charging station which have all standardization to charge them. now days the charging station are assemble at various places like domestic charger at residential area, off-street and robust charger at commercial and office area and rapid charger at strategic location. Most rechargeable EVs and equipment can be charged from a domestic wall socket.

II. SYSTEM COMPONENT

Transformer: It is a static device which transfer the power from one side to another side without change in the frequency. it have two coil primary and secondary. It used to step up or step down down the input supply according to application.

Voltage Regulator: The voltage regulator is a device which gives the fix DC voltage at its output terminals according to the rating of it. 7805 and 7812 are the examples voltage regulator which gives 5v and 12 DC voltage.

Rectifier: Rectifier is device which converts the AC input voltage into pulsating DC voltage. Here Bridge rectifier are used for this application. There are four bridge silicon diodes are connected. Filter circuit is also used to remove the AC substance.

ATMEGA328P-PU Microcontroller: This is a general purpose CMOS 8bit, 4K bite programmable. It have also 128 byte RAM. It is use for perform the various task processing and controlling.

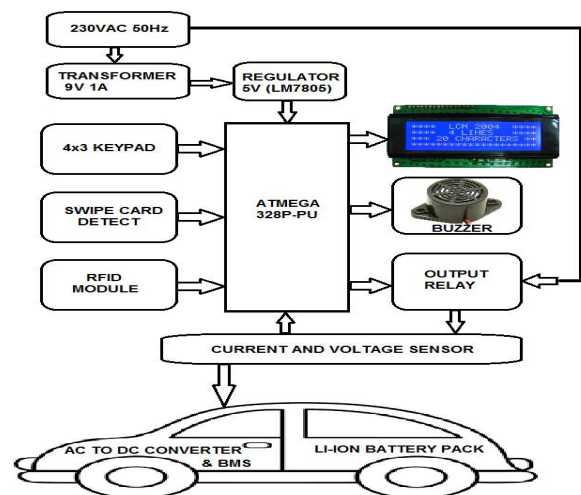


Fig. 1 EV Charging Station

RFID:RFID is an acronym for “radio-frequency identification” and refers to a technology whereby digital data encoded in RFID tags or smart labels (defined below) are captured by a reader via radio waves. RFID is similar to bar-coding in that data from a tag or label are captured by a device that stores the data in a database. RFID, however, has several advantages over systems that use barcode asset tracking software. The most notable is that RFID tag data can be read outside the line-of-sight, whereas barcodes must be aligned with an optical scanner.



Fig. RFID Model

4X3 Keypad: A keypad is a set of buttons arranged in a block or "pad" which bear digits, symbols or alphabetical letters. Pads mostly containing numbers are called a numeric keypad. Numeric keypads are found on alphanumeric keyboards and on other devices which require mainly numeric input such as calculators, push-button telephones, vending machines, ATMs, Point of Sale devices, combination locks, and digital door locks.

III. WORKING OF CHARGING SYSTEM

As shown in Fig. 1, 230V AC supply are taken from the any substation distribution system. This supply is fed to Step down Transformer which convert it into 9V, 1Ampere. Here LM7805 Voltage regulator connected next of the Transformer which gives 5 volt regulated voltage supply to ATMEGA328 Microcontroller. 4*3 Keypad is a numeric pad to gives the input to microcontroller. Swipe card detector is use for digital payment process. it gives the information to microcontroller. RFID works on inventory management, Asset tracking, ID budging. The Display is connected to the controller for showing necessary data for humans. after that through the output relay by the appropriate voltage and current ration, the supply are give to Electric Vehicle to charge it.

IV. CONCLUSION

This paper shows how to implement the Electric vehicle Charging station for charge the all type vehicles. The proposed system is capable to charge different type of vehicles at a time. Some advance features is also included which make it capable to deliver the power supply which is neat and clean, less costly. This charging station model is developed under the various standards related manufacture and build contraction, various electric components. This charging system can be make more efficient and powerful in future by using advanced technologies also.

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